

# Summaries

---

MARIAN BRANNY, KRZYSZTOF FILEK, JUSTYNA SWOLKIEN'

## **Air-Cooling in headings using compression refrigerator that acts directly**

Problem of air-cooling in blind headings with duct, exhausting systems of ventilation is considered. Performance of two types of compression refrigerators were tested. Calculations were made for different volume flows of air through evaporator and for different air temperatures in heading. Parameters of cooled air and cooling power of evaporators were calculated using mathematical model of compression refrigerator developed in [1]. The results of calculations are presented in the form of plots and tables. Cooling power of evaporators and its division on sensible and latent part was shown on diagrams.

**Keywords:** *mine air conditioning, air cooling in headings, compression refrigerator*

JERZY CIEŚLIK

## **Energy changes with damage and plastic dissipation process under uniaxial and triaxial compression test of sandstone samples**

Results of laboratory investigations focusing on energy changes with damage and plastic dissipation process under a uniaxial and triaxial compression tests of sandstone samples has been presented in this paper. It was assumed, that fracture propagation and plastic dissipation caused by compression of rock samples follows by coupled damage and plasticity mechanical model. Based on this model and the principle of conservation of energy, damage and the plastic dissipation energies was determined separately.

**Keywords:** *Triaxial tests, plastic dissipation, damage process*

MARIUSZ CHOLEWA, BEATA MANKIEWICZ

## **Stability of slopes of the second quarter of the municipal waste dumping ground in Chelmek**

The paper presents an analysis of the cohesion values of municipal wastes from the dumping ground in Chelmek in the context of its influence on the obtained values of the safety factor determined using Fellenius method. While preparing data for calculations, existing documentation concerning the dumping ground was used and for the full recognising the analysed quarter, in-situ tests were performed. The obtained data made it possible to carry out the theoretical calculations showing the possibility of the loss of the stability in the case of occurring certain determined values of geotechnical parameters and soil-water conditions

**Keywords:** *dumping grounds, stability of slopes, cohesion*

KAJETAN D'OBYRN, BOGDAN KOKOT, JAN KUCHARZ

## **Sealing the liquidated Górsko Shaft in the Wieliczka Salt Mine**

This paper presents technical solutions related to the sealing of the liquidated Górsko Shaft in the Wieliczka Salt Mine. Due to the identified spills in the surroundings of the shaft at different levels of the mine, sealing is

necessary in the upper part of the shaft from the surface to the boundary between the tertiary and quaternary layers. The goals of sealing cementation of the Górsko Shaft is: i) to eliminate surface water inflow leaching salt deposits into surroundings of the shaft, ii) obtain a concrete coat around the Gorsko Shaft tube, and iii) consolidate rock massif to ensure stability of the salt rock formation.

**Keywords:** *water inflow, shaft sealing, sealing vents, cementation*

MARIUSZ KAPUSTA, TADEUSZ SZPONDER

### **Formation of occupational risk, connected with the noise at the work stations in underground mining excavations**

The article presents the results of the noise measurement at selected workplaces in coal mines. The employer is obliged to identify, evaluate and estimate occupational risk, resulting from existing hazards. To analyze the exposure of workers to noise, a group of mining division employees was selected. The main source of noise in excavations comes from machines and technological processes associated with mining of the body of coal. Risk assessment was carried out with use of the PN-N-18002 norm, which enabled to estimate the size and the degree of risk acceptability, while allowed to determine prevention methods. In addition, the article compares actual and tabulated values of noise for various mining machinery.

**Keywords:** *noise, risk, harmful factors, occupational disease*

ANDRZEJ KROWIAK

### **Algorithms of automatic enumerating balance of masses of raw coal and the barren rock at driving of the galleries in mining works**

In the article mathematical models being used to automating calculations of balance of masses of raw coal and the barren rock were described, for each of working days comprising for the project of opening deposits (driving of the galleries). Three types of algorithms were considered: for the model assuming the successive performance of excavations, for the model taking into account the division of individual excavations into intervals differing indeed the proportion of raw coal and the waste rock and the model assuming parallel driving a few excavations. Enumerated functions are suitable to direct utilization, after defining entrance data.

**Keywords:** *exploitation of resources, mining, gallery, balance of mass, mathematical models*

MARIAN MIKOŚ, MICHAŁ KARCH

### **The proposal of the energy – efficient way of the impeller pump regulation**

In the thesis the experimental research results concerning possibilities of the use of the additional angular momentum of a stream under suction are presented as a factor enabling regulation of the impeller pump efficiency with maintaining a constant pressure value. This method improves the efficiency of the pumps which have been tested.

**Keywords:** *impeller pump, regulation of the impeller pump, prerotation*

NIKODEM SZŁAZAK

### **Prediction of climatic hazards in mine airways**

In underground mining, every year there are more and more difficult climatic conditions in the work-places. In the near future as a result of operating at deeper levels and to increase the concentration of output is expected to decrease in the climatic conditions. The state of climatic hazard in Polish mine is presented in the paper. Sources and ways heat flux to airway is described. Methods to improve working conditions, currently using in mines with high risk of temperature are characterised.

**Keywords:** *mine ventilation, climatic hazards, cooling and refrigeration*

### **Method for the Determination of Methane Content of Coal Seams**

Analyses of preparation and doing research on methane content in coal seams and an established procedures in laboratory are conducted for previous methods assessment. Analyses of previous methods for determining content of methane in coal seams allowed a uniform procedure for taking samples and for determine the content of methane in samples in the laboratory to be developed. Research on sorption and desorption of methane on coal were done for determining the methane losses during taking samples. Obtained results at different saturation pressures. Allowed to determine a dependance enabling calculation concerning the losses of methane during the taking coal samples in the mine workings. As a result of the analyses method for determining content of methane in coal seams were given.

**Keywords:** *content of methane, methods for determining content of methane in coal seams*

NIKODEM SZŁĄZAK, CZESŁAW KUBACZKA

### **Periodical changes in methane emission to a longwall during mining**

In longwalls there might be different methane hazard conditions, from very negligible to very risky ones, in case of which without using special control methods (ventilation, methane drainage) mining works could not be conducted. Safety in mines excavating coal seams saturated with methane depends on the proper estimation of methane hazard, conducted observations, hazard control as well as undertaken prevention methods. A weekly methane emission varies and is closely related to a mining process. At the beginning of the week there is a constant increase in methane emission, which reaches the maximum on the last day of excavation. During breaks in excavation, methane emission to a longwall decreases. Changes in methane emission in weekly periods can be described by means of the dependences presented in the article. However, in order to estimate its condition it is necessary to obtain information concerning earlier methane emission in longwalls.

**Keywords:** *methane hazard, methane-bearing capacity, unsteady methane emission*

NIKODEM SZŁĄZAK, DARIUSZ OBRACAJ, KAZIMIERZ PIERGIES

### **General principles of goaf inertisation by means of nitrogen for operating longwall**

The possibilities of using nitrogen in fire hazardous areas without sealing excavations enable a nitrogen to goaf inertisation of an operating longwall to be used. The general principles of goaf inertisation for operating longwall are presented. Methods for generating a nitrogen for mine air inertisation are discussed. The criteria and possibilities of effective inertisation of operation longwall goaf are presented as well. It is paid attention to dangers and required protection of mining area during goaf inertisation by means of nitrogen.

**Keywords:** *underground fire, inertisation, nitrogen*

DANIEL SARAMAK

### **Determinant factors of fine particle fractions generation in high-pressure grinding rolls crushing processes**

An influence of two basics adjustable parameters of the high-pressure grinding rolls: the operating pressure and speed of rolls on the finest particle generation in crushed products, were presented in the paper. Finest fractions in comminution products are generally undesirable, due to the over-grinding phenomenon, what decreases the flotation process efficiency and the overall process effectiveness. When there is an application of the roller press in technological circuit, the suitable control influences the finest particles generation, what leads to the control of the comminution process efficiency.

**Keywords:** *comminution, high-pressure grinding Rolls, crushing proces modeling*

GRZEGORZ WACHOWIAK

### **Impact of mine water discharge on water flow of rivers in the initial period of dewatering of the Tomislawice Open Pit (Konin Brown Coal Mine)**

Since 2009, dewatering of the Tomislawice Open Pit has become yet another anthropogenic factor changing hydrographic conditions in the catchment of the Upper Noteć River above Gopło Lake. The flow values of water-courses receiving mine water, i.e. the Pichna and Noteć rivers, recorded in the period before mine dewatering have been analyzed. The values of mine water discharges provided by the Konin Brown Coal Mine are discussed and verified against the results of conducted hydrometric measurements. The verified values of mine water discharge were compared with characteristic values of river flow. The percentage of mine water discharge in the flow of the Pichna and Noteć rivers has been calculated. The necessity to include also other anthropogenic factors such as water discharge from the Warta-Gopło Canal to the Noteć River in the estimates of the impact of the Tomislawice Open Pit dewatering on river discharge and water resources of Gopło Lake is indicated. The paper is based, for the most part, on the results of water environment monitoring of the Tomislawice Open Pit carried out by the Institute of Meteorology and Water Management National Research Institute Poznań Branch in cooperation with the Poltegor-Projekt (Wrocław).

**Keywords:** *Tomislawice Open Pit, mine dewatering, mine water discharge, river flow, the Pichna and Noteć rivers*

DANIEL ZBRONSKI

### **Air-jet mills used in mineral processing of chosen granular materials**

The satisfaction of industrial demand on the fine-grained materials caused the dynamic development of air-jet technologies. The division of air-jet mills and description of chosen their types are presented in the paper. The difference between mills mainly depends from method realization of comminution process, used milling-classify system and producer of mill. The experimental results of chosen granular materials comminution in the several types of mills confirmed the possibility obtainment of required particle size distribution of product on the definite stage of mineral processing.

**Keywords:** *comminution, granular material, air-jet mills*