

## Summaries

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ŚLAWOMIR BADURA, KATARZYNA MIGACZ

**Laboratory and Industrial Tests of Real Loads of Slicing Elements of WKL Teeth and New Generation ACXL Teeth** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

In this paper it is presented the results of the laboratory and halfindustrial tests of WKL, ACXL, CX-25/38 teeth of knives of the buckets for wheel excavators. Investigations were carried out on the samples, which physico-mechanical properties are approximate to the properties of the rocks dredged in KWB "Turów". Analysis of static and dynamic investigations let to define optimal shape of tooth for working in very hard multiple conditions. Moreover there were presented three dimensional models of teeth by using FEM. For discrete it was applied solid elements tetra. Numerical analysis let to assignation distribution of stresses in different constructions of teeth and verification their constructions.

**Keywords:** *Excavator's scoops, casting tooth, tooth on cone shape, industrial research tooth*

ŚLAWOMIR BADURA, KATARZYNA MIGACZ, PIOTR MICEK

**The Investigations of Possibility of Usage Rotating Teeth on the Bucket's Knives of Wheel Excavators** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

In this paper it is presented the results of the examination of new type rotating teeth of bucket of wheel excavators and analysis in comparison with actual used teeth. Investigations were carried out on each of knives of bucket armed on the teeth and also with full armament of bucket's knives of wheel for wheel excavator. It was investigated type of teeth WKL, R12.0M, CX-25/38. Comparison analysis let to optimal choice of definite type of teeth for working in very hard multiple conditions.

**Keywords:** *excavator's scoops, casting tooth, tooth on cone shape, industrial research tooth*

PAWEŁ BATKO, JÓZEF PYRA

**Measurement the Velocity of Detonation of an Explosive Placed in the Borehole, Using Apparatus MicroTrap** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article briefly discusses some factors affecting one of the most important parameters characterizing the explosives, namely the velocity of detonation. Also demonstrates how to measure the velocity of detonation of an explosive placed in the borehole, using the measuring apparatus MicroTrap.

**Keywords:** *velocity of detonation, explosives*

JERZY BEDNARCZYK, ANNA NOWAK

**Strategies and Scenarios of Prospective Development of Electric Energy Production from Brown Coal in the Light of Existing Conditions** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Solutions accepted in world scenarios of energy development until 2030 have been presented in the paper and compared with the principles of "The Polish Energy Policy until 2030". Indicators characterizing production of electric energy from coal in Poland in 2005–2009 and resulting synthetic relationships have been given. Strategic

brown coal reserves in Legnica and Gubin region have been discussed and their main parameters have been compared. Development of coal processing technology and electric energy production has been indicated.

**Keywords:** *energy development strategy, brown coal, electric energy, brown coal deposits*

JAN BROMOWICZ, BEATA FIGARSKA-WARCHOŁ

**Joints orientation in a Rock and Shape of cCrushed Aggregate Particles** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The aspect (axial) ratios and dihedral angles were measured for a large number of particles of granite, basalt, sandstone and limestone aggregates, prepared in the same crusher. Joints orientation and intensity in the places of sampling were taken into consideration in analysis. It was found that content of irregular (flaky and elongated) aggregate grains is related to the intensity of joint sets observed in the quarry and to the rock structure (eg lamination) and texture (grain and crystal size and shape). Cuboidal grains are usually produced from a rock in which three main joint sets have similar frequency. Irregular grains are more frequent in finer fractions than in coarser ones. This apparently reflects stronger textural control of cracking of the rock when crushed. On the other hand, coarser grains are a result of cracking along joints. Furthermore, it has been proved that dihedral angles of aggregate particles and, therefore their shapes, depend on the shape of basic fracture cell created by the joint system in the rock.

**Keywords:** *aggregates, joints orientation, shape of particles, petrography*

ZBIGNIEW BUCZEK, MAREK SZMUC, KRZYSZTOF MADEJ

**Liquidation of “Piaseczno” Excavation — Water Basin Construction** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

After the end of exploitation of mining excavation, an important stage was its safeguard. For that reason different conceptions of realization were considered at the design stage. The initial liquidation of excavation and also safety works have been conducted intensively since 2005 and have aimed water basin construction, which will be developed for recreation with the post-mining land. Restoration of the area, which was devastated by the long-term mining activity, is the fundamental aim.

**Keywords:** *mining passage, liquidation and recultivation, water basin*

MARCIN CHODAK, KRZYSZTOF POLAK

**Water Protection in Lower Rhine Lignite Basin** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The lignite deposits in the Lower Rhine Basin have advantageous geological conditions but are often located in the vicinity of ecologically valuable areas. In this work we present the examples of activities aimed at minimization of lignite extraction influences on surface waters and wetlands. The presented examples indicate that it is possible to entirely exclude negative effects of open-cast lignite extraction on the surface waters and wetlands.

**Keywords:** *surface mining, wetlands, rivers*

MAŁGORZATA CICHON

**Tools for Estimating the Risk of Hazards in the Workplace Used in Orica as Part of Preventive Health and Safety (BHP) in the Workplace** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article describes four procedures to estimate the risk in the workplace. Ranging from a simple personal risk assessment for one employee (Take 5 Lite) by estimating the risk for a group of employees or more complex operations (JSERA) until the risk assessment of workplace facilities (Hazard Study and Periodic Hazard Study). Presents the effect of the procedures used at the state and safety awareness in the workplace and improving safety.

**Keywords:** *Take 5 Lite, JSERA, Hazard Study, Periodic Hazard Study*

KAZIMIERZ CZOPEK

**The Analysis of Parameters of DCF Method in Estimation of Investment on Lignite Deposit** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

This article presents an example of a procedure for economic estimation of exploitation of a new deposit. This paper is concerned with a way of assigning of the scope of a decisional variable in the *NPV* (*Net Present Value*) formula. This article also takes into consideration the specific of lignite mining in cash flow calculation, taking into account instead of operating costs, the unit costs of mass exploitation. The discount method was used for the economic estimation of efficiency of exploitation of a new lignite deposits. After taking into account the mentioned lignite specific there are nine parameters in formula of *NPV* of a different nature; deterministic and probabilistic. These parameters include; investment expenses  $I_t$ , discount rate  $r$ , investment evaluation period  $t$ , number of years of the investment cycle  $k$ , final (residual) value  $R_e$ , tax rate  $T$ , sales price  $p$ , sale volume of lignite per year  $x_{pt}$ , yearly volume of a mass exploitation  $x_M$ , unit cost of mass exploitation. This paper presents also the problem of costs and prices of lignite with reference to the connection between lignite mining and electrical power station in market conditions. Lignite mines can't choose the recipient of its lignite, because this is an electrical power station, with is associated with lignite mines. This article describes the main elements, which influence the costs and prices of lignite. Concerning exploitation cost the deciding factor having influence on its value is cover to lignite deposit factor.

**Keywords:** *analysis, energetics, lignite mining, profitability of investment, cost and prices of lignite*

MACIEJ DĘBSKI

**Safety at Work around Bulk Materials Conveyors in Rock Mining** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

In the lecture there are shown the hazards for employees during bulk material conveyors operation. The lecture presents solutions for protection devices applied against hazards. There are mentioned the safety rules required to apply in conveyor maintenance. Also there are hints for conveyor design and maintenance from the safety point of view. The lecture describes actions due to providing the existing condition assessment and due to improving safety issues in a conveyor operation in a job site.

**Keywords:** *conveyor, hazard, safeguard, safety rule*

MAREK DOHNALIK, JADWIGA ZALEWSKA, ŁUKASZ KUT, JAN KACZMARCZYK

**Examination of Internal Pore Space 3D Images of Cement Rock with Use of Roentgen Computed Tomography (Micro-CT)** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The X-ray computed microtomography (micro-CT) is a non-destructive method for visualization of objects' internal structures (in geology — e.g. rocks or cement stones). Sample's X-ray projections at different angles are recorded and, on the basis of them, the objects' internal structure is reconstructed. Visualized parameter is the linear attenuation coefficient (proportional to X-ray's energy, material's density and atomic number of elements in object's structure). The micro-CT may be used to visualize the cement's internal structure and its quantitative analysis. The aim of this paper is to show application of micro-CT in cementary rocks examination. In this work the results of micro-CT measurement for cements of different age (1–28 days) are shown first time in Poland. Obtained results allowed to analyze changes of pore network during the cement rock's shrinking. Significant pore space evolution changes in case of cement rocks with different composition were observed. Results shown that micro-CT method is applicable for cement rocks examination. The main advantage of micro-CT is the ability to reconstruction of pore space and observation of its changes in time. Also the pores' spatial distribution and tortuosity may be examined.

**Keywords:** *cement, cement rock pore structure, pore structure evolution, microtomography*

GRZEGORZ GALINIAK, JERZY JAROSZ, RAFAŁ TOMASZEWSKI

**The Hithero Experiences in the Reclamation of Post-Mining Areas of "Sieniawa" Brown Coal Deposit** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article presents the actual state of reclamation of the post-mining areas of the lignite opencast mine of KWB "Sieniawa" Sp. z o.o. Development of "Sieniawa" Mine is discussed the issues pertaining to the transformation the land surface resulting from the conducted mining operations, as well as the overall prevailing conditions that are

related to land reclamation and development. Data that characterize the reclamation of lands for forestry, agriculture and water management purposes are presented.

**Keywords:** *open pit mining, lignite, reclamation, post mining terrains*

KRZYSZTOF GALOS

**Regional Variability of the Domestic Market of Natural Crushed Aggregates** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The paper presents detailed geographical structure of natural crushed aggregates production, on the background of development tendencies of domestic reserve base and production of such aggregates. Degree of intensification of aggregates' mining output and production, illustrated by average single mine output in each region and by tonnes of mining output per km<sup>2</sup>, was evaluated. Significance of each voivodeship as producer of the main types of such aggregates, was presented. Finally, present and future importance of interregional trade of natural crushed aggregates was characterised.

**Keywords:** *crushed aggregates, reserves, production, market*

TOMASZ GAWENDA

**Issues of Crushing Devices Selection for Mineral Aggregates Production Circuits** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Main issues connected with proper selection of crushing devices in aggregate production circuits were presented in the paper. The first and second section of the article concerns the basics of the comminution processes and the types of crushing devices applied on the European market. The third section treats the principles of crushers' selection on the stage of design and the comminution methodology. It appears that the way of operating the technological process — the number of crushing stages, the control of the material mass flow streams — influences the quality of obtained products. Problems of closed and open comminution circuits were presented in the section four. In summary the examples of technological circuits of aggregates production proposed by the Metso Minerals were shown. The model production of grifts in cone granulator with and without the fines recycle stream was also presented.

**Keywords:** *comminution, cone crushers, jaw crushers, impact crushers, comminution levels, crushing stage, irregular grains, selections of crushing devices*

STEFAN GÓRALCZYK, DANUTA KUKIELSKA

**The Quality Of Polish Aggregates** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

General information on aggregates industry and resources base has been presented. The division of aggregates, requirements and testing methods have been included along with comparative quality analysis. The analysis involved 100 range of aggregates produced by 95 producers. The aggregates have been tested by IMBiGS in the years 2006–2010. For the analysis, accepted results concerned fraction 8/16. The research were representative for all types of aggregates produced in Poland. The analysis involved basic technological properties of aggregates such as resistance to crushing, grindability, thermal shock resistance, absorbability and freeze resistance. The values gained for particular properties have been related to Standards PN-EN 12620 and PN-EN 13043. The quality of produced in Poland aggregates has been presented basing on the tests results. The quality of the aggregates has been related to the expectations connected with planned investments. The possibility of expanding raw materials base beyond traditional applied materials has been presented.

**Keywords:** *mineral aggregates, division, tests, requirements, quality evaluation*

STANISŁAW HAJDO, JERZY KLICH, KRZYSZTOF POLAK

**Conditions of Underground Lignite Gasification — 100 Years of Method Development** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Poland is one of the European countries with large amount of non-utilised lignite sources. The main reason for it is strong objection of local government and public society from areas where those open-pit mining could be explored.

Moreover opinion regarding non-conventional methods for lignite extraction to remain surface infrastructure become popular. The way to aim this goal is underground coal gasification process. This coal extraction method has been used for 100 years. The paper presents results of scientific and industrial research that has been released in former USSR, UE countries, USA and Australia. Additionally article presents major process assumptions and limitations elaborated from UCG pilot, demonstration and industrial plants experiences. Conclusions coming from those experiences should become starting point for all new scientific and industrial activities.

**Keywords:** *underground coal gasification, lignite, UCG criteria*

ZBIGNIEW JAGODZIŃSKI

**Logistic Preparation of Mining Machines' Transport on Their Own Undercarriage Between Open Pits in Konin Lignite Mine** • *Kwartalnik Górnictwo i Geoinżynieria* • z. 4, 2010

The article discusses the problems and issues necessary to resolve during organization of the mining machinery's transport on their own undercarriage from a technical and legal point of view. Konin Lignite Mine has the most experience in conducting this type of operations due to the fact that a lot more transports of machines have been conducted than in any other lignite mine in Poland. The article demonstrates how to cope with the logistical preparation of the entire operation, both for the preparation of the equipment and the settlement of formal and legal matters.

**Keywords:** *opencast mining, lignite, transport, mining machines*

MAREK WALDEMAR JOŃCZYK, BARBARA ORGANIŚCIAK

**Natural Threats in Open pit Lignit Mmine PGE KWB Belchatów SA. Recognition and Prevention** • *Kwartalnik Górnictwo i Geoinżynieria* • z. 4, 2010

The exploitation of lignite deposits in deep open pits is led in conditions of several natural threats' occurrence. This article presents selected issues of aquatic, geotechnical, gaseous and seismic menaces that occur in PGE KWB "Belchatów" SA Basis of minerals' exploitation in conditions of natural threats occurrence are discussed.

**Keywords:** *aquatic hazards, geotechnical hazards, seismic hazards, gas hazards, fire hazards, landslide, movement and deformation monitoring, tectonics.*

ALEKSANDER KABZIŃSKI

**20 Years of Aggregates in Polish Economy. History, the Present, Future** • *Kwartalnik Górnictwo i Geoinżynieria* • z. 4, 2010

Without air, water and... aggregates there is no life and economic activity. The production of aggregates, cheap, common, available building material is the answer for the economy's demand, including the construction industry. The time from political and economical transformation of 1989 is the example of cyclical downfalls, stabilizations and growth periods, even with insufficient supply times. There is a proven dependance between GDP and the demand for aggregates. Nowadays, aggregates are both natural (including crushed and sand-gravel aggregates) and artificial, including those from recycling. The quantitative majority of the former does not allow to ignore the latter. During last 20 years the aggregate industry gathered different experiences. From the processes of ownership changes, through technical and technological changes, implementing European standards of aggregate quality to becoming a decent player in the European aggregate industry. The paper presents experiences, evaluations and prognosis the come out of the activity of industry's leading organization — Polish Association of Aggregates Producers Employers that is closely related with the representative group of producers with different quality and quantity of production, but also different capital structure and way of functioning. The prognosis about market demand and production capacity is presented together with threats that may become obstacles in fulfilling the industry's most important task: providing the growing economy with aggregates. The paper describes the experiences of other countries, both old and new members of European Union and Polish experiences that come out of our six-year presence in its structures.

**Keywords:** *natural aggregates market, rock minerals, opencast mining*

KRZYSZTOF KARSZNIĄ, LEOPOLD CZARNECKI, LUCJAN STAWOWY

**The System for Continuous Deformation Monitoring of Opencasts in the Safety Aspect of Mine Works** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The exploitation of a brown coal deposit by using the open-pit method can generate various problems and threats coming from mining works bounded with accessing the successive levels. In the case of an open-cut mine, to the most dangerous problems belong land slides, especially of a multi-slope shape and appearing in an unpredictable and uncontrolled way. In the article a modern technical solution used for surface deformations monitoring by applying technical solutions of Leica Geosystems was presented. To geodetic and geotechnical data integration it was used a monitoring and control software "GeoMoS" (Geodetic Monitoring System) which — if properly configured and calibrated — makes it possible to execute measurement cycles of control points. The current on-line monitoring of surface deformations in the land slide risk area allows specialists to conduct safe opencast works.

**Keywords:** *geodetic monitoring, displacements, landslides, safety of mine Works*

ZBIGNIEW KASZTELEWICZ, SZYMON SYPNIEWSKI

**Reclamation in Polish Opencast Brown Coal Mining** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article presents the reclamation of post-mining terrains in particular Polish lignite mines. Reclamation as a terrain's value restoration process should be widely promoted as pro-environmental and prosocial activity of the mines.

**Keywords:** *reclamation, opencast mining, brown coal*

ZBIGNIEW KASZTELEWICZ, SZYMON SYPNIEWSKI, MACIEJ ZAJĄCZKOWSKI

**The Use of Compact Bucket Wheel Excavators in Opencast Mines** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The paper presents the technology of exploitation using compact bucket wheel excavators in lignite, clays or hard rocks like limestones. Advantages and disadvantages of these kinds of machines are discussed. A comparison of traditional BWEs used in Polish and foreign lignite mines with compact BWEs is conducted. Conclusions from this analysis allow to state that compact BWEs offer very advantageous mass to efficiency ratio and therefore allow to reduce investment costs in the mines using continuous exploitation systems.

**Keywords:** *bucket wheel excavators, compact excavators, opencast mining*

ZBIGNIEW KASZTELEWICZ, MACIEJ ZAJĄCZKOWSKI

**Conception of Spatial Representation of Dumping Costs on the External Dump** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Opencast exploitation of mineral deposits requires removing the overburden lying over them and dumping it outside the pit. Most often the overburden is located at the external dumps in immediate proximity from the opening cut. Biggest objects of this kind are created during the building of opencast lignite mines. Large depth on which the deposits are located results in a creation of an external dump with a capacity ranging from a few to few hundred million m<sup>3</sup>. Costs associated with dumping are relevant element of making the deposit accessible. The article presents a concept of spatial model of costs of dumping at the external dump. A hypothetical model of the external dump and terrain's topography on which the dump is located was created. The costs were projected with the use of the dump's block model.

**Keywords:** *lignite mine, external dump, cost of dumping, block model*

ZBIGNIEW KASZTELEWICZ, MACIEJ ZAJĄCZKOWSKI

**The Influence of Lignite Mining Activity on the Public Sector** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Using local energy resources is characteristic for lignite mining activity. These resources are used for the production of electricity in the nearby power plants. Lignite mines — because of their size and impact on the surroundings

(environmental, social and economic) — are important enterprises that create development of the areas in their neighborhood. However the role of the mines is not limited to the influence on local authorities. Their impact is much wider and associated with the country's whole economy through numerous public payments imposed on this sector of the industry. The article presents main public payments related to lignite mining activity. A list of these payments for the last three years was created. In addition, the influence of these payments on local communes' budgets where lignite mining is conducted was analyzed.

**Keywords:** *mining, lignite mine, public sector, taxes*

CZESŁAW KOTOWSKI, TADEUSZ RATAJCZAK

**The Carboniferous Limestones from Czatkowice — Their Technological Potential and Possibilities of Utilization** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The Carboniferous limestones have been quarried in Czatkowice for more than 60 years. Their winning represents an example of a selective and optimum utilization of almost every rock variety occurring within the deposit. Such a policy and the experience gathered for several tens of years have allowed: introducing complex utilization of all limestone varieties present; — implementing optimum management of the deposit, which results from technological properties of the rocks quarried on one hand and the market requirements on the other. Due to that, the Czatkowice quarry is a mining venture providing sought for, attractive rock products. Their marketing secures the solid financial position of the company.

**Keywords:** *Carboniferous limestones, Czatkowice, quarrying history, lithology and petrography, technological utilization, limestone powder*

WIESŁAW KOZIOŁ, ANDRZEJ CIEPLIŃSKI, ŁUKASZ MACHNIAK

**Comparative Analysis Efficiency of Work of Primary Machine in Lignite Mines — Problems Concerning Standardization of Coefficients** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The following report presents problems concerning recording, the stock-taking of the archival data, calculation and comparing (benchmarking) the coefficients of efficiency of bucket wheel excavator in lignite mines. These problems were illustrated computational examples. The finding uniform procedure of accumulating and calculation coefficients of utilization of primary machine in lignite mines has the important influence on operations review and increase of efficiency technological arrangements.

**Keywords:** *open cast mining, lignite, coefficients of efficiency of primary machine, benchmarking*

WIESŁAW KOZIOŁ, ŁUKASZ MACHNIAK

**Problems Concerning Classification and Exploitation of Hard Rocks and Soil in Lignite Mines** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The following report presents the genesis of disorders associated with the occurrence of hard rock mass, and a projected rocks provided to exploitation, based on the example of "Bełchatów" and "Turów" lignite deposits. Described the basic ways of determining the mineability of hard rocks and soil, as well as an attempt to use geo-mechanical classification of rock formation to assess the operating effects. The next part describes the influence of hard rock mass on the operating effects of bucket wheel excavator.

**Keywords:** *open cast mining, mining proces, hard rocks and soil difficult to mine, mineability*

JADWIGA KRÓL-KORCZAK, WOJCIECH JEZIOROWSKI

**Factors Affecting the Economic Conditions of Exploitation and Rational Use of Natural Aggregate Deposits** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article presents the key factors that impact on the economic conditions under which exploitation of natural aggregate deposits. Mines extracting natural aggregate deposits account for nearly half the total number of mines,

which is the reason why the reasonable small-scale deposits management plays an important role in polish mining industry. The article drew attention to the specificities of deposits and the resulting conditions for rational management of natural aggregate deposits, which begins at the stage of exploration and continues throughout the life of the mine, up to and including its liquidation.

**Keywords:** *the mining of mineral materials, the opencast mines, rational management deposit*

DOROTA ŁOCHAŃSKA

**Estimating Methods of Balancing Demand with Rock Materials Production** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Rock materials used for building and road construction are usually produced in large amounts; as a rule they meet the local demand and the costs of transportation tend to be the main means of expenses borne by consumers. In case of existence of several centres (regions) of rock minerals mining it is essential to define the amount of open-pit for each of them, in relation to their zones of demand. Not complying with this condition leads to the existence of intersecting transport lines of homogeneous production. Its results can be measured in the scale of the country. The present article defines the state of research over the issue concerning balancing production with the demand for rock materials as well as directions for further works.

**Keywords:** *demand, rock materials, region*

JAN MARIANOWSKI, TOMASZ CIEŚLA

**Effectiveness of Modernization of the Open Pit Machines from the Energy Consumption Point of View or History of Rock Raw Materials Mining Written in Joules** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

One can set apart the following stages of aggregate production process into a rock minerals open pit: drilling of blastholes, crushing of rock body with explosive materials, loading of yielded materials from excavators (wheel loaders), haulage of output, initial crushing and preparation into machinery systems of processing plant. A solution of problem has based on the application of a uniform energy criterion. The analysis and identification of mining processes have shown that it would be possible to describe all main technological operations from the energy consumption point of view (Translated by Halina Mytnik).

**Keywords:** *open pit, machines, specific energy*

ADAM MIREK, LESZEK BIAŁY

**The Activities Leading to Limit Threats Associated with Conducting Blasting Works in Opencast Mines** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The article presents the activities taken up by the employees of companies specializing in exploitation of rocks with blasting in the last several years that led to the limitation of threats that appear during blasting and as effects of its conduction.

**Keywords:** *limitations, threats, blasting works*

JOLANTA NIETRZEBA-MARCINONIS

**Biological Reclamation of Post-Mining Grounds in PGE KWB Turów SA** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The forest reclamation of dumping grounds in Turów since 60 years XX permitted on elaboration of own reclamation model. The ecological results are coming into being forest ecosystems about character a mixed highland forest with characteristic the arrangement of levels the diagnosticforest soils.

**Keywords:** *the forest reclamation, dumping groups*

**Modes of Reclamation and Redevelopment — Manner of Choice, Classification and Examples** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The classification of the modes of reclamation and redevelopment based on the previous classifications, but supplemented by new modes are presented in this article. Previously unclassified and rare use modes of reclamation are described and illustrated by examples, e.g. cultural modes, with contemplation function carried out on the post-mining areas which are martyrdom places connected with World War II. Specific ones — functions, which can reclaimed areas can fulfill have been ascribed to each general mode. Attention is paid on the fact, that there is not possible to create a closed classification, since the same functions can be ascribed to some others modes of reclamation. The manner of choosing the optimal modes of reclamation and redevelopment based on a previous characteristic and analysis of the factors (environmental, spatial, technical, cultural, social, economic), which describe post-mining areas and its surroundings are presented. It has been emphasized that the commonly used forest and agricultural modes of reclamation can sometimes squander other possibilities resulting from the characteristic of the objects, which need to be reclaimed as well as social or economic needs.

**Keywords:** *post mining areas, reclamation, redevelopment, factors, modes of reclamation, manner of choosing mode of reclamation*

KRZYSZTOF PIERZCHAŁA, PAWEŁ URBAŃSKI, DARIUSZ LATOŃ

**New Technical Solution in Drainage System at PGE KWB Bełchatów SA** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Drainage system of mine excavations is one of the most important elements necessary for the correct and safe operation of the mining process. This paper presents innovative solutions adopted in the following areas automation of plunge drainage system, based on the example of “Dębina” salt dome barrier wells; — use of high-power submersible pumps in pumping stations of surface drainage systems. Automations of the environmentally friendly “Dębina” salt dome barrier wells designed and implemented as ring barrier wells, is an example of appropriate approach adopted to optimize the performance of deep wells in relation to hydraulic and energy efficiency. Large drainage, including surface water pumping stations operated in opencast mines, such as PGE KWB Bełchatów SA can be identified as one of the potential applications of submersible pumps. The use of submersible OZ pumps enables automated and energy-efficient operation of new type pumping stations in drainage systems of mine excavations not only limited to extracting lignite.

**Keywords:** *mine excavation, drainage system, groundwater well, submersible pump, pumping station, immersible pump, pump installation, automation*

SEBASTIAN PRĘDKI

**Application of I-kon Electronic Initiation System in Blasting Operations at PGE KWB Bełchatow SA Open Pit Mine** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The blasting works at PGE KWB Bełchatow Open Pit Mine are based on the Nonel Unidet non-electric initiation system since 2000. Its application has enabled to improve the efficiency in comparison to so called classic initiation systems (electric detonators and detonation cord). The non-electric initiation systems have some constructional limitations, which can be eliminated only with very accurate and wide-programmable electronic detonators. In this paper the specific character of the blasting work at Bełchatow Mine, the advantages and limitations of non-electric system but also the description of the results of the first trail electronic blasts are presented.

**Keywords:** *blasting technique, non-electric initiation system, i-kon electronic initiation system*

MIRANDA PTAK

**Polish Opencast Mining Affecting Nature 2000 Areas** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

A new, more difficult time for opencast mining has started since Poland’s accession to European Union on 1st May 2004. This concerns getting new concessions as well as continuing mining activity. Mining entrepreneurs have to take requirements concerning Nature 2000 areas protection into account apart from hitherto prevailing environmental

requirements. In a brief form the paper presents the origin of this form of nature's protection, the development of the network in EU together with Poland's contribution and place in the establishment of these areas. Furthermore, documented mineral deposits lying in the Nature 2000 areas are identified with the division to particular minerals and quantities of deposits in particular voivodeships. The presented paper was created to depict the opencast mining's problem that comes out of the overlap of Nature 2000 areas and documented deposits existence. To see a chance of mining investments' development the industry has to face a new challenge — conducting operation in Nature 2000 areas. This will be one of the main themes of IX National Opencast Mining Congress.

**Keywords:** *opencast mining, Nature 2000*

JÓZEF PYRA

**Millisecond Delay as a Factor Influencing Spectrum of Vibration Induced by Detonation of Explosives Charges in Quarries** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The paper presents examples of vibration analysis of induced detonation of explosives charges shooting with different millisecond delays. The examples of analysis confirm the validity of the need for response spectrum analysis as a method for assessing the impact of vibratory motion to the surrounding object.

**Keywords:** *millisecond blasting, Response Spectrum*

KAZIMIERZ RÓŻKOWSKI, KRZYSZTOF POLAK, MAREK CAŁA

**Selected Problems Connected with Water Reclamation of Post-Mining Open-pits** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

Reclamation of post mining areas is a complicated process of restore degraded areas to natural environment. Correctly leading of this process in long time perspective restore the natural conditions. Moreover it enriches the natural environment, improves landscape quality and biodiversity. These potential advantages could be realised by water reclamation especially on areas where hydrographic network is not well developed. Multifunction reservoirs are also expected by local society. Selected problems connected with environmental conditions of water reclamation are focused in the paper.

**Keywords:** *open pit mining, lignite, water reclamation*

BEATA TRZASKUŚ-ŻAK

**The Impact of Receivables on Accounting and Tax Variants of the Profit and Loss Account in Open Cast Mine "X"** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

This article examines the profit and loss account in terms of accounting and tax in the open cast mine "X". The paper pays attention on the differences between both approaches (accounting and tax), also explains what they are. The article considers how does financial result vary includes the impact of the non-tax costs and non-tax revenues. There is also explored the impact of receivables, especially doubtful receivables. This is due mainly to creating reserves to cover debts, especially these which will not be payed off and which reduce gross profit, but do not reduce the volume of the tax basis and volume of the tax. It follows that these costs are deducted value of net profit for the month.

**Keywords:** *profit and loss account, non-tax costs, non-tax revenues, receivables*

NORBERT WOCKA

**Possibilities of Meeting the Demands for High Capacity, Heavy Duty Machines for Open Pit Mines Made in Poland** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The possibilities of meeting the demands for open pit mining machinery stock produced in Poland was described in the paper. Both forecast and constant percent fraction of lignite mines in the country energy balance was included. In a particularly way the need of preparation for production and beginning of preliminary design of high capacity

bucket wheel excavator KWK4000 (100000 m<sup>3</sup> per day) was discussed. The ability of excavator collaboration with already running in PGE KWB Bełchatów polish spreader ZGOT-15400 was pointed out. The PGE KWB Bełchatów experience in exploitation of open cast mining systems with high capacity over 100000 m<sup>3</sup> per day was pointed out.

**Keywords:** *open pit mining, high capacity machines for open pit mines*

STANISŁAW ŻUK

**The Analysis of Production Results in Polish Lignite Industry During the Period of 2005–2009 and Review of Current Condition of Lignite Industry in European Union Countries** • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2010

The object of this paper is to present the achievements of lignite mining industry in Poland, on the basis of production data presented for the four operating mines in the last five years, compared to the production results achieved in 2009. The basic data concerning the operational performance in active areas of lignite mining is described. In the second part of the article an attempt was made to present the energy sector based on lignite against a background of whole Polish energy sector. Furthermore a comparison of the latter's current situation with lignite mining sector in EU and the role of lignite in Europe's energy system was conducted.

**Keywords:** *lignite, opencast mining, energy sector*