

Summaries

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CFD Simulation of Reverse Flow Phenomena in Declined Galleries • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

An attempt to describe the reverse flow phenomena through numerical simulation was undertaken in this paper. The flow domain creates a 150 m long declined gallery with 15° angle of inclination. The airflow is descending in isotropic conditions. In 10 m long gallery's section a higher temperature of floor and roof than on remaining rock surfaces was assumed. The considered problem is described by a system of equations of continuity, Navier–Stokes and energy together with k – ϵ turbulence model. The calculations were performed for different wall temperatures of heated gallery's section. The flow field patterns, characterizing the respective stages of reverse flow expansion are analyzed. CFD code validation based on the experimental data [8] were performed. The numerical calculations by the programme FLUENT 6.1 have been supported.

Keywords: *CFD simulation, reverse flow in mining galleries, underground ventilation*

STANISŁAW NAWRAT, ZBIGNIEW KUCZERA, RAFAŁ ŁUCZAK, PIOTR ŻYCZKOWSKI

Problems with Assurance of Stable Parameters of Fuel From Demethanation of Mines, which is Used in Gas Engines • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

Gases from demethanation of hard coal beds are low-methane fuels, which can be used in different kinds of heating and power engineering systems, i.e. in boilers with gas burner, engines and gas turbines. Assurance of high stability of quantitative and qualitative parameters is serious problem, which makes difficulty with right exploitation of that installations. This article presents the requirements for gases from demethanation, which are used for feeding the heating-power engineering installation, and possibilities, which burn gases from demethanation from hard coal mine "Budryk", the influence of non-stable parameters of fuel on installation work and technical solutions, which provide the stabilization of quantitative and qualitative parameters of gases from demethanation, are discussed.

Keywords: *demethanation of mines, stabilization of quantitative and qualitative parameters, methane-aerial mixture, usage of methane*

ZBIGNIEW PIOTROWSKI, MACIEJ MAZURKIEWICZ

Absorbability of Cavings to be Sealed • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

Fly ash suspensions are used in Polish underground coalmines for many years, mainly for filling of caved areas. Computation of required amount of waste is one of the most important problem. It depends on volume of voids between rocks within the cavings (inter-grain space) and other factors. The total amount of suspension which can be used is named "absorbability of cavings". Results of model studies and technical tests realized for 38 longwalls applying caving method are presented in the paper.

Keywords: *fine-grained waste, suspensions, intergranular voids, absorbability of cavings*

BOGUSŁAW PTASZYŃSKI

Carbon Dioxide Concentration in Mine Workings • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

The article presents the phenomenon of the increase of CO₂ concentration value beyond admissible regulations in some underground workings in a certain ore mine. Research makes it clear that the cause of this repeated state is not a technical or organizational issue. Its grounds are rather physical. Selected results of extensive research conducted in the mine throughout 8 months are presented in the article, with the registration of the mentioned state of inadmissible CO₂ and O₂ concentration values in mine air. The paper also demonstrates the analysis of the correlation and multiple linear regression, as well as the outcome of its application to measurement results. Using the Statistica suite, the analytical form of the multiple linear regression was determined. The form of the obtained function could prove useful in forecasting the CO₂ concentration in mine air, all the more as the power of thus-determined linear correlation is very high.

Keywords: *mine atmosphere, gas outflows*

TADEUSZ SZPONDER

Determination of Criterion of Optimum Parameters Fog Nozzle Operation for Dust Removal from Coalmine's Atmosphere • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

Application of atomizer water is the main method of dust fighting from coalmine's atmosphere. Dust extraction effectiveness depends on parameters of atomized stream microstructure and cloud of dust. Dust removal effectiveness by spraying is the function of many parameters which are integrated in a ratio of drops surface in volume unit of atomized stream.

Keywords: *atomization, microstructure of atomized stream, drops surface, dust removal*

RYSZARD WOSZ

Deflection of the Roof During Exploitation of Deposit — it is Probability of Appear the Stratification of the Roof During Massive Excavation • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2006

The article is continuation of the research works concerning the principal and direct roof strata deflection above the deposit mined by means of the chamber — pillar system with roof deflection in the exploitation conditions of the copper deposit LGOM. A model of the roof deflection and the solutions of the equations of the beam's axis deflection have been shown in the earlier papers. In this paper has presented the functions of the deflection, which depends the coefficient of excavation. Has calculated value of coefficient: $a = 0.01-0.5$. In the next step were describing the deflection curves of each data of coefficient and has analyzed the different of deflection of the roofs. Were looking for the tangential point of position of the beams. On this base was decided when the beams taken contact and where were generation the part of the less of contact. This situation was defined as beginning of the process accumulation of elastic potential energy, which can be relieve while destroying the bump of the basic roof.

Keywords: *deflection of the beams on the Winkler's ground, tremors of the rock massive*