

CONTENT

Underground mining

- Begalinov A.B., Serdaliev E.T., Almenov T.M.** VARIOUS WAYS TO IMPROVE THE QUALITY AND EFFECT OF USING SPUTTERING CONCRETE IN THE UNDERGROUND **5**
- The present article is given the results of researches on perfection of technology concrete spatter support with construction of underground structures the factors influencing to durability and quality concrete spatter are considered, the prospects of application polimerconcrete of structures concrete spatter of fastening of underground structures are certain (determined).*
- Key words: composition of concrete, polymer-cement sputtering concrete, fasten by sputtering concrete.*
- Eremenko A.A., Eremenko V.A., Doev R.A., Kovrygin O.A.** TECHNOLOGY OF CONDUCTING CLEARING WORKS AT WORKING OFF THE SECURITY IT IS WHOLE ON Rockburst-Hazardous THE DEPOSIT **10**
- A new technology of ore extraction from protective pillars left under shafts, rivers, etc is proposed, and technological ore recovery schemes for a rockburst-hazardous orebody are established for the period from 2010 through 2020.*
- Key words: technology, treatment works, protective pillars, blocks, a system developed-processing.*
- Eremenko V.A., Razumov E.A., Zayatdinov D.F., Pozolotin A.S., Prokhvatilov S.A., Krasilov, S.Yu.** IMPROVING THE TWO-TIER TECHNOLOGY ANCHORAGE BROAD MATE OF MINE WORKINGS..... **20**
- On the basis of the methodical calculations and experimental research the two-level scheme anchorage to effectively support a broad pairing development workings, providing safety of mining works.*
- Key words: mine, tension timbering, the preparatory work mate, roofing work.*
- Kozyrev A.A., Semenova I.E., Zemtsovskiy A.V.** DETERMINATION OF SAFETY PARAMETERS OF NEAR-SURFACE PILLAR FOR UNDERGROUND MINING OF PERSPECTIVE PARTOMCHORR DEPOSIT IN HIBINY MASSIF ... **30**
- Perspective Partomchorr deposit is located near the Simboserskiy preserve, so there is a necessity to reduce influence of excavation of apatite-nepheline ore by underground mining on environment and to keep surface initial state. Prediction of changes in stress strain state due to excavation is carried out for choosing mining method of the Partomchorr deposit. Three-dimensional computations are carried out by finite element method with Sigma3D software which was developed in Mining institute of the Kola Science Centre. The results of stress strain state simulation of the Partomchorr deposit with different mining methods are presented in this article. The analysis of tensile strain distribution in underworked rock mass is also presented. The safety parameters of near-surface pillar and room-and-pillar method are established.*
- Key words: geomechanics, numerical simulation of stress strain state, pillar stability, rock strength, substantiation of mining method parameters.*
- Maslennikov S.A.** TECHNOLOGY OF FASTENING SKIP SHAFT MINE «MIR»... **40**
- The technology of fastening of vertical shaft applied in difficult conditions using iron-concrete lining is offered, allowing to use concrete with the raised module of deformation.*
- Key words: vertical shaft, iron-concrete lining, technology of fastening.*

- Ruchkin V.I.** THE MOVEMENT ROCK OF WORKING OFF OF THE SOUTH-ERN ARE DEPOSIT OF PESCHANSKY GROUP OF DEPOSITS **45**
In article the analysis of analytical calculation and an actual condition of development is resulted movement a file of rock of working off of blind isolated ore deposit new ways of the decision of the given problem are offered
Key words: process movements, the ore body, intense condition.
- Open mining works**
- Van-Van-E A.P.** AN ANALYTICAL METHOD FOR GOLD RESOURCES ESTIMA-TION IN THE KHABAROVSKI KRAI TECHNOGENE PLACER DEPOSITS **49**
In the article methods are substantiated for technogene deposits gold resources cal-culation, based on the geological survey and exploitation data multifactor analysis carried out with respect to a specific placer deposit. Basic calculation indices in methods are primary reserves, exploration and development losses, productivity. Also basic calculations have been carried out concerning comprehensively sur-veyed deposits, as well as geologic-geomorphologic and morph-structural placers peculiarities were taken into consideration.
Key words: placer, analytical method, gold, deposits, forecast resources, exploration, exploitation.
- Gibadyllin Z.R., Gnedih A.P.** THE ESTIMATION OF EFFICIENCY OF SYS-TEMS OF MOVING OF ORE AT DEVELOPMENT ONBOARD STOCKS OF DEPOSITS THE COMBINED GEOTECHNOLOGY **54**
Possible technological schemes of moving of ore weight with use of career space to-gether with developments of underground mine are considered at the combined way of working off of deposits. The comparative economic estimation of systems of moving of ore weight from weight breaking to a warehouse on a surface is given
Key words: the technological scheme, ore moving, economic efficiency.
- Drobadenko V.P., Malukhin N.G., Vil'mis A.L., Shemerov A.A.** TECH-NOLOGY FOR DEVELOPMENT OF THE OCEAN-SHELF DEPOSITS **58**
The article presents the basis of increase of the effectiveness of mining of mineral resources by addition of hydraulic loosening to the rock-in-taking device followed by airlifting of the slurry to the surface.
Key words: underwater robots, slurry.
- Kosolapov A.I., Malofeev D.E., Odayev D.G.** SCHEDULING OF MINING OPERATIONS AT GROUP OF CONTIGUOUS GOLD DEPOSITS' OPEN-CAST EXPLOITATION **62**
The variant of decrease in peak total volumes of overburden on open pits group, us-ing the coefficient of variation in mining and density of temporarily basset edge depreservation is stated.
Key words: open pits group, scheduling of mining operations, density of temporarily basset edge depreservation.
- Kutepov Yu.L., Kutepova N.A., Kovyazin A.V., Ivochkina M.A., Filatov A.V.** ORGANIZATION AND CARRYING OUT OF MONITORING OF THE SAFETY OF THE FORMATION OF PHOSPHOGYPSUM DUMPS **68**
Given characteristics of waste, generated from a waste of phosphoric acid produc-tion, for example, objects of the cities of Cheboksary and Balakovo. Considered the engineering-geological and hydrogeological conditions of phosphogypsum dumps. Outlines the methodological questions of the organization of systems of safety monitoring. Given some of the results of observations of the regime of

underground waters and deformations of the surface of the dump, and its Foundation.	
Key words: phosphogypsum dumps, the specific structure of the array, security monitoring, observation station, vertical deformations, pore pressure.	
Lozinskaya M.A. JUSTIFICATION OF COAL TRANSPORTATION PARAMETERS DURING THE SURFACE MINING OF COAL DEPOSITS.....	73
The approaches to justify qualitative and quantitative parameters of both coal and waste volumes movement have been presented. The classification of coal transportation routes based on a coal quality has been compiled.	
Key words: qualitative and quantitative parameters, coal transportation, organisational and technological scheme.	
Medvedev M.L., Zuev A.E. ANALYSIS AND EVALUATION OF WAYS OF ROCK PLACING IN EXTERNAL DUMPS AT OPEN MINING OF A DIP THROW ORE DEPOSIT	77
Presented are analysis and results of investigations of ways of rock placing in external dumps, based on the energetic approach. Instrument of investigation is simulation. Embraced are the main forms of dumps and ways of dump formation, offered are new ways in which energetic characteristics are better in examined variety.	
Key words: external, dump, form, way, motor transport, placing of rock, simulation, energetic characteristics, dynamics.	
Malyutin D.V., Oveshnikov Yu.M. ON THE PROCESSING OF REFRACTORY ORE "MALOMYRSKY" GOLD DEPOSIT	84
In this article the problem of processing refractory ores, mainly dominated by "Malomyrskom" field. Are project data on reserves of ore, which reflect the importance of the problem of treating refractory ores. A definition of refractory ores. Shows the most effective way of sulfide ores, which is widely used throughout the world and begins to develop in the Amur region. The essence of this method, its advantages and disadvantages. Provides information about the genesis of sulphide ores and environmental aspects of their processing. Also in the article describes the process of pressure leaching the chemical side. Describes the technological aspects of processing by pressure leaching.	
Key words: hard ore, dispersion, deposit processing, cyanidation, autoclave, oxidation, evaporation, flotation, pulp, liner, extracting useful component.	
Umarov F.Ya. MONITORING OF A CONDITION OF A DEEP PIT SLOPE	88
The importance of systematization of fire activities on the NPC is due to the importance and complexity of fire safety in the whole country as one of the forms of implementation of public security as a whole. Fires cause irreparable damage to the environment and society.	
Key words: fire protection, fire resistance, air spray, fire safety, fire fighting.	
The enrichment of minerals	
Gulyashinov A.N., Myazin V.P. COMBINED TECHNOLOGICAL SCHEMES OF PROCESSING OF COMPLEX ORES AND CONCENTRATES WITH THE USE OF STEAM	93
Proposed new combined technological schemes of processing of substandard pyrite concentrates, and oxide of lead-zinc ores, and gold-bearing arsenopyrite ores and concentrates on the basis of their firing in the atmosphere of superheated steam.	
Key words: ore, roasting, water vapour.	
Litvinenko V.G., Myazin V.P., Dorzhieva A.G. STUDIES OF THE COMPOSITION OF SILICA PROCESS FOR THE EXTRACTION OF URANIUM ORE PULPS OF THE ANION EXCHANGE RESIN.....	97
	419

This article deals with the problem of sorption of uranium. Analyzed the effect of silicic acid on the extraction of uranium from ore slurries. Based on these studies revealed that the recovery of the sorption properties of silicified resins to systematically carry out the operation alkaline treatment.

Key words: uranium, anion exchange resin, the sorption properties, exchange capacity.

Myazin V.P., Shesternev D.M. TECHNICAL SOLUTIONS FOR THE IMPLEMENTATION OF THE TECHNOLOGY CIRCLE-LOGODICHNOGO HEAP LEACHING IN PERMAFROST TRANSBAIKALIA

101

Mineral resources of gold, suitable for heap leaching and located in permafrost OF Zabaikalie are considered in the article. The activity of enterprises using heap leaching and operating in Zabaikalsky Krai for their work in freezing temperatures is analyzed. Technical solution that makes it possible to adjust the thermal regime in the ore pile and aimed to extend the season of heap leaching in winter is proposed. Technical and economic evaluations of implementing it in production are given.

Key words: gold deposit, heap leaching at low temperatures, permafrost.

Zhukov V.V., Sharikov Yu.V., Turunen I. DEVELOPMENT OF MATHEMATICAL MODEL FOR GOLD THIOSULPHATE LEACHING IN BATCH REACTOR.....

109

Utilization of sodium thiosulphate as leaching agent is challenging technology which is needed to assess effectiveness of the process. In the study mathematical model of gold leaching in batch reactor from concentrate in thiosulphate solution has presented. Results might be implemented to create process in batch reactor and in cascade of continuous stirred tanks reactors, scaling-up of the process and planning of production by that technology.

Key words: modeling, leaching, thiosulphate, gold, batch.

Zimbovsky I.G. MODERN REAGENTS COLLECTORS FOR FLOTATION OF COPPER-ZINC SULPHIDE ORE

117

In this article shows the main schemes of flotation enrichment of copper-zinc sulfide ores. The most significant domestic works were created during last decades. Workings is dedicated to increasing the effectiveness of flotation enrichment of copper-zinc sulfide ores and the using of new reagents collectors.

Key words: flotation, sulphides, sphalerite, pyrite, complexes.

Kienko L.A., Samatova L.A. IMPROVEMENT OF TECHNOLOGICAL REGIMES OF FLOTATION OF THE FINE-DISPERSED PARTICLES WHEN DRESSING THE CARBONATE-FLUORITE ORES OF THE PRIMORSKY REGION DEPOSITS

123

Results of investigations in the aim of increasing a degree of dispersion of carboxyl collectors are presented. The possibility of action effectiveness increase on the slimy-like particles of ore has been determined. A combination of reagents allowing to lower temperature of flotation of the carbonate-fluorite ores to 10-12 C° were suggested.

Key words: dispersion, flotation, carboxyl collectors, thermostatic modifier, carbonate-fluorite ores.

Kozlov VA. PROCESSES DEZATURATION IN DEHYDRATION OF COAL SLUDGE FILTERING CENTRIFUGES

129

Considered are the foundations of the theory of dezaturation in the Annex to the work of filtering centrifuges, intended for dehydration of coal sludge.

Key words: dehydration of coal, centrifugal force, dezaturation.

Sklyarova G.F., Krupskaya L.T. CONCERNING RATIONAL TECHNOLOGIES CREATION FOR SOLNECNY MINING AND BENEFICATION COMPLEX WASTES PROCESSING.....	138
<i>In the article some aspects are discussed of rational technologies creation for plants of Solnecny mining and beneficiation complex wastes processing. These wastes are assessed as potential technogenic pollution sources of environment objects.</i>	
<i>The necessity is substantiated of wastes utilization, which is urgent from both economic and ecologic viewpoints.</i>	
<i>Key words: tailing dump, ecosystem, useful components.</i>	
Measurement, control, diagnostics	
Bogomazov A.A., Golodov M.A. INVESTIGATION OF VERTICAL SHAFTS TEMPERATURE REGIME AND ITS INFLUENCE ON RIGID REINFORCEMENT	145
<i>Air front temperature measurement in various parts of the shaft and at various depths have been made. Calculations of lengthening brackets and conductors depending on temperature have been fulfilled and the graphs have been draw. the dependence of twenty-four-hour amplitude of temperatures oscillations on the shaft depth have been found out. Spline-functions of dependence of amplitudes of average monthly and extreme temperatures on the shaft depth have been received.</i>	
<i>Key words: air temperature, shaft, depth, oscillations, amplitude.</i>	
Voronkov G.Ya. INFLUENCE OF ENVIRONMENT ON THE MECHANISM OF BEHAVIOR OF A PART OF A FILE	150
<i>Features of the mechanism destruction parts of hills under the influence of wednesday in the conditions of a tension are considered.</i>	
<i>Key words: durability, breed, the file, mechanics, the tension, environment, the crack, destruction.</i>	
Gavrilov V.L. ANALYSIS OF CHANGES OF COAL QUALITY IN THE «FACE-CONSUMER» PROCESSING CHAIN	156
<i>The change of coal quality for the passage of the technological chain "face - consumer" from the number of enterprises in South Yakutia has been analysed. The patterns of this transformation and possibilities of control of coal quality characteristics in the chain are shown.</i>	
<i>Key words: coal, quality control, technological chain, South Yakutia.</i>	
Kallistova T.V. THE TECTONIC STRUCTURE IMPACT OF THE ARRAY ON ITS DEFORMATION PROPERTIES OF ENGINEERING BUILDING FOUNDATIONS.....	163
<i>This article is an example of a problem solution of identifying the causes of bridge deformation associated with the lack of comprehensive engineering geological and geophysical studies on the design phase when in this case they founding the best place for buildings. Often objects state in the active zone of tectonic faults. Activities aimed for consolidating and restoring the impacts of geodynamic manifestations entails not only the economic costs but also it is a risk zone for objects using. Complex geophysical methods and geodetic parameters allow to solve the problem of choosing the most favourable place without any significant inhomogeneities and dangerous tectonic faults.</i>	
<i>Key words: the complex of geophysical methods.</i>	
Kurkov A.V., Balakina I.G., Karkeshkina A.Yu. THE TESTING ASSESSMENT OF THE DEPENDENCE OF THE TECHNICAL PARAMETERS OF THE SEPARATION PROCESS OF THE URANIUM ORE OF THE CLASS-25+15 MM FROM THE SENSITIVITY OF THE DEVICES	169
	421

n practice, nowadays the lower limit of the sorting classes of the uranium ores enrichment with the help of automatic methods is 25 mm. The reduction of the limit of the sorting classes until the point +15 mm in the case of the separation with the help of radio metrical method has been laying out because of the insufficient sensitivity of the radio metrical devices for the class range -25+15 mm. For the determination of the possible technical parameters of the uranium ores enrichment of low classes according to the sensitivity of the devices there has been created an experimental stand on the bases of the ore separation set RSM-10. This set consists of the separator UAS-50. The separator has been equipped with the measuring unit of a "relay" type with five detection units (DU) with scintillation crystals NaI(Tl) with the dimensions 63x63 mm for the achievement of the required sensitivity at the root allocation stage. On the example of the ores with the different enrichment rates in the fields of Elkonsky district there has been carried out the experimental separation of the class -25+15 mm with the assessment of the process parameters. As the result there has been determined, the necessary number of the detection units at the root allocation stage – three DU are for free-milling and mid-milling ores, four DU are for hard-milling ores.

Key words: uranium ores, Elkonsky district, sensitivity, a detection block, separation, a radio metrical method.

Mirenkov V.E., Krasnovsky A.A. DEFORMATION OF A CRACK-WEAKENED ROCK BLOCK.....

175

The article discusses a problem about wedging of a rock block with a crack that runs onto the boundary of the rock block. The authors derive singular integral equations that connect normal and shears stresses on elongation of a cut, simulating the crack, and discuss the numerical calculation results.

Key words: rock block, crack, surfaces, stresses, displacements, singular equations, boundary, contact, wedging.

Petrov D.N., Neobutov G.P. EXPERIMENTAL RESEARCHES OF DEFORMABILITY AND WORKABILITY OF ICE-ROCK FILLING

184

The results of experimental researches of the deforming of ice-rock material in laboratory and natural conditions are presented. It is shown that the filling from freezing materials has highly reological properties. The offset is absent in rock filling at present development of mining works in deposit.

Key words: ice-rock filling, deforming of ice-rock material, relative offsets, workability.

Rubtsova E.V., Skulkin A.A. PROCEDURAL FRAMEWORK DEVELOPMENT FOR THE MEASURING HYDRAULIC FRACTURE IMPLEMENTATION.....

188

The article studies 2D problem on stress-strain state assessment in the vicinity of a circular tunnel by the data obtained in the course of hydrofracturing through three wells drilled at random.

Key words: cross-section of a tunnel, measurement well, hydraulic fracturing, principal stresses, set of equations.

Savvin D.V., Nikiforova M.R., Omelyanenko A.V., Fedorova L.L. THE RESULTS OF EXPERIMENTAL STUDIES OF CRYOGENIC STATE OF A ROCK MASS METHOD GEORADIOLOCATION IN THE CONDITIONS OF AN OPEN FIELD DEVELOPMENT OF THE CRYOLITHOZONE

192

The possibilities of remote research cryogenic conditions and rock mass structure are reviewed. Examples are given of experimental investigations of the seasonally thawed layer, the lenses of ice and rock bands melt by GPR.

Key words: georadar, permafrost, seasonally thaw layer, defrost.

Savos'kina A.M., Shirokov D.A. ALLOCATION OF HEAVY METALS IN FRESH AND SALT WATER MIXING ZONE (IN THE OB BAY).....	197
<i>This article presents the main results of research directed to estimate the levels of some heavy metals in water and bottom sediments. Samples were taken from the Ob bay between July 2010 and October 2010. Fresh and salt water mixing zone was particularly investigated.</i>	
<i>Key words: heavy metals, salinity, Ob bay, marginal filter, coagulation.</i>	
Smirnov V.G. ASSESSING THE POSSIBILITY OF CRACK FORMATION INSIDE A COAL WHEN OUTBURST DANGEROUS STATE OF COALBED OCCURS.....	203
<i>The conditions of cracks formation are considered when outburst dangerous state of coalbed occurs. Distances between planes cracks are estimated.</i>	
<i>Key words: crack formation, deformation.</i>	
Khachay O.A., Khachay O.Yu., Klimko V.K. DYNAMICAL CHARACTERISTICS OF SLOW DEFORMATION WAVES AS A MASSIF RESPONSE ON HEAVY EXPLOSION INFLUENCE	208
<i>The use of additional parameter-velocity of slow deformation wave propagation allowed us with use method of phase diagrams identify their hierarchic structure, which allow us to use that information for modeling and interpretation the propagation seismic and deformation waves in hierarchic structures. It is interesting with use of that suggested processing method research the thin structure of the chaotic area for understanding the high energetic rock shock and evaluation a criterion for massif stability estimation.</i>	
<i>Key words: massif response, slow deformation waves, seismic mine catalogue, analyze of observed data, phase diagrams.</i>	
Khachay O.A., Khachay O.Yu., Shipeev O.V. RESEARCH OF HIERARCHIC STRUCTURE OF SLOW DEFORMATION WAVES DYNAMICAL CHARACTERISTICS- MASSIF RESPONSES ON EXPLOSIONS.....	215
<i>The use of additional parameter-velocity of slow deformation wave propagation allowed us with use method of phase diagrams identify their hierarchic structure, which allow us to use that information for modeling and interpretation the propagation seismic and deformation waves in hierarchic structures. It is researched with use of that suggested processing method the thin structure of the chaotic area for two responses of the massif on a high energetic explosion in the northern and southern parts of it. The results are significant for understanding the high energetic rock shock and evaluation a criterion for massif stability estimation.</i>	
<i>Key words: massif response, slow deformation waves, seismic mine catalogue, analyze of observed data, phase diagrams.</i>	
Automated control systems	
Mel'nikov N.N., Lukichev S.V., Nagovitsyn O.V. COMPUTER TECHNOLOGY OF ENGINEERING PROVIDING OF MINING ON BASIS OF MINEFRAME SOFTWARE	223
<i>The computer technology engineering support of mining works, realized on the basis of software systems MINEFRAME. Given the composition and the structure of the system, methods and means of management of models of objects. Lists of Geology, mine surveying and technological tasks, solved with the use of software systems.</i>	
<i>Key words: mining, local area network, database, computer technologies.</i>	
Karpovich E.E. ASSESSING THE QUALITY OF SOFTWARE APPLICATIONS ON THE BASIS OF METRIC CHARACTERISTICS	235
	423

In this article the assignment of metric characteristics of software quality is defined. The classification of software metrics is presented. The existing approaches to the definition of software metrics are considered. The possibilities of automation definition, analysis and visualization of metric characteristics of the programs in high level languages are discussed.

Key words: complexity of programs, software metrics, high level programming languages, the language MODULA-2.

Aerology

Lebedev, V.S., Skopintseva O.V., Savel'ev D.I. DEEP SORBED IN STONE COALS OF KUZNETSK POOL.....

244

The article presents the data on the quantity and composition of deep sorbed hydrocarbons in the coals of Kuznetsk coal basin, extracted from coal by method of thermal decontamination. Found the difference of the content and composition of deep sorbed hydrocarbons in different brands of coal. Deep sorbed significantly enriched with heavy hydrocarbons relatively free gas of coal layers. The greatest content of deep sorbed hydrocarbons and the enrichment of their heavy hydrocarbons found in the coals of marks G, and QOL. Set the allocation of deep sorbed hydrocarbons in drilling of coal and it is expected that similar processes take place in the process of coal mining coal mining harvesters. The allocation of deep sorbed hydrocarbons in coal mining can be a trigger for the development of the processes of fire and explosions.

Key words: sorption and desorption, deep sorbed in the coal, thermal coal, fire and explosions in coal mines.

Lukin M.K., Govorukhin Yu.M. AERODYNAMIC METHOD OF BREAKING OXIDATION PROCESS IN MINED-OUT SPACE OF COAL MINING

251

Touched upon the problem of oxidation processes, which may arise among the gob and distended rocks. Underground endogenous fires - complicated type of accidents. With the processes of spontaneous combustion of coal losses in the worked-out space is a number of major industrial accidents. For the forecast of zones with dangerous aerodynamic modes of the system «coal-to-air» have developed a method of estimation of parameters of air distribution in the worked-out space of flat layers of the average power of Kuzbass.

Key words: coal mining, aerodynamic modes, the program complex «Geomechanics», oxidative process.

Oil and gas

Krapivskiy E.I., Vishnyakov I.A. THERMAL DESIGN OF PIPELINE, EQUIPPED WITH ELECTRIC HEATING SYSTEM OF PIPE WALL.....

256

Potential of application of the developed technique for thermal design of the pipeline, equipped with electric heating system, in software product ANSYS/Fluent for the purpose of derivation of a criterion heat transfer equations is demonstrated. Methods of pipe heat insulation selection and power selection of electric heating system for nonisothermic above-ground pipeline is proposed.

Key words: oil pipeline, electric heating system, criterion equation, selection of power.

Krapivskiy E.I., Pakhotin P.A. SUBSTANTIATION OF TECHNOLOGIES OF REMOTE ELECTROMAGNETIC DIAGNOSTICS OF UNDERWATER TRANSPORTS OF OIL AND GAS PIPELINES

260

To improve diagnostics of subsea pipeline, we propose an integrated method for remote diagnostics, based on a study of the orthogonal components of constant magnetic and low-frequency electromagnetic fields subsea pipeline.

Key words: subsea pipeline, pipeline diagnostics, pipeline electromagnetic field, equipment of pipeline electromagnetic diagnostics, pipeline coating, spatial location, stress-strain state of pipelines.

Nikolaev A.K., Bykov K.V., Malarev V.I. DETERMINATION OF hydrodynamic loss coefficient OF THE MAIN OIL PIPELINE **265**

The comparative analysis of accuracy of various methods of assessment of hydrodynamic loss coefficient in the field of the main oil pipelines operation is made. Formulas for calculation of hydrodynamic loss coefficient with the smallest mean square error are offered.

Key words: main oil pipeline, hydrodynamic loss coefficient.

Mining machinery, equipment and transport

Malinovsky A.K., Sidash Y.A., Voronko E.I., Ustinova A.S. DYNAMICS OF SAFETY BRAKE MINE HOIST SYSTEMS **269**

Dynamical processes an emergency stop mine hoist under the safety brake and in the mode of simultaneous action of mechanical and electrical brakes. the comparative analysis of the processes on the basis of data obtained from computer simulation

Key words: mine hoist, safety brake, mode of simultaneous action, dynamic braking.

Taranov S.I. TENDENCIES IN DEVELOPMENT OF CONTROL SYSTEMS AND DIAGNOSTICS OF THE MINING AND TRANSPORT COMPLEX ELECTROMECHANICAL EQUIPMENT **276**

In article the latest control systems of a drive of an AC drive of excavators and dump trucks are considered is mining – extracting enterprises. The main tendencies on development of diagnostics of AC drive for this type of the equipment are allocated, the main operating modes of engines of a course the excavator and a dump truck are considered.

Key words: asynchronous drive, unification, diagnostics, the wattmeter method, excavator, dump truck.

Tarasov P.I., Leonov V. a., Mezentshev O.G., Kovgan D.V. COMPLEX OF TRACKED VEHICLES FOR THE CONSTRUCTION OF QUARRIES ON WEAK GROUND CARRIER..... **278**

This article explores the possibility of creating complex vehicles operating conditions on soils with low bearing capacity (swamp, virgin snow, off road, rough woodland) at ambient temperature from – 50 to + 40 °C. An analysis of existing tracked movers, and, on the basis of this transporter the prospects for creating a wide range of vehicles on tracks.

Key words: all-terrain vehicle, tracked mover, rubber track, metal hinged track, four-tracked.

Khetagurov V.N., Kamenetsky E.S., Sobolev S.E., Khetagurov S.V., Pliev V.A. WORKING CHAMBERS AMOUNT AFFECT ON THE CENTRIFUGAL MILL PRODUCTIVITY ACCORDING TO THE DESIGN SIZE CLASS..... **283**

The results of the vertical type centrifugal mill tests with horizontal locking ring gap between mobile and immobile elements, as well as the placement in the peripheral bottom of the workspace, additional screening of ring surfaces and installation of three or six radial ribs in the rotor were reported. It is established that the productivity of the centrifugal mill by the finished product during mineral raw materials grinding is higher when mounted the three edges rotor. To increase the yield of the standard product (- 0,08 mm) from the vertical type centrifugal mill, it is necessary to install three radial ribs in its rotor cavity under lower column height over the rotor.

Key words: centrifugal mill of vertical type, grinding, dolomite, modes of testing.

Labour protection

- Gendler S.G.** THE BASIC DIRECTIONS OF BAIKAL RAILWAY TUNNEL VENTILATION SYSTEM MODERNIZATION **288**

Various variants of the Baikal tunnel ventilation schemes are described. The data of experimental researches of a tunnel aerodynamic parameters and definition of natural draught size are presented. Quantities of air for tunnel ventilation taking into account the radiation factor for various schemes of ventilation are calculated. The basic directions of modernization of the Baikal tunnel ventilation are defined.

Key words: ventilation scheme, radon allocation, air heating, natural draught, ventilation gate.

- Gendler S.G., Kochetkova E.B., Dal' N.N.** EXPERIENCE IMPROVEMENT BY MANAGEMENT OF INDUSTRIAL SAFETY AND LABOR PROTECTION IN THE COAL INDUSTRY OF RUSSIA ON THE EXAMPLE OF JOINT STOCK COMPANY "VORKUTAUGOL" **297**

On the example of coal mines of Vorkuta it is shown that in the coal industry of Russia it is necessary to consider as an essential reserve of increase of production safety realization of the organizational actions directed on preventive identification of violations of safety regulations, potentially bringing to accidents, carrying out behavioural security audits, and also involvement of miners in management of occupational safety and health and industrial safety.

Key words: coal mines, occupational safety, industrial safety, accident rate, behavioural audit, management.

Blasting operations

- Girich I.B.** INCREASE OF EFFICIENCY OF EXPLOSIVE WORKS ON PITS WITH DIFFICULT GEOLOGICAL STRUCTURE..... **306**

The method of an assessment of an arrangement of not uniformity in difficult structural massifs by means of a georadar, for the purpose of optimization of the drilling-and-blasting works parameters on pits with difficult structure is offered.

Key words: the difficult structural massif, oversize, georadar, delay time, electric detonator with electronic delay.

- Rumyantsev A.E., Paramonov G.P., Kovalevsky V.N.** GO TO THE QUESTION OF CHARGING PARAMETERS AND PROPERTIES OF EXPLOSIVES ON THE FORMATION OF THE PLANIMETRIC CRACK **309**

On a solid of rocks being behind planimetric crack it is necessary to apply special technologies of drilling-and-blasting works to decrease intensive influence of seismic waves. One of such technologies is planimetric detonation. The essence of this method consists in formation of an unloading crack before explosion of charges that allows to provide safety solid of rocks being behind planimetric crack from destroying waves of pressure of mass explosion.

Key words: seismic waves, planimetric detonation.

- Kholodilov A.N., Artemov V.A., Vinogradov J.I.** ESTIMATION PROCEDURE OF A LINE OF LEAST RESISTANCE WITH ACCELERATION INFORMATION FOR ROCK BLASTING TECHNIQUE..... **314**

The estimation procedure of a line of least resistance with acceleration information from a trial blast is offered. The results of approbation on mine are discussed.

Key words: line of least resistance, accelerometer, seismic wave, trial blast.

Economy, management and planning

- Borisov M.S.** ACTUAL PROBLEMS OF CRISIS PREVENTION IN SMALL AND MEDIUM BUSINESSES **319**

- The author considers the current problems of improving the organizational and economic mechanism of crisis prevention in small and medium businesses. It paid attention to the characteristics of information and tools to prevent the economic crisis on small and medium businesses.
- Key words: crisis prevention, improvement of organizational and economic mechanism, small and medium enterprises, information and economic instruments.
- Bunin M.A.** THE TECHNOPARK EMERGENCE IN THE U.S. AND JAPAN **323**
- The article deals with the history of technology parks as the direction of the global innovation economy, and the economies of the U.S. and Japan. The importance of the creation of technology parks to improve the economy's competitiveness in the global market in the context of globalization.
- Key words: industrial park, innovative development, the U.S., Japan, competitiveness.
- Zatonckiy A.V., Bekker M.V.** PERM NATIONAL RESEARCH POLYTECHNIC UNIVERSITY CASH FLOW MODELING WITH INDUSTRIAL EQUIPMENT REPAIRING **326**
- Model of cash flows caused by industrial equipment repairing is approved and realized. This model is different from another by the opportunity to take into account a technical readiness of equipment and it make possible to evaluate of management decisions.
- Key words: equipment, repair, modeling, optimization.
- Isaev M.N.** CONCEPTUAL APPROACH TO GOVERNMENT REGULATION OF INNOVATIVE ENTREPRENEURSHIP **335**
- In this paper investigates the theoretical basis of state regulation of business and innovation offered its rationale in the context of globalization. Showing objective differences in the approaches to the solution of the problem in developed countries and countries with emerging markets.
- Key words: innovative entrepreneurship, government regulation, R & D, innovation development, innovation.
- Kilin A.B., Azev V.A., Kostarev A.S., Shapovalenko G.N., Kobets E.V., Zhukov A.L.** MOTIVATING CERTIFICATION SYSTEM CONTINUOUS PROCESS IMPROVEMENT ON EXPERIENCE COMPANY "SUEK - KHAKASSIA" **339**
- This paper presents the experience in training employees of LLC "SUEK-Khakassia" for motivating the development of certification. The basic steps are selected for implementation.
- Key words: motivating certification, improvement of production, personnel development.
- Plakitkin Yu.A.** TROUBLESOME FIELD DEVELOPMENT OF COAL INDUSTRY OF RUSSIA IN THE PERIOD UP TO 2030 **346**
- The paper analyzes the problematic field of development of the coal industry in view of the forthcoming challenges and threats to world energy development patterns and global technological development.
- Key words: program development, coal mining, world consumption of the fuel-energy resources consumption, energy, coal exports price.
- Fokina M.S., Panyukov A.V.** MULTIPRODUCT MODEL OF PRODUCTION MANAGEMENT IN THE MINING ENTERPRISE **354**
- The importance of systematization of fire activities on the NPC is due to the importance and complexity of fire safety in the whole country as one of the forms of implementation of public security as a whole. Fires cause irreparable damage to the environment and society.
- Key words: fire protection, fire resistance, air spray, fire safety, fire fighting.

Shevchenko E.V. RUSSIAN AND CANADIAN STANDARTS FOR THE REPORTING OF SOLID MINERAL RESOURCES AND MINERAL RESERVES: COMPARATIVE ANALYSIS	358
<i>The article covers the issues concerned the main international standards for the reporting of mineral resources and mineral reserves and the standards of their classification. The special attention has been put on the comparative analysis of Russian and Canadian standards. The main features of the NAEN Code and possible consequences of its implementation in Russian geologic practice are considered.</i>	
<i>Key words: classification of solid mineral resources and mineral reserves, international standards for public reporting, the NAEN Code.</i>	
Shkvarya L.V. CONCEPTUAL FOUNDATIONS OF BUSINESS INNOVATION ..	369
<i>The paper analyzes the main intrinsic characteristics, features, functions, innovative entrepreneurship and the main aspects of its impact on the national economy.</i>	
<i>Key words: innovative entrepreneurship, innovation, entrepreneurship, innovation system, innovative products.</i>	
Ecology	
Alexandrov A.V, Lipina L.N. TECHNOGENEOUS INFLUENCE ON THE ATMOSPHERE IN IN OPERATIVE RANGE OF THE MINING ENTERPRISE.....	373
<i>Algorithm for the evaluation of air pollution in the area of the mining companies using GIS technologies is given in the article, implementation of the algorithm is shown by the example of one of the mining enterprises is shown. Regularities for the forecast of dust distribution caused by area sources (tailings) are revealed. Zoning of area of influence of mining enterprise according complex index of atmosphere pollution (KIZA), the index is an integral characteristic.</i>	
<i>Key words: assessment of pollution, the atmosphere, the GIS-technology, mining enterprise, a comprehensive index.</i>	
Popov E.M. TO THE QUESTION ON EKOLOGO-ECONOMIC CONSEQUENCES OF DEVELOPMENT OF THE TECHNOLOGICAL INDUSTRY BASED ON APPLICATION OF THE MOST WIDESPREAD NANOPART	380
<i>Nanotechnology have given to the world many opening and inventions. Their application will allow to raise efficiency of economic activities of the person. But there are not enough the researches reflecting consequences of influence nanopart on the person. To reduce these blanks given article also is devoted attempts.</i>	
<i>Key words: nanotechnology, nanotubes, air pollution.</i>	
Sokolov E.M., Sheinkman L.E., Dergunov D.V. MINIMIZATION OF ABATEMENT COSTS WATER BODIES IN THE ELIMINATION OF PHENOL MINING OF ENTERPRISES	384
<i>We consider the problem of finding the optimal level of consumption of specific chemical ingredients (hydrogen peroxide H₂O₂ and iron chloride (III) FeCl₃) when the minimum level of the specific unit cost of physical-chemical treatment of mine water from phenolic compounds, based on advanced oxidation processes.</i>	
<i>Key words: mine water, phenol, ultraviolet radiation, hydrogen peroxide, chloride iron (III), optimal control, economic costs.</i>	
Mathematical modeling	
Bryukhanov A.M., Koptikov V.P., Yuzhanin I.A., Evdokimova V.P. EFFICIENCY ASSESSMENT OF ADVANCE OVERWORKING OF SEAMS LIABLE TO GAS DYNAMIC PHENOMENA.....	391

Basic theses and mathematical models are presented for a statistical method of determining efficiency of advance overworking of seams liable to gas dynamic phenomena. Generalized estimation of the models is given in terms of geomechanical and physical processes they describe, as well as technical and economic assessment of the method.

Key words: protective overworking, gas dynamic phenomena, mathematical model, geomechanical and physical processes, assessment.

Tsvetkov A.B., Frjanov V.N. SYNTHESIS OF MODEL OF THE STRATIFIED MASSIF TAKING INTO ACCOUNT INTERACTION OF STRATUMS ON CONTACTS

398

In paper the method of synthesis of a mathematical model of the stratified hills to which structural parts boundary value problems of the theory of elasticity with different physicommechanical parametres are put in correspondence is offered. Boundary value problems are synthesised in a mathematical model by means of a method of finite differences. The concept set forth above is implemented in the form of a complex of programs. Outcomes of numerical solution correspond to known analytical solution for an is horizontal-layered massif.

Key words: mathematical model, rock massif, coal stratum, deads, finite difference method, theory of elasticity selvage problem, synthesis, gravitation.

Higher mining education

Valuev A.M. INTELLIGENT MAN-MACHINE DIALOG AS A CONCEPTUAL FRAMEWORK FOR SPECIALIZED SOFTWARE PACKAGES.....

403

The following principal features are proposed for intelligent implementation of interactive regime in systems for production processes modeling: the use of "external" model expressing a specialist viewpoint as well as optimization methods oriented to the entire model class and lingual means for directed search problems description. Some examples of this direction of development for surface mining modeling are presented.

Key words: intelligent software package, man-machine dialog, modeling, surface mining.

Preprints

Oganesyan N.K. DEVELOPMENT OF SCIENTIFIC APPROACHES TO A SUBSTANTIATION OF THE DESIGN DECISIONS AND FORMS OF DEVELOPMENT OF THE TECHNOLOGICAL SYSTEMS OF COAL MINES.....

19

Presented system of methodical recommendations, presented in the form of the methods of realization of the conceptual approach to the selection and justification of strategies for the development of technological systems of coal mines in the competitive conditions, which are the basis of increase of their technological and economic efficiency. Given the results of the implementation of the algorithm integrated assessment of the technological systems of coal mines, based on the principles of qualimetry and formation of the integral-detailed prototype of the coal companies with the target direction of development and realization of the industrial-technological aspects of the strategies and forms of development of mine Fund.

Key words: integral index, summarizing function, coefficient of importance, mine Fund.

Oganesyan N.K. ASSESSMENT THRESHOLDS AND LIMIT POINTS IN THE DEVELOPMENT OF TECHNOLOGIES OF A COAL MINE

53

Set out the guidelines identify the stage of the need for changes in the technological scheme, which is proposed to be identified with the help of the evaluation thresholds and limit points in the development of the technology of mines (the

429

method of the critical limit point). Considered the major design decisions on reconstruction of technological system ш.Октябрьская OJSC «SUEK-Kuzbass», which according to the results of the assessment of the status of mine Fund of Kuzbass requires forms of development in the form of reconstruction.

Key words: marginal point, the marginal income, coal mine.

Savenok O.V. DEVELOPMENT PRINCIPLE, METHODS AND TECHNOLOGY OF RESOURCES SAVING FOR OIL PRODUCING WITH PROVISION FOR COMPLEX FACTOR

144

For hard extraction oils resources saving has special, but in row of the events solving importance since production in these cases occurs under low profitability. In general sense all perspective equipment decision, methods and technologies, anyway, promote minimization a resource – natural, material, energy, financial and others. On the other hand, resources saving as independent direction in activity of the companies until has a scale of the system branch problem, and carries mainly secondary nature to questions of the production plan – a level of production, period and other. The Problem of resources saving for oil producing with complicated condition to exploitation until has a system decision. In ditto time, for present-day day is worked out some general approaches to problem of resources saving in oil and gas branch. The Problem of the production resources efficiency strategy of oil producing consists in shaping the system approach to collections factor.

Key words: resources saving, passing oil gas, complex power system, gas motor, system gas cogeneration, synthetic gas, petrochemical product, syntheses of methanol.

Deposited manuscripts

Voloshinovskiy K.I. ELABORATION OF THE PROGRAMME OF THE COURSE «RESEARCH AND TESTING OF INSTRUMENTS AND SYSTEMS» ...

29

Voloshinovskiy K.I. THE PRACTICAL PART OF THE COURSE PROGRAMME «RESEARCH AND TESTING OF INSTRUMENTS AND SYSTEMS»

39

