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Key words: underground mine, oil-and-gas-hazardous zones, gas show, shaft explosion protection.

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Key words: mine field, geodynamic zoning, tectonic fault, block structure, panel, bed, mine roadway, extraction pillar, caving.


Standard technique calculations and experimental tests enable to offer two-tiered strata bolting for temporary roadways driven in permafrost rock masses. With the objectives of achieving stability of roadway wall rocks and reducing melting and foliation of rocks, it is advised to construct roof support using combination of steel weld mesh and basalt warmth-keeping jacket.

Key words: Mine, permafrost, rock bolting, temporary roadways, roof, roof support.
### Open-cast

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**DEEP MINING PLACERS WITH BESTRANSPORTNOY SYSTEM DEVELOPMENT**

Sound method of calculating the basic parameters and indicators transportless mining system that allows a small investment of time to analyze a large number of options and choose the one most suitable.

Key words: transportless mining system, dragline, face settings, the height of the upper and lower ledges, volume reexcavation rocks.

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**ANALYSIS OF POSSIBILITY PRODUCTIVE CAPACITY VARIATION ON OPEN-PIT MINING WITH SLOPING ORE DEPOSITS**

The article about production intensity synchronization with market requirement regulation. It presents modern technological methods and analysis results of productive capacity intensification by management of stage exploitation conditions.

Key words: productive capacity intensification, temporarily non-working board, stage exploitation of open pit.

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**Panishev S.V., Ermakov S.A., Kaimonov M.V., Kozlov D.S., Maksimov M.S.**  
**INTEGRATED TEMPERATURE MONITORING IN PERMAFROST HOST ROCK MASS OF KANGALASSKY COAL OPEN PIT MINE**

The article exposes long-term observations over temperature behavior of permafrost enclosing Kangalassky coal open pit mine and in surface of blasted overburden rock in the course of sequential stripping of face by dragline. The authors reach a conclusion on the analysis of regelation of rocks to be performed seasonally: (1) spring–summer period and (2) autumn–winter period.

Key words: permafrost, regelation, temperature of rocks, open pit mining, average fragmented rock size, dragline.

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**THE BASIS OF MECHANICAL SCRAPER COMPLEX OF TECHNICAL PARAMETERS FOR WATERY SCATTERING DEPOSIT**

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Key words: the watery deposit, walking (stepping) scraper, geometrical parameters, drive, hydrosystem, stability, ladle, punching.

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**DYNAMICS OF DEPOSIT OF PRODUCTIVE MOISTURE IN SOIL COVERING OF MINING-INDUCED TERRAINS IN THE KUZBASS FOREST–STEPPE ZONE**

The article discusses dynamics of productive moisture deposit in soil covering of mining-induced terrains in the forest–steppe zone of Kuzbass. The mining-induced terrain soil is represented by mine waste and embryonic earth: initial, organo-accumulative, sod and humus-accumulative. Accumulations of productive moisture in different kinds of embryonic earth are compared.

Key words: productive moisture deposit in soil, mining-induced terrain, embryonic earth.

### Enrichment of minerals

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Estimation of sole or combined bulk scale and one-piece ore sorting impact on mine performance. Additional estimation of further heap leaching of low-grade pre-processing products.

Key words: feedstock ore, ore pre-processing, bulk scale ore sorting, one-piece sorting, combination flow sheet, integral performance criterion.
Ananenko K.E., Golsman D.A., Zashikhin A.V. SIMPLIFIED SINK-AND-FLOAT TEST OF GOLD ORES AND PLACER GOLD AND THEIR PROCESSING PRODUCTS. The article describes the procedure of sink-and-float analysis for gold-bearing materials and the procedure trial on placer gold.

Key words: primary concentrate rewash, particle size distribution, placer gold.

Ananenko K.E., Konnova N.I., Nikolaeva N.V. FINE GOLD EXTRACTION IN PRIMARY CONCENTRATE REWASH. The authors describe primary concentrate rewash flow chart and its service experience on placer gold.

Key words: gravity concentration, placer gold, rewash, gold settling by pressure.

Artiomov S.V., Panshin A.M., Kritskaia M.G. THE STUDY OF AEROSOL FLOTATION PECULIARITIES. The theoretical and experimental research of the influence exerted by time period of induction and relaxation of deformed adsorption layer of air bubble on the stability of wetting film showed that in flotation in mixture of dry air and saturated steam, selectivity of adhesion rises due to the wetting film stabilization. The developed method for calculating steam flow consumption in mist spray flotation requires is unneedful of empirical information.

Key words: mist spray flotation, induction time period, relaxation time period, wetting film stability, adhesion selectivity, steam flow consumption.

Bogomolov V.A. AN EXPERIMENTAL SUBSTANTIATION OF A TECHNIQUE OF DEFINITION OF THE CONTENT OF GOLD IN ORES WITH FREE GOLD. A technique of preparation for analyses of samples with containing free gold is developed. The technique is based on gravitational allocation of free gold from the milled ores in a concentrate, reception of poor tails, the analysis, and the subsequent calculation of the content of gold on balance of these products.

Key words: gold ores, free gold, preliminary concentrating, the «Running Wave» concentrator.

Radzhabov M.M. PROOF TEST OF VIBRATORY–GRAVITY CONCENTRATOR WITH GOLD-BEARING ROUGH STOCK AT A/S CHUKOTKA LLC. The authors propose a new vibratory–gravity concentration process for extraction of fine and very fine gold from waste and transition products of primary concentrate rewash.

Key words: fine and very fine gold, primary concentrate rewash, thin layer, segregation, vibratory–gravity concentrator.

Mihailov A.G. TECHNOLOGICAL PRINCIPLES OF COMPONENTS EXTRACTION FROM A MASSIF BY BOTTOM-UP CAPILLARY LEACHING. The new technological approach of useful components extraction from a massif by bottom-up capillary leaching with superficial areal collection productional solutions is considered.

Key words: leaching, massif, bottom-up stream, capillaries, a reagent, productional solution.

Shadrunova I.V., Orekhova N.N. NONFERROUS METAL RECOVERY FROM MINE AND DUMP WATER. At the present time economic acceptably and ecological reasonable methods for making recycle of shaft spillway and dump water technology it is cementation, galvanic coagulation, sorbtion. More difficult task - get a product which possibly utilize. In paper eventuate galvanic coagulation non-ferrous metals extract technology from shaft spillway and dump water: thermodynamic simulation, kinetic regularities metals selective extract, study phase structure of sediment, laboratory test on model and real solution.
Key words: Recycle, galvanic coagulation, simulation, factors, dump water, shaft spillway, model solution, laboratory test, extract, cooper, zinc.

Measurement, control, diagnostics


Method of the numerical simulation of the electrical signal in the piezotransducer caused by cracks forming in the rock massif and inducing acoustic emission is discussed. The dependencies of the electrical signal amplitude at the output of the piezotransducer versus the crack’s length, their orientation and position relative to the surface area of the fractured rock massif around underground mining excavation are given.

Key words: cracks, rock massif, the surface, piezo-transducer, the electrical signal, acoustic emission.

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Key words: borehole hydraulic mining, iron ore, disintegration, ground pressure, wave technologies.


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Key words: small seafloor module, shelf, seismic exploration, transit areas.

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Key words: methane, degassing, underground vacuum gas pipeline, degassing facility, methane and air mixture.
Building of underground constructions and mines

Kirichenko S.V. GEOMECHANICAL RISK EVALUATION DURING THE UN-DERGROUND GAS STORAGE BUILDING

This article examines the current methods of construction of underground gas storage facilities. We study the geomechanical risks to reduce the probability of adverse events during design and construction. It is also the estimation of the behavior of salt massif and its possible defect types.

Key words: Underground gas storage, production-capacity, underground storage tanks, rock salt, salt strata, geomechanical risk.

Kulikova E.Yu. THE CONCEPT OF SAFETY IN URBAN UNDERGROUND CONSTRUCTION

This article provides an analysis of conceptions of safety in urban underground construction. Safety systemized by the degree of natural-technical geosystem “rock mass – technology – underground structure – the environment”.

Key words: safety, underground construction, natural-technical geosystem “rock mass – technology – underground structure – the environment”, concept, hazard.

Geology

Golynskaya F.A. EFFECT OF GENETIC MOISTURE ON SELF-IGNITION OF COAL

Genetic moisture in coal - an essential component involved in the processes leading to their spontaneous combustion. Analytical moisture Wa involved in oxidative reactions as endothermic with organic and inorganic matter in coal. Moscow Basin coals at values of Wa from 10 to 15% become dangerous by spontaneous combustion.

Key words: genetic moisture, self-ignition of coal, humidity, oxidative activity, iron sulphides.

Automated control systems

Aristov A.O. QUASI CELLULAR NETS. CIRCULATION AND CLASSIFI-CATION

There is a new type of dynamic discrete structures without signature. It named quasi cellular nets. There is different type of circulations and classification of this discrete structures.

Key words: Quasi cellular net, discrete structure, flow, circulation, classification.

Volkova P., Dmitrieva V.V. WORKING OUT OF COMPLEX SYSTEM OF REGULATION OF THE BOILER UNIT

In given article the complex system of automation of the boiler unit is considered. For its creation the most important sizes are traced and interrelations between them come to light. The received dependences between the characteristic allow to construct the general scheme of regulation.

Key words: The boiler unit, complex system of regulation of the boiler unit, automation of boiler installation, the uniform scheme of regulation.

Glazkova E.A. SYSTEM OF POWER SUPPLY SOURCE FOR PLD

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Key words: Power supply source, voltage rectification, voltage stabilization, PLD, voltage of power supply for PLD.

Lukichev S.V., Kornienko A.V. PROGRAMMING TOOLS FOR LARGE-SCALE BLAST DESIGN AND AFTEREFFECT MODELING IN OPEN PIT MINING
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Key words: automated design system, drilling-and-blasting, large-scale blast design, MineFrame system, open pit mining, controlled fragmentation zones, broken-rock disintegration modeling.

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Key words: geological information, digital copy of report, code field, Microsoft Access, hyperlink, analytical data.

Mining machinery, equipment and transport

Gegelashvili M.V., Burlakov I.R., Basiev C.G., Kritskaia M.G.  PERFECTION OF A CONSTRUCTION OF A VERTICAL MILL OF A COMPELLATORY AUTOGENOUS GRINDING FOR RECEPTION OF A PRODUCT SUITABLE FOR THE SUBSEQUENT DRESSING................................................. 218

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Key words: power shovel, stability, a core of section.

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Key words: an adaptive frictional clutch, the bifunctional actuation device, exactitude of operation, load ability.

Aerology, methane, safety

Radchenko S.A. Sorption and gas-kinetic properties of coal and coal-bearing rocks and their applicability for improving methane emission prediction

The author has based and designed new methods and means for integrated coal and methane deposit development at enhanced safety and efficiency, without high finance and labor content or re-engineering required.

Key words: gas heat exchange, mineral coal-gas, gas content of rocks, enclosing rocks, methane emission.

Technology mining

Vorobiev A.E., Moldabaeva G.Zh., Dzhimieva R.B., Beznoska N. Innovative techniques of in situ oil shale degassing and thermal destruction

The article focuses on methods of oil recovery from hard minerals, in the first place, from oil shale. Selection of the most ecology-friendly and safe oil shale mining technology is built upon the developed set of mining efficiency determinants based on differences in characteristics of the required mineral, productive stratum and technology details.

Key words: oil shale, thermal treatment, kerogen conversion, liquid hydrocarbons.

Gorbach V.A. Analysis of international experience and scientific-technological developments in the field of extraction of chemical compounds from geothermal fluids

Over the past decades, the world has gained experience in the use of thermal water and the waste fluid geothermal power plants as a non-traditional minerals. The article examines the processes and methods of extract chemical compounds from different deposits of hydrothermal fluid.

Key words: geothermal solution, valuable chemical compounds, processes and methods of extraction.

Gridin O.M., Teplova T.B., Gogotov A.A., Doronin M.A. Application of diamonds in industry and methods of processing

Diamond is known to man since ancient times. Over time, improved technology of diamond cutting and expanding the scope of this mineral. At present there are several methods of processing of diamonds, using mechanical, chemical or thermal effects, which enable to achieve nanometer surface roughness parameters Ra. The article provides a description of these methods with a list of the characteristics of each method and the results of the surface treatment of diamonds.

Key words: diamond processing method, surface roughness nanometer level.

Kolmykov V.I., Gorozhankin V.V., Romanenko D.N. Increase of durability of shnekov’s cases of boring chisels by chemical heat treatment

It is shown that high-temperature nitro-cementation of shnekov boring chisels from alloyed hromomargantsevy staly allowed to increase their durability, in comparison with the chisels reinforced by hard-alloy inserts, more than by 4 times at the expense of fuller use of metal of the case. Thus nitrocementation in the highly active sating environment provided formation of
superficial diffusive layers with a large number of firm tsementitny inclusions that caused high wear resistance and a samozatachivayemost of chisels in the course of work.

Key words: durability, shnekovy boring chisels, chemical heat treatment, hardening, hardness.

**Blasting operations**

**Tarasenko V.P.**  BASIS AND PROCEDURE FOR CALCULATION OF BLASTING PARAMETERS IN OPEN PIT MINES, CONSIDERING SIZES OF ELONGATED CHARGE COMPONENTS

The author presumes and demonstrates that effect of an elongated borehole explosive charge is mainly governed by combination of spherical and cylindrical symmetries in explosive fracture pattern.

Key words: elongated borehole charge, blastability of rocks, stemming size, blasted rock.

**Economy, management and planning**

**Markaryan L.V.**  ANALYSIS AND OPTIMIZATION OF THE DECISION-MAKING PROCESS ON THE BASIS OF THE EVOLUTIONARY AGREED SOLUTIONS

In this article, we propose a new expert forecasting method-MEA (method of evolutionary agreed solutions). MEAs is presented as a way of organizing collective work of people to make an agreed single solution. To optimize the MEA and accelerate the entry consolidated solution procedure is proposed to use the asynchronous exchange of options for solutions. We describe the rules and an algorithm for the interaction of the method applied to the network program.

Key words: expert method, MES (the method of evolutionary agreed solutions), iteration, expert evaluation, optimization of the process, competence, forecasting.

**Nikulin A.M.**  INTRODUCTIBILITY OF INDUSTRIAL ASSOCIATION ELEMENTS IN INTEGRATION OF INDUSTRIAL PLANTS IN THE PRESENT-DAY ECONOMIC ENVIRONMENT

The present article analyzes the integration processes occurring in the domestic industry both in a planned economy, and in modern market conditions. In article the basic positive elements of integration as a territorial production association which could be successfully introduced in modern conditions with real economic benefit are revealed.

Key words: integration, integration pre-requisites, integration motives, experience, territorial industrial association, holding, industrial group.

**Petrova T.V., Hodich O.A.**  INNOVATIVE DIRECTION TOWARD MORE COMPREHENSIVE MINERAL EXTRACTION IN COAL MINING

As an innovative direction toward more comprehensive mineral extraction in coal mining, it is offered to lay out a deposit into uniform production blocks meant for mining leases to be granted to coal mining enterprises. With the optimized spatial planning decisions reached as a result, this approach will ensure smooth coal mining at reduced capital costs and prime costs of coal, and decreased coal loss.

Key words: procedure, capital costs, mining prime cost, uniform production blocks.

**Petrossov A.A.**  CALCULATION OF METAL BALANCE IN SELECTING AND ECONOMIC SUPPORT SYSTEMS DEVELOPMENT OF ORE DEPOSITS

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Key words: system development, enrichment, metallurgical processing, loss, dilution, balance recoverable metal value.

Sibgatulin R.R., Fedorova G.V. BALANCED SCORECARD AS A STRATEGIC CORPORATE FINANCE MANAGEMENT TOOL

The article analyzes strategic management of a company's bankroll based on a balanced set of the company performance indicators in terms of the Uralugol JCS.

Key words: Balanced Scorecard (BSC), Key Performance Indicators (KPI).

Fomina O.A. ANALYSIS OF THE CURRENT STATE OF THE RUSSIAN COAL INDUSTRY

The analysis of the financial condition of the coal companies in the period of the innovation of the industry.

Key words: Coal companies, financial resources, financial indicators, innovative development.

Tsukerman V.A., Selin I.V. BUDGETING PROCESSES AND MONITORING OF INTRA-PRODUCTION EXPENDITURES AT THE MINING ENTERPRISE

There are considered the budgeting system and monitoring of the mining complex enterprises allowing to obtain information necessary for making managerial decisions.

Key words: budgeting, monitoring costs, and industrial enterprises.

Electrification mining enterprise

Kurchin A.V., Pichuev A.V. PROSPECTS FOR ETHERNET-TECHNOLOGY IN THE MONITORING OF ELECTRICAL ENERGY CAREER

The article presents the analysis of the characteristics and applications of wireless telecommunications for the transmission of electrical energy consumption data. The tasks performed and the outlook for using Ethernet technology in the monitoring of mobile electrical career and creating a combined system of collecting and processing data on energy consumption in the processing areas career.

Key words: technology, Ethernet, power, telecommunications, energy efficiency, electrical installation.

Sadridinov A.B., Pichuev A.V. ENERGY ESTIMATES OF MINING OPERATIONS FROM RECOGNIZING THEIR IMPACT ON MAN-MADE ENVIRONMENT IN THE URBAN UNDERGROUND CONSTRUCTION

The article deals with current issues of energy efficiency evaluation of management of mining operations in the urban underground construction. The tasks and directions of improvement of methods and criteria for determining the energy efficiency, taking into account the environmental performance of man-made environment. The components of energy for the overall assessment of mining energy efficiency complexes.

Key words: energy efficiency criteria, tunnel machines and systems, urban underground construction, energy.

Mathematical and computer modeling

Redkin G.M., Konovalov A.V., Alexanov V.Y. MATHEMATICAL MODELING OF AVERAGE NATURAL CLEAVAGE

The article describes the methods for determination of shape and spatial direction of average natural cleavage and blockiness of the rock mass, that have been developed on the basis of fracture system frequency vector. Examples of these parameters determination are given for a part of Korobkovskoye deposit.

Key words: fracture system, fracturing, fracture system vector, average natural cleavage, blockiness.
Sokolov I.V., Antipin Yu.G., Smirnov A.A., Nikitin I.V., Baranovsky K.V. 
SELECTION OF A MINEFIELD OPENING-UP SCENARIO IN COMBINED MINING BASED ON ECONOMIC AND MATHEMATICAL MODELING

The article offers classification of methods and schemes of underground deposit opening-up in combined mining and, based on that, rational alternative schemes are constructed. The efficient alternative and the optimum mining level height in opening-up of an underground copper–zinc deposit are determined using the developed economic and mathematical model and computer-aided calculation program.

Key words: combined mining, deposit opening-up method and scheme, economic and mathematical modeling, efficient opening-up alternative selection criteria.

Tsvetkov A.B. 
MATHEMATICAL MODELING IMPACT GAS PRESSURE IN ROCK MASS

A mathematical model that takes into account the manifestations of the gas pressure in the rock mass, which is based on a set of problem-oriented program based on the concept of synthesis of a mathematical model of piecewise-homogeneous rock mass of blocks.

Key words: Mathematical model, rock massif, structural block, coal stratum, deads, adjacent strata, geologic fault, finite difference method, theory of elasticity, salvage problem, synthesis, gravitation, gas.

Shurygin D.N. 
CLASSIFICATION OF PARAGENETICAL COMPLEXES OF ROCK ROOF OF COAL SEAMS IN EAST DONBASS

Under consideration is a new approach to classifying coal seam roof rocks from the viewpoint of the roof stability. The author has found regular patterns in the range of roof rock types, which allows the roof stability estimation by lithological types and thickness of rocks.

Key words: seam roof, paragenetic complex of rocks, roof rock stability.

Shurygin D.N. 
DETERMINATION OF OPTIMAL SEMIVARIOGRAM MODEL ON THE BASIS OF THE METHOD OF THE GROUP ACCOUNT OF ARGUMENTS

The article presents algorithm for an optimal model of theoretical variogram to fit with experimental data. The mathematical model presented as a sum of variograms (de Veys, spherical, linear, etc.) is characterized by optimum complexity.

Key words: geostatistics, variogram, model of variogram.

Oil and gas

Zaurbekov S.A. 
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Key words: hole drilling, geological conditions, flattening, drill hole path stabilization.

Metallurgy

Chernykh S.V., Menushenkov V.P., Skorodumov S.V., Zhukov D.G., Vidmanov I.M. 
EFFECT OF INTENSIVE PLASTIC TORSION ON THE STRUCTURE AND MAGNETIC PROPERTIES OF CAST ALLOY Nd9.5Fe84.5B6

Effect of intensive plastic torsion (IPT) on the structure and magnetic properties of cast alloy Nd9.5Fe84.5B6 is studied using X-raying and differential thermal analysis (DTA) as well as vibration magnetometer. Structural composition of the IPT-
affected specimen contains α-Fe, small amount of Nd₂Fe₁₄B and amorphous material amount of which depends on degree of strain. Next annealing of the deformed specimen causes solidification of the amorphous material, and nano-composite structure Nd₂Fe₁₄B/α-Fe is generated as a result. Maximum coercive force and magnetic energy are reached on the specimen exposed to deformation at a rate of 20 hammer cycles on Bridgman anvil \( H_c = 4.5 \ \text{kOe} \) and \( (BH)_{\text{max}} = 166 \ \text{kJ/m}^3 \).

Key words: NdFeB; Intensive plastic torsion; Structure; Nano-composite Nd₂Fe₁₄B/α-Fe; Coercive force.

**Works of young scientists**

**Gulyaev E.S.** DESCRIPTION OF GEOMETRIC PRECISION OF THREAD TRACER USING GENERALIZED COORDINATES.................................................. 386

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Key words: thread tracer, geometric precision, coordinate systems.

**Manuel Felix** STRATEGIC RISK MANAGEMENT IN DIAMOND MINING INDUSTRY IN THE REPUBLIC OF ANGOLA......................................................... 388

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Key words: diamond market, risk management, investment project, risk assessment model.

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Key words: defining boundaries quarry, the ultimate quarry depth, contour ratio, mining information technology, optimization quarry.

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