

## CONTENT

---

### Underground mining

- Demin V.F., Demina T.V., Baimuldin M.M.** ADVANCED TECHNOLOGICAL TOOLS FOR MINE ROADWAY CONSTRUCTION WITH ROCK BOLTING ..... 5  
*Stability of underground excavations depends on enclosing rock properties. Damage resistance of the excavations is governed by the type and consistency of mine support, the sites of mine roadways and their orientation in rock mass relative to the effective stresses. The present authors have developed advanced flowsheets of roadway construction with rock bolting. A rock bolt with internal opening (or external grooving) and an extensible steel rock bolt are designed. The detailed drawings of an adjustable metal pickup and a coupling of rock bolts are prepared. It is scheduled to carry out competitive testing of the proposed rock bolting tools and the best analogues of foreign manufacture under production conditions.*  
Key words: mining, longwall, rock bolting, labor content, mine, coupling.
- Demin V.F., Smagulova A.S., Demina T.V.** EFFECT OF PRINCIPAL HORIZONTAL STRESSES ON ROADWAY STABILITY ..... 11  
*Locating roadways in parallel to the directions of maximum horizontal stresses favorably influences the roadway stability. With the stated objectives, it has been found unfavorable to position roadways in the Saransky site of the Karaganda Coal Basin at 72° to the north-south line, while the optimum location of the roadway is crosswise to the indicated course. The dedicated program allows flexible visualization of calculations based on the found relation between stresses and the roadway path angle.*  
Key words: rock mass, stresses, strains, principal horizontal stresses, roadway path angle, geomechanical relations, stress-strain state, roadway stability.
- Zubkov V.V., Kvyatkovskaya E.E.** INFLUENCE OF THICKNESS LAYER ON FORMATION OF ABUTMENT PRESSURE ZONE ..... 18  
*The article presents the results of numerical experiments on estimation of stressed state of rock mass and the identification of zone of high rock pressure during the test suites of coal layers.*  
Key words: abutment pressure zone, thickness layer, suite layers.
- Savich I.N., Mustafin V.I.** JUSTIFICATION PARAMETERS STOREY MECHANICAL ISSUE IN THE DEVELOPMENT OF POWERFUL ORE DEPOSITS ... 23  
*Justification parameters of mining systems, allowing for high quantity and quality indicators extraction is an important task in the design underground development of mineral deposits. Research on the basis of physical and computer modeling allows solving this problem and efficient spatial design solutions with a simultaneous improvement process of stoping, which can significantly improve mining of ore reserves.*  
Key words: caving systems, system parameters, the mode and order of release, physical modeling, ore loss, ore dilution.
- Kozlov V.V.** THE PERSPECTIVE DIRECTIONS OF THE ORGANIZATION OF THE PRODUCTION OF UNDERGROUND COAL MINING ..... 28  
*One of the promising directions of the organization of underground coal mining, in conditions of complication of the geological conditions, is the transition to the technologies maneuvering by the mechanized complex on the basis of the automated choice of schemes of production organization and departure from the traditional way of development of coal layers, providing for dismantling of equipment with the subsequent transfer it to a new slaughter.*  
Key words: coal, fully mechanized face, artificial intelligence, production.
- Malkin A.S., Agafonov V.V.** BACKGROUND OF THE CONCEPTUAL DESIGN METHODOLOGY FOR MULTI-FUNCTION MINE SYSTEMS ..... 32  
*The analysis of modern hypotheses division of coal mines that are typical for the group with certain basic parameters and results of production and economic activity.*  
Key words: multi-functional.
- Mikheev V.O., Agafonova A.B.** STRUCTURAL HIERARCHY OF THE COAL MINE DECISION-MAKING SUPPORT SYSTEM ..... 38  
*It is shown that the formation of the design decisions of technological schemes of coal mines in is obligatory to take into account the basic aspects of the concept of the properties of the*

system (incompatibility, waivers, etc.) and the principles of hierarchy and subordination elements subsystems, adaptation, stability, etc.

Key words: properties, design, coal mine.

- Palankoev I.M.** DEGREE ESTIMATION OF AN ACCIDENT SITUATION RISK IN VERTICAL SHAFTS DURING THEM SINKING BY GROUND FREEZING METHOD ..... 44

In the article had been analyzed all technological phases of shaft sinking by ground freezing method and were revealed possibilities of accidents in each phase of ground freezing.

Key words: ground freezing, accident, freezing column, quicksand outburst, uneven pressure of a lining.

- Radchenko S.A., Levchenko Ya.V.** FORMATION OF OVERBURDEN DURING THE PRODUCTION OF LARGE SCALE COAL BRACHYSYNCLINES ..... 52

The article deals with the features of the formation of overburden during the production of large scale coal brachysynclines, which occur during the creation of different zones of altitude in the open pit mine, each of these zones is characterized by its own properties of production, system and scheme of removing the overburden.

Key words: removal of overburden, brachysyncline, angle of hade deposits, coal mining, coal, area development.

- Rakishiev B.R., Moldabayev S.K., Samenov G.K., Nurgalieva M.S.** EXPANSION OF WORKING AREA OF OPEN CAST MINES DURING THE CHANGEOVER TO CYCLING PROGRESSIVE OPERATIONS ..... 58

Some methods of intensive work within the stripping zone with the angle slope increase of working pit wall and backlog of stripping elimination during the changeover from rail transport to combined motor belt one are considered.

Key words: stripping rocks; open-cast mine field; combined motor belt transport; working area.

- Stradanchenko S.G., Golodov M.A.** DIRECTIONS OF MODELING NARROW FACE TECHNOLOGIES OF WORKING OUT NEAR SHAFT PILLARS ..... 67

The structure of the process of modeling of narrow face technologies of working out near shaft pillars is given. Definitions of criterion of the management efficiency by working out the stocks in near shaft pillars.

Key words: vertical trunk, pillar, the development of models of reserves.

- Yutyaev A.E., Belyaev V.V., Agafonov V.V.** COGENERATION OF RESOURCE-SAVING TECHNOLOGIES IN COAL MINING ..... 69

Address aspects of resource - and energy-saving in the sphere of mining production, as well as the diversification of economic activities of the coal-mining enterprises on the basis of the use of cogeneration technologies.

Key words: cogeneration, motor Stirling heat pump.

### Open mining works

- Aybinder I.I., Garikov I.F., Shenderov A.I.** ENERGY EFFICIENCY OF A COMBINED SYSTEM OF OPEN-PIT DEVELOPMENT IN DEVELOPING COAL DEPOSITS ..... 75

Examines energy savings in combination system of development of coal deposits with a innovation dlinostrelvogo spreader for working off of ledges overburden high fortress. The possibility of a substantial improvement in the efficiency of energy production at the expense of transporting alcoholic overburden without the use of graphics-intensive technological schemes by road or rail.

Key words: system design, energy efficiency, ledge, overburden, dragline, spreader, conveyor, shredder, performance, road transport.

- Kazakov V.A.** THE DEPENDENCE OF THE PERFORMANCE OF THE DREDGER OF PHYSICO-MECHANICAL PROPERTIES OF THE DEVELOPED SAPROPELS ..... 83

The procedure for the calculation of productivity the projectile within the limits of rational values of the density of the slurry depending on physico-mechanical properties of sapropel is reviewed

Key words: sapropel, slurry density, the density of sapropel in deposits, the volume consistency, the performance of the dredger, ash content, relative humidity of sapropel.

- Radomskii S.M., Radomskaya V.I.** CLASSIFICATION OF ISOLATIONS MINERALS NATIVE GOLD OF POKROVSKIY GOLD-ORE LAYER OF THE AMUR REGION ..... **88**

Is proposed the serial mode of the wet classification of pulps in the space of intervals 1000–0.05 mcm based on example of Pokrovskiy's ores the gold-ore layer of the Amur Region. The maximum distribution of the isolations of virgin gold in the fractions 10-1 m is quantitatively established. The chemical treatment of ores by hydrofluoric acid increases a quantity of nanominerals of gold by 0.5%.

Key words: native gold, classes of the coarseness, method of classification, Amur Region.

### The enrichment of minerals

- Ermolovich E.A., Ketov C.B.** ULTRA-FINE GRINDING EXPERIENCE OF WASTE OF FERRUGINOUS QUARTZITE ENRICHMENT ..... **93**

The article deals with the structural and textural features of the tailings of iron ore and a significant difference between them and the natural iron ores. The application of ultra-fine grinding technology for the processing of tailings is justified. A principle possibility of ultra-fine grinding tailings ferruginous quartzite by rotary-jet mill is established.

Key words: waste of enrichment, ferriferous quartzites, magnetite, quartz, ultrafine grinding, double whirlpool mill.

- Myazin V.P., Sherstenev D.M., Bayanov A.E.** TECHNICAL SOLUTIONS FOR THE IMPLEMENTATION OF THE TECHNOLOGY CIRCLE-LOGO-DICHNOGO HEAP LEACHING IN PERMAFROST TRANSBAIKALIA ..... **99**

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.

- Romashev A.O., Kuskov V.B., Kuskova Ya.V.** SEPARATION OF DIFFERENT MATERIALS UNDER SEGREGATION ..... **107**

A positive effect by using phenomenon of segregation in the course of processes of separation materials at the concentration table. Also shows the possibility of classifying fine granular material by size using vibrating segregation.

Key words: segregation, concentration table, beneficiation of fine particles, screenless classifying.

- Sedelnikova G.V., Koshel E.A.** MODIFICATION OF GOLD SULFIDE CONCENTRATE UNDER MAGNETIC-PULSED TREATMENT ..... **112**

The article describes research findings on modification of gold sulfide concentrate under magnetic-pulsed treatment.

Key words: magnetic-pulsed treatment, thermo-electromotive force, specific resistance.

- Shadrinova I.V., Sabanova M.N., Orekhova N.N.** INVESTIGATION OF GUIDELINES OF ORE CONCENTRATION HIGHER PRODUCTION DATA CONSIDERED OF THINIMPREGNATED ORE FROM SOUTH URAL REGION ..... **118**

Cooper-zinc ores of South Ural consider to difficult object for concentration, which characterized low content of valuable component, thin and ultrathin dispersion, natural activation of zinc mineral. In article results of ores on washability methodical researches presented and microscopically analysis of concentration product. Total cause of ore concentration inadequate effectiveness established. Guidelines of flotation higher production data considered. Results of research into the effects of reagent-dispersant on indicator of flotation presented.

Key words: capacity of tin, high alkaline environment, aeration.

### Measurement, control, diagnostics

- Zagorsky L.S., Shkuratnik V.L., Chervinchuk S.Yu.** ASSESSMENT OF OFFSHORE MICROSEISMS IN THE SHELF SEA ..... **125**

<i>The article focuses on the methods of assessing microseisms sourced by tidal bore and open sea disturbance.</i>	
<i>Key words: shelf sea, continental shoulder, primary forward wave, plane-layered medium.</i>	
<b>Maksimov R.N., Mazko A.I.</b> DETERMINATION OF THE FIXED-BED SEDIMENT THICKNESS ON THE VERTICAL VIBRATING FILTER SURFACE .....	<b>131</b>
<i>The authors analyze structural features of sediment bed on the vertical vibrating filter membrane.</i>	
<i>Key words: filtering, vibration, sediment.</i>	
<b>Radzhabov A.O., Rakhimov V.R.</b> ANALYSIS OF THE ADJACENT ROCK MASS STRESS STATE IN THE COMBINED OPEN PIT-AND-UNDERGROUND MINING .....	<b>136</b>
<i>The authors have analyzed stress state of the adjacent rock mass under effect of the combined open pit-and-underground mining with different shape excavations.</i>	
<i>Key words: rock mass, open pit, adjacent rock mass.</i>	
<b>Soltabaeva S.T., Baigurin G.D., Kalyibekov T., Toleuov B.T., Ryisbekov K.B.</b> DESIGN PROCEDURE OF DEGREE OF READINESS OF STOCKS TO DREDGING TAKING INTO ACCOUNT COMPLEXITY OF THE STRUCTURE OF THE DEPOSIT .....	<b>140</b>
<i>In article the design procedure of degree of readiness of stocks to dredging taking into account complexity of a structure of a deposit which influences reliability of degree of readiness of stocks of minerals is offered</i>	
<i>Key words: methodology, area, volume, ratio of exploitation.</i>	
<b>Usanov S.V., Konovalova Yu.P.</b> DEFORMATION PROCESSES DURING METRO TUNNEL ENGINEERING IN EKATERINBURG .....	<b>142</b>
<i>The article tells about results of instrumental geodetic observations over surface and buildings deformations at the underground railway construction in the Yekaterinburg–City. As a result of researches a block character of rock deformation is established.</i>	
<i>Key words: displacement, tunnel, subsidence of rocks, blocks.</i>	
<b>The construction of underground constructions and mines</b>	
<b>Kulikova E. Yu.</b> UP-TO-DATE ASPECTS OF PREDICTION AND MONITORING OF UNDERGROUND STRUCTURES .....	<b>145</b>
<i>Forecasting and monitoring of the environment – two aspects of environmental safety control during the construction of underground facilities.</i>	
<i>Key words: forecasting, monitoring, geosystem, man-made impact, method, simulation.</i>	
<b>Automated control systems</b>	
<b>Kuzin D.A., Zapevalov A.V., Syrchin A.V.</b> THE RELATIONAL MODEL OF MULTILAYER PERCEPTRON .....	<b>151</b>
<i>Describes the approach developed by the authors to present the structure and parameters of multilayer perceptron in a relational database. A method of representation of the perceptron with dynamic data structures (doubly linked list) with fragments of description in C language. Shown in a chart data the relational data structure to represent a perceptron consisting of six related entities.</i>	
<i>Key words: perceptron, neural network, neuron, DBMS, relational model, relation, entity.</i>	
<b>Nazarenko V.M., Nazarenko M.V., Khomenko S.A.</b> NEW APPROACHES TO DESIGNING AUTOMATIC MINING PROCESS CONTROL SYSTEMS BASED ON GIS K-MINE.....	<b>155</b>
<i>The article discusses utilization of information technologies in mining process control. The authors describe the structure and functional capabilities of an automatic mining process control system based on GIS K-Mine. In focus of the analysis are information exchange in multiuser regime, functionality of the system modules in primary modeling of a mineral deposit and mine infrastructure elements, updating of geological surveying graphic data, planning, projecting and control of mining operations.</i>	
<i>Key words: mineral, mining, geoinformation system (GIS), transport equipment.</i>	

## Mining machinery, equipment and transport

- Volkova L.P., Pankrushin P.Yu.** FEATURES OF MANAGEMENT OF THE STRUGOVY UNIT IN THE CONDITIONS OF NOT PARALLELISM OF SHTREEKS ..... **169**  
*Prospects of improvement of management by strugovy units in aspect of the solution of a problem of transition to technology of coal mining without continuous presence of the person at a clearing face are considered. Features of adaptive systems of purposeful behavior and self-organizing systems are noted. Possibility of application of neural networks for management of the strugovy unit in the conditions of not parallelism of shtreeks locates.*  
*Key words: strugovy units, deserted dredging of coal, management in the layer planes, self-organizing systems, neural networks.*
- Vorontsov A.N., Volokhovskiy V.Yu., Slesarev D.A.** CASE HISTORY OF ESTIMATION PROCEDURE FOR STRENGTH AND REMAINING LIFE OF STEEL CABLES OF HOISTING MACHINES ..... **175**  
*Strength assessment approach and life-time prediction of deteriorated wire ropes based on magnetic NDT technique are presented. Stress safety factor is used as indicator of working history state of degraded rope. Examples of strength estimation of hoisting rope and crane rope under fatigue bending are demonstrated.*  
*Key words: hoisting wire ropes, magnetic testing, loss of metallic area, wire breaks, safety factor, strength, residual life-time.*
- Erygin A.T., Okhapkin A.Yu., Burov Yu.V.** INPUT DATA FOR IMPROVED TECHNICAL-AND-ECONOMIC PERFORMANCE OF PORTABLE INSTRUMENTS USED IN THE CLASS II EXPLOSION-HAZARDOUS ENVIRONMENT ..... **185**  
*In work as a result of experimental researches are established characteristics intrinsic safety  $I_B = f(L, E)$  for explosive environments IIC of a category of explosion hazard for new before unexplored area of parameters of electric circuits which use to improve technical and economic characteristics of portable devices and electric equipments, will expand the area of their application, will provide access to developers of the given devices and electric equipments to their settlement estimation intrinsic safety.*  
*Key words: intrinsic safety, an electric circuit, an electric equipment, a settlement estimation.*
- Ivanov S.L., Fokin A.S., Zvonarev I.E.** OPTIMIZATION OF GEOMETRIC PARAMETERS OF COARSE-GRAINED GEAR OF THE EXTERNAL LINKS ON THE EXAMPLE DRIVE TURNTABLE EXCAVATOR ESH-10/60 ..... **189**  
*Reduction of wear is possible by optimizing the geometrical parameters of engagement in the design and creation of conditions for rational lubrication during operation. An example of the increase in bending strength of teeth and minimize the unit slides into engagement through the inclusion of geometric calculation of the tangential displacement and changes in the height of the tooth.*  
*Key words: specific sliding, block contour, combined offset, contact.*
- Krasuk A.M., Russkiy E.Yu.** RESEARCHES OF THE STRENGTH AND FREQUENCY PROPERTIES OF FANS DUAL WORKING BLADES OF MAIN AIRING ..... **192**  
*The loadings acting dual sheet blade are considered, the intense-deformed condition blade is certain, decrement of fluctuations blade is found, dependences of stress on frequency of revolving force are constructed*  
*Key words: dual sheet blade, decrement of fluctuations, the intense-deformed condition, frequencies of fluctuations.*
- Lebedeva E.V.** THE USE OF ELECTRONIC TACHOMETERS WHEN SURVEYING THE OBSERVATION OF THE CONVERGENCE OF MINE WORKINGS .... **200**  
*The Convergence of mining developments affect the safety of conducting mining works. The use of electronic tachometers allows to increase the accuracy of the survey observations of the deformations.*  
*Key words: mining, mine surveying instruments, deformation, shooting, root mean square error of measurements.*
- Lemeshko M.A., Trifonov A.V.** INVESTIGATION OF THE ADAPTIVE MACHINE DRIVE «UBG-1A» ..... **202**

The article deals with the investigation of the adaptive machine drive «УБГ-1А» at the mutual interaction of the cutter with the face during rotation drilling. The tasks of the investigations carried out are formulated briefly.

Key words: adaptive machine, investigation of the adaptive machine drive.

**Sekretov M.V.** CHOICE OF RATIONAL FORMS OF TEETHS OF THE WORKING TOOL OF DRILL MACHINES OF SHOCK ACTION ..... **208**

The analysis of geometrical forms of teeths of the working tool for destruction of rocks by blow is given. On the basis of this analysis areas of rational application of teeths are recommended, recommendations about updating of geometrical parametres of teeths are given.

Key words: the working tool for destruction of rocks by blow, the form of teeths, shock wave, contact zone, corner of an inclination of a lateral surface of a tooth, tooth radius, effectiveness ratio of the form of a tooth.

**Taran I.A.** ANALYSIS OF FULL-FLOW ELECTRIC/MECHANICAL TRANSMISSION OF DIESEL ENGINE DRIVEN MINE LOCOMOTIVE..... **214**

Full-parametric transmission of the mine locomotive is considered; angular velocities, torques, and structural elements parameters being part of it are determined due to the innovative technology of transmission analysis that corresponds to the construction of random structural transmission layouts with the menu of elementary basic elements with parallel automated generation of their mathematical models.

Key words: innovative technology of transmission analysis, full-parametric transmission, mathematical models, automated generation, mine locomotive.

**Chadaev A.S., Zyryanov I.V.** ROCK TRANSPORTATION USING MOTOR VEHICLES IN DIAMOND PIPE MINING ..... **222**

The article compares specifications of wheeled and tracked motor vehicles operating in limited space of deep open pit mines under low temperature.

Key words: diesel trolley car, mineral deposit, open pit mine, climatic conditions, transport system.

### **Labour protection**

**Kalinin A.P.** SYSTEMATIZATION OF THE FORMS OF MOTIVATIONAL ACTION ON THE ECONOMIC SUBJECTS FOR RAISING THE LEVEL OF COMPLEXITY, SAFETY AND RATIONALITY OF THE MASTERY OF THE URBAN UNDERGROUND SPACE ..... **230**

In the article the basic forms of motivational economic action on participants in the mastery of urban underground space under the conditions for a significant increase in the urbanized territories are analyzed and systematized.

Key words: megapolis, motivation, the methods of the stimulating action, urban underground space.

### **Blasting operations**

**Umarov F.Ya., Bibik I.P.** DEVELOPMENT OF SAFE FIRING METHOD TO PRESERVE PITWALL ROCK MASS AND ENGINEERING INSTALLATIONS IN OPEN PIT MINE FROM BLASTING-INDUCED SEISMIC LOAD ..... **235**

The calculation procedure is developed for seismically safe weight of charges for instantaneous and one-delay firing, and recommendations are made concerning delay intervals between rows of blastholes for nonelectric blasting in rocks of medium resistance to blasting, delay intervals between blastholes in a row for rocks of low resistance to blasting and diagonal explosion patterns aimed at reduction of impact of seismic vibrations.

Key words: blasting-induced seismic load, instantaneous explosions, short-delay explosions, open pitwall rocks, engineering installations.

### **Economy, management and planning**

**Artemiev V.B., D'yakonov A.V.** DEVELOPMENT OF THE FUNCTIONAL OF THE HEAD OF THE PLOT COAL MINE ..... **240**

A complex of criteria and indicators for evaluating the functionality of the chief of an industrial site, the dependences of the efficiency and safety of the production of the types of func-

<p>tionality of the chief of an industrial site of a coal cut and level of its involvement in the development process, the methods of development of the functional of the chief of a site.</p> <p><i>Key words:</i> coal cut, industrial plot, work safety, functionality.</p>	
<p><b>Bauer V.P., Pashevich M.V.</b> RISKS OF THE CREDIT FIELD «COMMERCIAL BANK - THE MINING COMPANY» IN MODERN CONDITIONS .....</p> <p>Possibility of use of the concept of a credit field of commercial bank with a view of revealing of features of occurrence of credit risk in system «commercial banks - the mining companies» is studied. The conclusion about efficiency of the approach in case of credit service clustered and network structures of the mining companies becomes.</p> <p><i>Key words:</i> commercial bank, the mining company, a credit field, credit risk, cluster, a network.</p>	<b>247</b>
<p><b>Valuev A.M., Kuligin L.E.</b> APPLICATION OF “SCIENTIFIC MANAGEMENT” APPROACHES IN ORGANIZATIONAL PROCESSES USING MODERN INFORMATIONAL TECHNOLOGIES .....</p> <p>For production systems based on manual labor with the use of mechanisms the method and means of informational support for collection and treatment of data concerning labor operations duration is developed, including the specialized software and hardware complex. Using them, the statistically significant raise of labor productivity was obtained.</p> <p><i>Key words:</i> production process, operation, labour productivity, statistical significance, software package, palmtop computer.</p>	<b>254</b>
<p><b>Volovik A.V., Klavdiev A.A., Trushnikov V.E.</b> RELIABILITY MONITORING OF TECHNICAL ARTICLES CLAIM .....</p> <p>In the article the economical approach for rapidly and objectively assess the technical level of products in use in general and the effectiveness of measures to improve their reliability (technical excellence) – in particular, given the uncertainty of the behavior of the medium.</p> <p><i>Key words:</i> monitoring, quality, reliability, technical perfection , regulation, uncertainty, approach.</p>	<b>262</b>
<p><b>Volovik A.V., Klavdiev A.A., Trushnikov V.E.</b> DEFINITION CONFIDENCE LIMITS HOURS OF PRODUCTS FOR FAILURE OF A SMALL SAMPLE OF OBSERVATIONS .....</p> <p>In the article the rational procedure for determining confidence limits when assessing developments of products in advance. Using the distribution of order statistics, to determine the boundaries of use of products to failure can be significantly small the sampling observations. It is highly relevant that approach and to address the issues related to ensuring the safe use of the products, as statistics for Security operates very small number of accidents and incidents.</p> <p><i>Key words:</i> entropy, order statistics, time to failure, a small selection of a minute, and security.</p>	<b>271</b>
<p><b>Volovik A.V., Klavdiev A.A., Trushnikov V.E.</b> IMPROVING THE ACCURACY OF ESTIMATES OF STATISTICAL DISTRIBUTIONS ADDITIONAL OFFSET TABULAR .....</p> <p>The proposed approach is based on one of the properties of the statistics, which consists in the fact that an unbiased consistent estimate is often possible to obtain a consistent estimate of the offset by multiplying it by a suitable function of. The point is further offset assessments in order to increase their accuracy in a small sample.</p> <p><i>Key words:</i> lower confidence limit, the density distribution, the statistical evaluation of the density distribution, small sample size, the average time between failures.</p>	<b>278</b>
<p><b>Kuzmina R.S.</b> OPTIMIZATION OF QUALITY MANAGEMENT OF MANUFACTURE OF MINING MACHINERY .....</p> <p>Formulated the task of optimization of quality management of manufacture of mining machinery in the conditions of the limited volume of investments. It is accepted that the costs of improving the quality inversely proportional to the standard deviation of parameters, which determine the level of quality. On the example of the simple parts with two parameters shown, that due to the choice of the optimal values of these parameters it is possible to 9 - 12 per cent increase the quality level in comparison with the value adopted in the present time.</p> <p><i>Key words:</i> optimization problem, the control parameters, the quality level of mining machines, the volume of investments, accuracy and eligibility of the manufacturer.</p>	<b>286</b>

<b>Kilin A.B., Azev V.A., Kostarev A.S., Shapovalenko G.N., Osharov A.V., Maryasov I.V., Poleshchuk M.N.</b> THE APPROACH TO DETERMINING THE VALUE OF THE PERSONNEL THE COAL COMPANIES.....	<b>291</b>
<i>For the discussion of the presented approach to determining the value of the personnel of the coal companies and the experience of its implementation on the example of two main categories of personnel: the chief of a site and the mechanics of the site in OOO SUEK-Khakassia».</i>	
<i>Key words: coal mining enterprise, staff, value, definition, methodology, approach.</i>	
<b>Martyakova E.V., Kravchenko A.A., Skazhenik V.B.</b> ECONOMIC APPRAISAL OF COAL MINING ADVANCE AT THE PRESENT-DAY STAGE.....	<b>303</b>
<i>The authors view all sides of a question of adequate technical-economical assessment of coal mines, systematize objectives of the assessment and possible approaches and propose the estimating algorithm based on space-and-time modeling of feasible mining scenarios and calculation of natural values and financial performance of the scenarios.</i>	
<i>Key words: quality management system, standard, control.</i>	
<b>Matsko N.A.</b> ECONOMETRIC RESEARCH OF INFLUENCE OF THE PRIMARY SECTOR SCALE ON ECONOMIC GROWTH.....	<b>308</b>
<i>The article is devoted to studying of influence of primary sector scale on rates of economic growth. On the basis of data on countries' development for last four decades it is constructed the econometric model for income per capita growth rates. Negative relation between natural resources share in GDP and long-term growth rates of a standard of living is established. The relation is kept after controlling other significant variables.</i>	
<i>Key words: economic growth rates, primary sector of economy, gross domestic product.</i>	
<b>Sergeev I.B., Ponomarenko T.V.</b> THE SYNERGETIC EFFECTS OF MINING COMPANIES' INTEGRATION: FORMATION AND ESTIMATION .....	<b>316</b>
<i>The causes, incentives and effectiveness of mining companies' corporate integration are analyzed. The ways of possible integration synergetic effect creation are explored. The use of real options method for estimating strategic synergic effects is proved and calculations based on a binomial model for Russian mining and chemical companies are given.</i>	
<i>Key words: corporative integration, integrated mining enterprise, real-options valuation (ROV), strategic synergic effects.</i>	
<b>Straupnik I.A.</b> TECHNOLOGICAL AND ECONOMIC EFFICIENCY OF HEAT ENERGY EXTRACTION BY THE MEANS OF NEAR-SURFACE CIRCULATION SYSTEMS BASED ON COAXIAL BOREHOLES.....	<b>324</b>
<i>Among renewable energies, low-temperature geothermal energy is gaining importance due the different applications that are being accomplished within residential sector. There are presented methodological design principals to create effective heat transfer during mining in the near-surface circulating systems based on coaxial boreholes. It is also described the way of optimal circulating system calculation based on the choice of the most profitable design.</i>	
<i>Key words: heat exchange boreholes, heat transfer, geothermal energy, coaxial heat exchangers.</i>	
<b>Chernyy S.A., Yushina T.I., Petrov I.M., Bogdanov S.V.</b> EVALUATION PROFITABILITY OF MINING PROJECTS FOR PRODUCTION OF RARE-EARTH METALS .....	<b>329</b>
<i>The potential profitability of a number of well-known projects to develop rare earth deposits is evaluated in this article. Also the impact of possible changes of the rare earths market on projects implementation is analyzed.</i>	
<i>Key words: deposits of rare earths, rare earth metals, profitability, potential recoverable value.</i>	
<b>Mathematical modeling</b>	
<b>Tsvetkov A.B., Frjanov V.N.</b> MATHEMATICAL MODELLING OF A GEOLOGIC FRACTURE IN HILLS WITH A DEVELOPMENT .....	<b>333</b>
<i>In paper outcomes of operation of a complex of the job oriented programs built on the concept of synthesis of a mathematical model from the inhomogeneous units are presented, in correspondence to each of which the boundary value problem of theory of elasticity is put.</i>	



The problem of affecting of a development and a geologic fracture of mucks over its roofing is observed.

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

### Works of young scientists

- Badmaraev A.N.** REPRESENTATION OF ROAD NETWORK IN THE COMPUTER... **338**  
*In this article the problem of representation of the road network on a computer while minimizing data redundancy was considered. Three levels of detail of the road network were identified.*  
 Key words: road network, road, way, level of detail, computer, graph, route, way.
- Bekrenev I.V.** RESEARCH OF SPECIFICS OF DEVELOPMENT THE NONMETALLIC CONSTRUCTION MATERIALS MARKET OF RUSSIA..... **340**  
*In the research the condition of the Russian market of the nonmetallic construction materials is estimated, the forecast of the further development of the branch is also given. In the article the development of regional markets of the country, is analysed. It is considered a number of problems of the Russian nonmetallic the industries and possible variants of decision are also offered.*  
 Key words: the nonmetallic construction materials (NCM), market, volume, export, import, stocks, price, mineral source of raw materials.
- Borisov M.S.** TOPICAL PROBLEMS OF PREVENTION OF CRISIS SITUATIONS ON THE ENTERPRISES OF SMALL AND AVERAGE BUSINESS..... **349**  
*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.
- Kaplunov V.U.** ON THE POSSIBILITIES AND CONDITIONS OF THE FRACTAL REPRESENTATION OF THE STRUCTURE OF THE MINING INDUSTRY... **357**  
*For compact representation of different ecological-economic data should be used to develop a structured database. For the mining industry there is the possibility of presenting a database based on the properties of fractals.*  
 Key words: database, fractal, self-similarity, fractional.
- Kudryavtceva E.Yu.** ELECTRONIC LIBRARY ..... **363**  
*The article considers the importance of developing an electronic library. Advantages and disadvantages of use, features of development and legal framework of electronic resources.*  
 Key words: digital library, the advantages of creating digital libraries, functional electronic library, CMS, the legal framework of electronic resources.
- Marko I.Yu.** ASSESSMENT OF COMPETENCIES BY FACTOR ANALYSIS ..... **366**  
*Possession of methods of acceptance of personnel decisions on the basis of modelling competency allows to describe types of behavior which are necessary to the organization for achievement of high level efficiency. Concepts the competence and competency are used in the HR-management theory and practice to improve processes of compensation, development of workers, selection, hiring, an estimation of efficiency of activity and the decision of other problems. The special attention in article is given to estimation methods of competency, in particular to a method of the factorial analysis.*  
 Key words: the competence, competency, competency model, the factorial analysis, principal component analysis.
- Makhotkin A.M.** ASSESSMENT OF EFFICIENCY OF MAIN ROPE UNLOADING SYSTEMS IN REENGINEERING OF MINE HOSTS ..... **376**  
*The author considers circuit designs of systems meant for unloading of main ropes in reengineering of mine single-cage and two-skip hoists in deep mines. The pull rope unloading ability and efficiency of the considered designs are estimated.*  
 Key words: mine hoist, unloading system for mine hoist ropes.
- Odabai-Fard V.V.** MECHANISM OF AN ECOLOGICAL-ECONOMIC ASSESSMENT AND CHOICE OF OPTION IN FORMATION AND EXPLORATION OF AN ANTHROPOGENIC FIELD OF NONMETALLIC CONSTRUCTION MATERIALS ..... **383**

*In this article the model and the mechanism of an assessment expediency of anthropogenic fields' formation for the purpose of situation improvement in the field of complex use of mineral raw materials are offered.*

*Key words: nonmetallic industrial minerals, technogenic fields, anthropogenic fields, ecological-economic model, ecological-economic assessment mechanism.*

**Popov M.S.** WORKING OUT OF ECONOMIC-MATHEMATICAL MODEL OF THE ESTIMATION OF VARIANTS OF OUTSOURCING MINING AND TRANSPORT OF WORKS..... **387**

*The economic nature of outsourcing reveals. The economic-mathematical model of an estimation of variants of outsourcing mining and transport works at the enterprises of open coal output is resulted*

*Key words: outsourcing, economic-mathematical model, mining and transport the works, open coal output.*

**Svalova K.V.** EXPERIMENTAL STUDIES OF RETENTION CAPACITY OF THE SOLID PHASE DURING MECHANICAL WASTEWATER OF MINING COMPANIES FILTRATION USING FIBROUS POLYMERIC MATERIALS ..... **391**

*The article presents the existing methods for purification of industrial waste water of mining companies, is considered a mechanical way, as the most popular. We describe case studies, as well as retention capacity is counted some filter media and their combinations on the basis of fibrous polymeric materials.*

*Key words: mechanical cleaning, wastewater and recycled water, filtration, retention capacity.*

**Sergeenko A.A.** COMPUTER TECHNOLOGIES IN MINING..... **397**

*Problems and tasks of information of processes of mining manufacture are considered. Software of automation of the various design stages already existing are offered.*

*Key words: mining, the software, information, automation of processes, the review.*

**Tarasov S.P.** DESIGN AND PARAMETRIC BASIS OF MULTI-FUNCTIONAL MACHINE COMPLEX FOR OVERSIZE BREAKAGE..... **400**

*Oversizes left on open pit bottom and walls after drilling-and-blasting exert adverse impact on open pit mine capacity. One of the problem solutions is designing machine complex for safe breakage of oversizes.*

*Key words: drilling-and-blasting, open pit mine, explosives, oversizes, geological and mining conditions.*

**Khonkhodgaev F.T.** PROBLEMS OF DEVELOPMENT OF MINING COMPLEX REGIONS OF THE TAJIKISTAN..... **407**

*The article describes the current state of the mining complex of the Republic of Tajikistan, its overall basic socio-economic problems and their causes, deficiencies which hinder the development potential of stabilization and development prospects, proposals for measures to support the MC, Mineral resources of the country.*

*Key words: mining complex, industrial production, reforming, restructuring.*

**From editorial Board**..... **98**

**From editorial Board**..... **315**

### Preprints

**Artem'ev V.B.** THE RESULTS OF THE 2011 AND TASKS OF JSC «SUEK» TO ENHANCE THE SAFETY AND EFFICIENCY OF PRODUCTION IN 2012..... **10**

*Covers the main goals and strategy of JSC «SUEK», aimed at further improving the safety and efficiency of production, the methods of achieving the set goals. Made accent to the need of planning the work to ensure the safety of production.*

**Ivanov L.V., Kon'shin B.F.** AUTOMATION OF NON-CONTACT ANALYSIS OF THE STATE OF ROCK MASSIF ..... **17**

*Considered the problem of accuracy of the automated processing fotoplanigramm in determining the specific and the problem of automation of processing of images of the explosion of the array career to receive the operative information about his condition. The analysis of*

the weaknesses of processing algorithms and ways of their elimination and analysis of existing methods of image processing, and the choice of method, the most-in-full of the relevant task given the specifics of the image.

Key words: mining range, granulometric composition, filtering, fotoplanigramma.

**Zhukov V.V., Sharikov Y.V., Turunen I.** MATHEMATICAL MODELING OF GOLD THIOSULPHATE LEACHING IN CASCADE OF IDEAL MIXING REACTORS ..... **31**

Using 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 cascade of reactors from concentrate in thiosulphate solution has presented. Results might be implemented to scaling-up of the process, create control system of present process and planning of production by that technology.

Key words: modeling, CSTR cascade, leaching, thiosulphate, gold.

**Pham Van Thuong** DEVELOPMENT RECOMMENDATIONS FOR SUPPORTING TUNNELS IN MINES IN COMPLICATED GEOLOGICAL CONDITIONS .... **66**

The article refers the recommendation supports for tunnels in underground mines in the geological conditions in Khe Tam mine in Quang Ninh province Viet Nam.

Key words: underground and mining construction, displacement of the rock mass around underground mines, rock pressures on the supports in tunnels in underground mines.

**Solov'ev A.M., Soloviev I.M.** IMPROVEMENT OF THE DRIVE EXPLORATION ROTARY DRILLING RIGS..... **92**

Results of experimental studies of variable speed drives in relation to the drilling rigs for solid minerals, a mathematical model was developed to determine the necessary parameters of the drive during its setup and conservation, proposed methods of analysis of non-sinusoidal waveforms current in order to improve the energy efficiency of a thyristor drive.

**Rybak L.V.** ECOLOGY OF URBAN TERRITORIES OF KUZBASS ..... **139**

The analysis of the environmental state of urban territories of the Kemerovo area. Explores the dynamics of the changes of atmospheric pollution over the last five years and the condition of the atmospheric air in the cities of Kuzbass in 2011. The analysis of the main objects of the polluting underground water. Shows the main components of polluting underground water in urban areas. Reflected the negative impact of large-scale development of coal in Kuzbas and closure of mines on the condition of underground waters. Special attention is paid to single-industry cities.

Key words: underground water, polluting components, the development of coal, urban areas, closure of mines, single-industry towns.

**Kazakov V.A.** JUSTIFICATION OF PARAMETERS OF THE TRENCH METHOD OF THE HYDROMECHANIZED DEVELOPMENT OF SAPROPOLIC DEPOSITS ..... **261**

Parameters of a trench method of development of sapropel by dredge taking into account its physicommechanical properties providing decrease in losses by mining are proved.

Key words: hydromechanized development of sapropelic deposits, parameters of trench method, sapropel losses by mining.

**Savvina E.N., Poleshchuk M.N., Shiviryalkina O.S., Vagenina L.N.** THE EXPERIENCE OF THE SUCCESSFUL MANAGEMENT ..... **290**

Presented vital position and a positive experience of managers, reveal their concept of organization of production, as well as the analysis of specific situations, look at the actual problems, reflection.

**Dmitriyev V.G., Ivanov N.Yu.** THEORY TAPE TUBULAR CONVEYOR SPATIAL CURVILINEAR ROUTE. ISSUE 1 ..... **323**

Estimation of wind load and forces of inertia on the curved part of the route in the calculation of the total load on the metal frame of the composition of the tape tubular conveyor. Taken into account the tension of the tape, which creates additional lateral specific effort when calculating the total load on becoming tape tubular conveyor for curvilinear sections of the road from the ring roller bearings. Invented the mathematical model of the tape tubular conveyor for research of non-stationary processes on the computer.

Key words: inertia, wind load, the criterion of Reynolds, tape.

<b>Le Cong Kyong, Kuznetsov V.A.</b> EXPERIMENTAL RESEARCH AND ANALYTICAL ESTIMATE OF THE COEFFICIENT OF DISCHARGE STRIPPING THE ROCKS BY THEIR EXPLOSIVE HANDLING.....	<b>328</b>
<i>Considered the engineering-geological conditions of the existing coal mines socialist Republic of Vietnam to the introduction of explosive transshipment of overburden rocks in the developed space of quarries in the canopy of the Deposit of coal layers. Experimental research of the coefficient of the dumping of overburden from the main natural factors and technological parameters of the pot when their explosive transshipment met at the coal career Nubeo. On this basis, obtained in the dependence of the relief of specific consumption of explosives; - diameter downhole charge; the height of the ledge; the angle of inclination of wells; width and capacity of the coal seam.</i>	
<i>Key words: open mining, coal mine, drilling and blasting work, borehole charges, the coefficient of discharge, the parameters of the pot, and Vietnam.</i>	
<b>Savich I.N., Pavlov A.A., Mustafin V.I., Romanov V.A., Sukhov D.I., Savich O.I., Ishchenko V.L.</b> GEOTECHNOLOGY IN THE DEVELOPMENT ORE DEPOSITS .....	<b>375</b>
<i>Substantiation is given of the main parameters of the systems with the collapse and the regime of release of ore under loose bearing strata, providing rational indicators of extraction of mineral resources in the process of development of ore deposits, as well as the well hydraulic output Sands, used as a placeholder in the formation of the backfill array.</i>	
<i>Key words: system with the collapse of ore and host rock, computer simulation, loss of ores, ore dilution of ore, end issue, the figure of the issue.</i>	

**Deposited manuscripts**

<b>Morozov V.N., Pyatygin V.A., Tatarinov V.N.</b> THE SYSTEM OF GEOECOLOGICAL MONITORING OF DANGEROUS FOR RADIATION OBJECTS.....	<b>22</b>
<b>Voloshinovskiy K.I.</b> REFINEMENT FOR SEMINARS & LECTURES PROGRAM «MEASUREMENT SYSTEMS & PRIMARY SIGNAL CONVERTERS» (MS&SC)....	<b>168</b>
<b>Khutsishvili G.A.</b> RECOMMENDED VARIANTS OF THE TECHNOLOGY OF WORKING OFF OF COAL LAYERS SHORT TREATMENT SLAUGHTER.....	<b>188</b>
<b>Voloshinovskiy K.I.</b> REFINEMENT FOR SEMINAR PROGRAM «SPECIAL CONTROL SYSTEMS SYNTHESIS» .....	<b>199</b>
<b>Khutsishvili G.A.</b> RECOMMENDED VARIANTS OF THE TECHNOLOGY OF WORKING OFF OF COAL LAYERS SHORT TREATMENT SLAUGHTER.....	<b>207</b>
<b>Khutsishvili G.A.</b> THE DEVELOPMENT OF THE VARIANTS OF THE WELL MACHINING OF HYDRAULIC MINING SITES OF COAL LAYERS.....	<b>234</b>
<b>Shilkova O.S.</b> TEST ENERGY OF TECHNOLOGICAL PROCESSING OF METHANE	<b>239</b>
<b>Khutsishvili G.A.</b> DEVELOPMENT OF THE VARIANTS OF BOREHOLE HYDRAULIC MINING SITES OF COAL LAYERS.....	<b>253</b>

