Summaries

HALA H. ABD EL-GAWAD, NAGLAA A. EL-HUSSINY, MARGUERITE A. WASSF,
MOHAMED G. KALIFA, BERLANTY A. ISKANDER, MOHAMED EL-MENSHAWI H. SHALABI

Briquetting of Rosetta Ilmenite Ore with Different Organic Binder and Its Reduction in Hydrogen in the Temperature Range of 800÷1200°C · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

Fine grained ilmenite ore was briquetted with different amounts of molasses or pitch and pressed under different values of pressure was studied in this investigation. The results show that optimal amount of added molasses and pitch were 1.5%, the pressure was fixed to 294.3 MPa. Furthermore, the characteristics of raw materials was examined by different methods of analysis, such as x-ray and screen analysis. The produced briquettes were then reduced by different amounts of hydrogen by different temperatures and the reduction kinetics was determined.

Keywords: *ilmenite, reduction kinetics, briquetting, reduction by hydrogen*

STANISŁAW CIERPISZ, DANIEL KOWOL

Impact of Disturbances of Process of Coal Washing in a Jig on Changes of Separation Density — Laboratory Tests · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

Results from testing the impact of selected types of disturbances in washing process in a jig on changes of separation density were presented in the paper. It was proved that change of separation density, caused by variability of characteristics of coal washing ability, is significant and increases with an increase of height of the float. It was also found that readings of float sensor, at assumed constant process conditions, are disturbed, what can result in changes of separation density. Fluctuations are small and they can be reduced by a suitable filtration of measuring signal. The conducted tests also indicated that inertia of float, that depends on its geometrical dimensions of float, can have an impact on rapidity of reaction to changes of bed density distribution or set float density.

Keywords: *coal beneficiation, jig, separation density, float shape*

MARWA A.G. ELNGAR, FATMA M. MOHAMED, SALWA A.H. EL-BOHY,
CARMEN M. SHARABY, MOHAMED EL-MENSHAWI H. SHALABI

Factors Affected the Performance of Fire Clay Refractory Bricks · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

In this investigation some factors affected the performance of the fire clay refractory bricks such as size of grog, percentage of water added to the raw material, percentage of grog and temperature of firing were studied. The results showed that if the percentage of grog increased the shrinkage of bricks decreased, as well as density of bricks was increasing the porosity and water absorption also increased. Furthermore, with increasing of the added water to the raw material the porosity of the bricks increased and if water absorption increased, density decreased. The characteristics of raw material by such methods as x-ray and chemical analysis were also examined.

Keywords: *refractory, grog, kaolin, thermal shocks, compressive strength*

PETER FEČKO, BARBARA TORA

Bacterial Decontamination of Soil from Ostrava Airport · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The paper deals with an examination of possible application of biodegradation in the decontamination of soil samples from Leoš Janáček's Airport in Ostrava. Soils samples were used for laboratory tests of biodegradation taken from oil interceptors. The laboratory biodegradation tests were carried out with a pure bacterial culture of *Pseudomonas putida*, a pure laboratory culture of *Rhodococcus sp.*, their mixture and a mixture prepared combining their media free of bacteria. The results of the paper imply that for the given purpose, i.e. for biodegradation of airport pollutants, it is most suitable to apply a mixed bacterial culture of *Pseudomonas putida* and *Rhodococcus sp.* The results of the paper show that the biodegradation method is applicable for the pollution in question.

Keywords: *biodegradation, Pseudomonas putida, Rhodococcus sp., mixed culture*

DARIUSZ FOSZCZ, TOMASZ NIEDOBA, TADEUSZ TUMIDAJSKI

Chosen Problems of Balancing of Copper Ores Beneficiation Products · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The adequate evaluation of feed separation into concentrate and waste is the crucial problem of mineral processing. The paper presents the analysis of copper ores, originating from Legnica and Głogów copper deposit area, beneficiation products balance. The errors of yields determination, which are the effect of improper sample collections, inexactness of chemical analyzes, as well of errors being the effect of products arising time shifts (which can be the highest ones) were taken into consideration. As the measures of the direct errors of chosen product yield estimation, the gradient vectors and its quadratic errors given by total differential method were applied. Then, by Grumbrecht method, the mean values of yields for the balanced period were calculated for minimization of the sums of increments $\Delta\alpha$, $\Delta\beta$ and $\Delta\vartheta$. The given results were compared and evaluated; some of the possibilities of metal production calculations in industrial conditions were discussed.

Keywords: *Copper ores beneficiation, measurement errors, production balance, Grumbrecht method*

KRZYSZTOF GALOS

New Mineral Policy of the European Union · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

European Commission Communication „The raw materials initiative — meeting our critical needs for growth and jobs in Europe" was published on 4th November 2008, started to be the basic document on directions of non-energy raw materials policy of the European Union. Three pillars of an integrated raw materials policy were proposed: ensure access to raw materials from interantional markets; set the right framework conditions within the EU in order to foster sustainable supply of raw materials from EU sources, support of resource efficiency growth and recycling promotion in order to reduce the EU's consumption of primary raw materials and decreasethe relative import dependance. The paper presents the basic premises of preparation of this document, its main assumptions, and — finally — ten basic actions of such policy in Polish circumstances.

Keywords: *mineral raw materials, European Union, mineral policy*

TOMASZ GAWENDA

Main Aspects of Hard Mineral Raw Materials Comminution in High Pressure Grinding Rolls · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The high pressure grinding rolls (HPGR) of third generation are ones of the most modern devices and are often applied in new designed mineral processing plants in the whole world. Furthermore, they replace older crushers working on secondary comminution stages and mills on first grinding stages, being the source of high profits, mainly by energy savings, lower exploitation costs and higher quality of products. Sometimes, they totally replace mills, both by production of mineral flours and ores directed to beneficiation process. In the introduction to the main part of the paper, the main problems relied to exploitation of older grinding rolls types, as well the signification and application of the new ones were presented. The second chapter contains the discussion over the construction,

rule of working and course of the comminution process in HPGR and the third one shows the benefits occurring from their applications on the basis of certain technological systems.

Keywords: *HPGR, comminution, energy consumption, roll layers*

TOMASZ GAWENDA, TOMASZ NIEDOBA, KRZYSZTOF PRZYBYCIEŃ, TADEUSZ TUMIDAJSKI

Application of Genetic Algorithms to Modeling of Mineral Processing Operations · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The dynamic development of technical sciences and economical problems relied to it requires new, more appropriate and more precise researching methods and more detailed quantitative analyzes. There are many optimizing methods, which can be applied in analyzes if technological systems of mineral processing. Recently, the calculation methods based on the genetic algorithms were applied in purpose of designing, simulation and optimization of operation systems work effects. In the presented paper, this method was used to estimate coefficients of formulae describing hydrocyclone work on the basis of empirical results. It occurred that from the four presented approximation ways (estimation) of Plitt equation coefficients, the method of genetic algorithms was minimally the best. The application of genetic algorithms in simulation of devices and mineral processing systems is a very good solution if the applied heuristic models describe sufficiently well conditions and work effects of devices.

Keywords: *genetic algorithms, mathematical modeling, hydrocyclones*

ANNA HOŁDA, EWA KISIELOWSKA, TOMASZ NIEDOBA

Chemical and Biological Analysis of Chromium Waste · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The paper presents chemical and microbiological analysis (were from qualitative and quantitative point of view) of the collected samples of wastes. The procedure of chemical analysis is based on a quantitative extraction of Cr(VI) from the solid samples and its determination in the extract by the method of flow coulometry by means of apparatus EcaFlow 150GLP, applying calibration by method of model curve. The determination of chromium by flow coulometry is based on utilization of inner electrode coulometric titration. Microbiological analysis shows that the concentration of chromium(VI) above 2000 mg/l is toxic for psychro- and mesophilous bacteria, stopping the growth of their colonies, but fungi from sort *Rhizopus sp.* and *Penicillium sp.* are tolerant for high concentrations of chromium(VI).

Keywords: *Cr(VI), chromium waste, microorganisms, bacteria, fungi*

BERLANTY A. ISKANDER, NAGWA A. KAMEL

Mechanical Properties of Biodegradable Bone Cement Composites · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

A material that can be used as a scaffold in tissue engineering must satisfy a number of requirements. These include biocompatibility, biodegradation to non toxic products within the time frame required for the application, process ability to complicated shapes with appropriate porosity, ability to support cell growth and proliferation, and appropriate mechanical properties, as well as maintaining mechanical strength during most part of the tissue regeneration. In the present work, the bone cement composites were prepared by mixing different ratios of calcium sulfate dihydrate ($CaSO_4.2H_2O$) filler (60, 65 and 70 wt%) with the polyester resin/NV, MMA, NV/MMA monomers mixture. The biodegradability of PSF crosslinked with NV, MMA and NV/MMA loaded with 60% gypsum was studied using Simulated Body Fluid SBF (pH 7.3) in vitro medium. The degradation rate of fumarate based polyesters as well as bone cement composites were measured as the percentage of weight loss over time of exposure to the SBF solutions. The mechanical properties showed different behavior according to the bone cement concentration. The compressive strength and the microstructure were also studied before and after immersing in SBF solution.

Keywords: *biodegradability, bone cement, Simulated Body Fluid, Weight loss, compressive strength, modulus of elasticity*

STANISŁAW KAMIŃSKI, DOROTA KAMIŃSKA

Measurement of Materials Granulation in Minerallurgy by Application of Modern Electronic Measuring Devices • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

In this paper authors want to present unique measuring system which allow to determin of grain-size distribution of grains and particles with diameter form 0.5 μm to 100 mm. Grain-size distribution may consist of 45 measurement points. Tentatively it is determine for couple thousand of virtual sieves. This sives are indistuctable and much more strict than mechanic ones. Measuring system network can assign many ratings and norm properties according to European standard for aggregate.

Keywords: *European standard, sieve analysis, grain-size measuring, measuring analyzers, grain-size distribution*

ALDONA KRAWCZYKOWSKA, KAZIMIERZ TRYBALSKI, DAMIAN KRAWCZYKOWSKI

Application of Neural Networks Models to Lithological Composition Determination of Copper Ore • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

The paper concerns the application of neural networks models in recognition of lithological types of copper ore. To verify the predictive abilities of the most efficient models, the data sets given by scanning photos analyzes of two characteristic mixtures of various lithological types were applied. These were mixture with the advantage of sandstone ore and mixture with the advantage of carbonate and shale ores. The results of recognition were compared with the real contents of individual lithological types of copper ore in analyzed mixtures.

Keywords: *lithological types of copper ore, modeling, neural networks*

DAMIAN KRAWCZYKOWSKI, KAZIMIERZ TRYBALSKI

Usefulness of the Particle Size Distribution Laser Analyzes on Balancing of Hydrocyclone Classification Products • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

The paper concerns adequacy of particle size distributions of flotation wastes classification products of ZN–Pb ore and its influence on balancing of classification products. The investigations concerned performance of granulometric analyzes of the wastes (feeds) directed to the classification process in hydrocyclone, as well the outflows and overflows — classification products, determination of the analyzes adequacy, balancing calculations of classification products yields. The modern, laser particle sizer Analysette 22 was applied to perform analyzes, which rule of measurement is based on laser diffraction on measured particles. This is the standard, common method of fine particles distribution determination.

Keywords: *laser particle sizing, adequacy of granulometric analyzes, balance of classification products*

MAREK LENARTOWICZ, DANIEL KOWOL, MICHAŁ ŁAGÓDKA, PIOTR MATUSIAK

Laboratory Tests on the Impact of Screen Parameters on the Characteristics of Pulsatory Movement of Water in a Pulstory Jig • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Type of operational screen, on which pulsatory movement of material concentrated in a jig takes place, is one of many factors, which have an impact on the quality of the material parameters. Proper selection of screen parameters can have a positive impact on the steadiness of water pulsatory movement and efficiency of feed separation in wide grain classes. Results of laboratory tests, which are presented in the paper, showed that there is a possibility of modification of water pulsation curve, depending on the resistance of water flow through screen openings. Besides it was found that a stroke and speed of raising stream of water decrease with an increase of resistance of water flow through the screens.

Keywords: *screen parameters, pulsatory jig, speed of raising stream of water*

ALEKSANDRA LEWKIEWICZ-MAŁYSA, ELŻBIETA KONOPKA

Protection of Natural Rock Mass Properties as a Storage Yard of the Deposit Waste-Water · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

In search of a safe storage place for the deposit waste water, accompanying of gass exploatation, attention focused on depleted geological structures of gas accumulation. The effectiveness of the injection process of waste-water is influenced by the permeability of the near-well zone and the physicochemical properties of the injected liquid, especially the presence of colmatogenic components. The colmatation of rocks may be caused either by the presence of macroscopically visible mineral suspended solids in the deposit water, or solid products of chemical reactions in the oxidation environment. Therefore it is necessary to remove primary and secondary colmatogenic components from the waste-water to be disposed in the rock mass. Laboratory research has been done on introductory cleaning of particular deposit water, which could be safely stored in the rock formation. The purpose of the research was to define and to eliminate components, which are conducive to silting-up of the rock mass, by physicochemical processes.

Keywords: *deposit waste-water, absorptive wells, injection, colmatation*

EWA MAŁYSA, ANNA IWAŃSKA

Influence of Differnt Flotation Reagents on Rising Velocity of Air Bubbles · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The paper presents results of studies on influence of the flotation reagents, used in the coal flotation, on rising velocity of the air bubbles. The bubble rising velocity was determined using a novel Simple Physicochemical Metod of Detection (SPMD) organic contaminations in water. The measurements were carried out for octanol, montanol, flotanol, centifroth and 1-hexsanol solutions of different concentrations. It was found that the rising velocities of the bubbles were decreasing with increasing concentration of the flotation reagents studied. The bubble velocity was lowered from the value of 35 cm/s in distilled water to ca. 16 cm/s at high concentrations of the reagents studied. However, the minimum concentration needed for this velocity diminishing of the rising bubbles is a specific feature of the reagents studied. Further increasing of the reagent concentration had no influence on the bubble rising velocity, what means that the bubble interface had been already immobilized.

Keywords: *bubble velocity, adsorption, flotation reagent*

JOLANTA MARCINIAK-KOWALSKA, EDYTA WÓJCIK-OSIP

The Study of the Process of Lamella Flotation of the Coal · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The paper presents the results of laboratory investigation of raw fine coal flotation. The classical process was then compared with lamella flotation. The obtained laboratory results show that the effect of enlarging flotation cell by filling it with lamella packages influences positively on the quality of froth product by lowering its ash contents.

Keywords: *floatation of coal suspension, lamella sedimentation, lamella packets*

REMIGIUSZ MODRZEWSKI, PIOTR WODZIŃSKI

Oscillating Motion of a Double-Frequency Screen · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

The present study demonstrates the results of the research programme carried out at the Department of Process Equipment, Technical University of Lodz, and concerns double-frequency screens. Those investigations were aimed at the determination of the experimental screen kinematics on a semi-technical scale. On the basis of the research results the design assumptions of the industrial machine aimed at fine-grained screening have been elaborated.

Keywords: *double-frequency screens, screen kinematics, fine-grained material*

ZDZISLAW NAZIEMIEC, DANIEL SARAMAK

The Analysis of Changes in Pressing Force Impact on Material in HPGR Compression Zone • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Proper determination of real pressing force in HPGR is especially essential from the viewpoint of lime industry as well as fine and filler aggregates production. Too excessive pressing forces often results in production of lower quality products. Two methods of determination the real pressing force in HPGR were presented in the article. First one takes into consideration geometrical changes in the volume of press's compression zone, while the second is connected with the gap's width.

Keywords: *HPGR, compression zone in HPGR, pressing force*

TOMASZ NIEDOBA

Multidimensional Distribution Functions of Grained Materials Features by Application of Non-Parametric Approximations of Marginal Distribution Functions • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Estimations of individual grained materials characteristics distribution functions is usually done separately. The method of Morgenstern, applied in the paper allows searching for multidimensional distribution function, taking into consideration at least two features simultaneously. The estimation of particles size and their density was performed on the basis of coal from KWK „Piast". In the purpose of so-called marginal distribution functions estimation the non-parametric statistical methods were applied — Gauss kernel method and orthogonal Fourier series method. The results were statistically evaluated what confirmed the adequacy of the method.

Keywords: *multidimensional distribution functions, Morgenstern function, grained materials, non-parametric statistical methods*

ALICJA NOWAK, AGNIESZKA SUROWIAK

Evaluation of the Sharpness of Fine Coal Particles (< 2 mm) Separation During Desulphurization Process Performed in Spiral Separators • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

The paper presents the industrial results of the fine coal particle fractions (< 2 mm) desulphurization process investigation. The purpose of the research was to evaluate the sharpness of the finest coal particles separation in spiral separators. Performing this task, the representative samples of the feed and separation products were collected in two energetic fine coal beneficiation plants. The granulometric and densimetric analyzes of the samples, as well the chemical analyzes of individual class-fractions were performed. Then, the separation sharpness factors were calculated on the basis of the separation curves approximated by Weibull distribution function. This was the basis for making conclusions concerning the adequacy of selecting separators working and technological system parameters.

Keywords: *separation curves, separation sharpness, spiral separators, fine coals*

MARIUSZ OSOBA, ALEKSANDER LUTYŃSKI

Technological Selection of Pulse Water Jigs During the Designing Process • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

The article presents basic requirements regarding selection and designing of pulse water jig fulfilling certain technological assumptions. Algorithms and guidelines for designing KOMAG pulse jigs for hard coal and mineral processing are shown. General scheme of technological loop with pulse water jig which fulfills basic needs for control and regulation of jig's parameters is presented.

Keywords: *pulsatory jig, mineral processing, designing of mineral processing devices*

SAVAS ÖZÜN, ÜMIT ATALAY, YUSUF KAGAN KADIOĞLU

Investigation of Upgrading of Nepheline Syenite Ore by a New Collector • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Foid bearing rocks are one of the most major felsic intrusive rocks of Central Anatolian Crystalline complex (CACC) which are observed at the inner part of central Anatolia, Kırşehir, Turkey. Foid bearing rocks are mainly constituted from three different subunits: nepheline syenite, nepheline diorite and nepheline gabro. Nepheline syenite is represented the abundant lithological composition of alkaline magmatic rocks in the region. In this study the removal of mica, (ilmenite) iron-titanium oxide and magnetite minerals in Nepheline Syenite rocks from Central Anatolian Crystalline Complex, Turkey is investigated by flotation at alkali condition following to this high intensity wet magnetic seperation (HIWMS) was applied. The best results were obtained from – 106 + 38 microns particle sizes nepheline syenite feed. A concentrate with 7.84% K_2O, 11.22% Na_2O, 0.22% Fe_2O_3 and 0.01% TiO_2 content was produced with of 62.5% recovery by weight.

Keywords: *nepheline syenite, feldspar source, flotation*

BARBARA PESZKO, TOMASZ NIEDOBA

Influence of the Particles Shape on Joined Distribution of Their Size Determined by Coulter Counter Method • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Coulter Counter is one of the most common devices applied to counting ultrafine particles. Because of its construction, this device is able to count particles of sizes from 10% till 60% of the diameter of installed diaphragm. To obtain the full particle size distribution it is necessary to combine given partial distribution functions. To approximate the partial distribution functions given by various installed diaphragms, the Weibull distribution function was applied. For the researched material, which was diabase, the set of shape coefficients was calculated, which may be taken into consideration by individual partial distribution functions combination,. The shape coefficients were calculated on the basis of image analysis method and of particle size distribution results. The given joined distribution functions, with and without application of shape coefficient, were compared and evaluated.

Keywords: *Coulter Counter, Weibull distribution function, particle size distribution function*

DOMINIKA KATARZYNA SZPONDER, KAZIMIERZ TRYBALSKI

Determination of fly ashes properties with use of different research methods and measuring devices • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

Fly ash is noxious waste that comes from minerals substances dispersed in coal and are subjected to many physical and chemical processes during coal combustion. Because of different types of coals, different types of combustion, a high level of dispersion of mineral substances in coals and the duration of thermal processes, the particles of fly ash are diversified as to their structure, phase and chemical composition. The diversity of produced fly ash makes it necessary to determinate their physical, chemical and mineralogical properties in order to select suitable utilization method.This paper presents a few research methods and measuring devices used to determine physical, chemical and mineralogical properties of raw and waste materials and also their usefulness to characterize fly ashes properties.

Keywords: *fly ash, density measurements, specific surface measurements, grain size analysis, X-ray diffraction analysis, scanning microscopy, X-ray microanalysis, thermal analysis*

ZBIGNIEW TAJCHMAN

Regressive Model of Ultrafine Particles Classification Process • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2009

The paper presents the issues relied to the description and the basic technological factors of flowing classification process, which main medium were suspensions of chosen model materials ultra fine particles. After conduction of basic process factors evaluation, which originated mainly from the Tromp curve, the ones seemed to be the most

appropriate to evaluate the process were chosen for the further research. Three model materials were selected: quartz glass; quartzite; barite. Furthermore, three changeable parameters of flowing classification process conduction were chosen, which were: temperature; volumetric concentration of the suspension; concentration of hydrogen ions of process conduction environment. The results of chosen process parameters significant influence on elementary phenomena occurring during particles (of sized up to 60 μm) separation process were presented, as well the results of viscosity and suspension stability. The described state of elementary phenomena recognition being the part of classification process determines unequivocally the state of models construction of this process. Their general feature is deterministic approach joined with introduction of significant simplifications. This is caused mainly by lack of many elementary phenomena measuring possibilities during the process conduction. The constant coefficients introduced to the equation, which, however, do not allow the unequivocal interpretation of all of the phenomena occurring during the classification process. This do not solve the complexity of the problem because the random interactions should be considered in process description. The Randomness of the process causes many difficulties in determination of correlations between individual elementary phenomena and also in precise identification of full group of factors influencing on course and results of the process. Only in recent years, the random interactions are introduced in various range to existed deterministic process models.

Keywords: *flowing classification, physicochemical parameters, regression analysis*

RYSZARD WASIELEWSKI, BARBARA TORA

Solid Secondary Fuels · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

Refuse-derived fuel (RDF) or solid recovered fuel/specified recovered fuel (SRF) is a fuel produced by shredding and dehydrating municipal solid waste (MSW) in a converter or steam pressure treating in an autoclave. RDF consists largely of organic components of municipal waste such as plastics and biodegradable waste. RDF processing facilities are normally located near a source of MSW and, while an optional combustion facility is normally close to the processing facility, it may also be located at a remote location. SRF can be distinguished from RDF in the fact that it is produced to reach a standard such as CEN/343 ANAS. The use of Solid Recovered Fuels (SRF) derived from mixed-/mono waste streams is expected to result in a significant contribution to the generation of sustainable energy. The demand for alternative waste treatment is addressed by production and direct co-combustion of SRF in pulverised fuel fired power plants as an environmentally friendly, energy efficient, short-term available and cost effective technical solution.

Keywords: *solid recovered fuel, renewable energy, waste-to-energy*

JAN ZAWADA, KONSTANTY CHOCHOŁ

Experimental Research of Crushing Energy (on Example of the Model Lever Blake Crusher) · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2009

Determination of energy consumption is the main and unsolved problem of the crushing mechanics. The fact comes as the consequence of great complications of comminution processes (crushing, milling). For this reason the experimental studies of the elementary and machine processes appear as the approved methods for definition of the crushing energy. The present work is addressed to estimation of the global energy as well as its components — dissipation and elastic energy — necessary for crushing two domestic rocks in Blake lever crusher. The following values were assumed as the calculation base: force acting upon the front toggle plate and its displacement, represented by energy loops. New data for scientific and engineering applications were obtained.

Keywords: *energy consumption, Blake lever crusher, comminution process, crushing, milling*