

# Summaries

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ZBIGNIEW BURTAN

## **Geomechanical model of a transversely isotropic medium as a simplified model of rock strata**

In consideration of real properties of rock mass built of several strata differing in their strain-related parameters, the geomechanical model of rock strata seems a good solution to be used in analytical studies of mining impacts. On the other hand, the formulas governing such model are most complex, besides, not all strain parameters are available during the mining operations, so underlying mining forecasting are simplified models of rock strata based on the models of a transversely isotropic medium. The author suggests how to represent isotropic strata underlying the level being mined by a single, transversely isotropic stratum. These principles together with precisely controlled boundary conditions allow for finding the state of stress and displacement at an arbitrary point in the analysed rock medium, represented by the transversely isotropic medium.

**Keywords:** *mining geomechanics, state of stress in the rock strata, underground mining*

KRZYSZTOF CIAŁOWICZ, JANUSZ CHMURA, ANDRZEJ LASOŃ, TADEUSZ MIKOŚ, MACIEJ PAWLIKOWSKI, ANTONI TAJDUŚ

## **Mining and building preservation of archeological objects in Egypt in the aspect of their further usage**

Archeological, geologic and mining research performed on a pre – dynastic mastaba, which dates 5 thousand years back, indicates the presence of some archeological layers under the object. Throughout the centuries the foundations and the walls have been destroyed by rains and flooding from the Nile. This destructive influence of moisture and the weight of the building itself have caused local deformations of bricks, binder and the walls. The preliminary mining project aims at detailed recognition and research of the base and the walls of the mastaba. Further steps include direct exploration of the anthropogenic layer, placed under the walls. The application of mining methods guarantees the stability of the historical walls of the mastaba without any deformations. After this exploration, it will be possible to replace this space with the material that would protect the stability of the preserved walls of the mastaba. In the future, this can be the basis for contemporary reconstructions of this incredibly valuable relic.

**Keywords:** *mining archaeology, mining special methods, Tell el Farcha*

AGATA CZARNIGOWSKA, ANNA SOBOTKA

## **The method of construction project planning and control: case study**

It is quite common that in the course of construction works their programmes (both schedules and cost plans) have to be adjusted to changing conditions. If plans are to be met, it is thus necessary to monitor performance to introduce necessary repair actions. Progress checks providing information useful in project control should be conducted on regular basis. The aim of the paper is to present a method used for managing projects on operations level – the *Earned Value* method (*EV*) and its extension – *Earned Schedule* (*ES*). In these methods, a set of simple indices allow the project manager to decide on further progress of works. Application of the method has been illustrated by a road works case study.

**Key words:** *construction project, planning, control, Earned Value, Earned Schedule*

KRZYSZTOF FILEK

### **Water transport by shaft lines in air-cooling installations in underground mine excavations**

A control of thermal hazard in underground mines is connected with cooling equipment utilization. Heat received from cooled air in excavations can be used on a surface. This article applies to problem of warm water transport from mine, with special consideration its pressure and temperature. The algebraic equations of pressure distribution were shown and differential equations of temperature distribution in water lines were derived. Two numerical examples, which represented discussed problems, were solved – their results were presented in form of diagrams in two pictures.

*Keywords: thermal hazard, mine air-conditioning, heat receiving*

RAFAŁ LUCZAK

### **An assessment of TS300 cooler operation quality with utilization of statistical analysis of data**

In the article, an analysis of air parameter validation, which is cooled by direct action cooler type TS300, made by Termospec Ltd., and influence of air parameters on a process of its cooling and refrigerating power of applied cooler were presented. A cooling efficiency was evaluated by statistical criteria in the form of multiple regression equations. In this work a statistical analysis of air and water parameters was shown and on this basis an estimation of evaporator and condenser input data was made. An application of obtained statistical equations allows in the simply and fast manner determine the cooled air parameters and makes possible to realize a simulation of evaporator and condenser powers in the relationship to input data validation in the places of forecast refrigerator localization.

*Keywords: direct action cooler, refrigerating power, statistical analysis*

MARIAN PALUCH, RYSZARD WOSZ

### **Analyze of the dynamic deflection of the direct roof during exploitation of deposit**

In the article was described effect of the works concerning the direct roof strata deflection above the deposit mined by means of the long-wall system with roof destruction in the exploitation conditions of the black coal. A model of the roof has been defined as a brittle rock. The main constitute equations of the model include the factor which describes the dynamic process of moving direct roof. In calculation long of the cantilever was 10 m, tall 12 m and the third dimension was 1 m.

*Keywords: deflection of the beam, brittle rock, single opening, stress concentration factor*

STANISŁAW WASILEWSKI, TOMASZ CHOROBA

### **Remote temperature measurements in the assessment of thermal activity of coal waste dumps**

Landfills mines fit firmly in the landscape of the mining areas. The presence of carbon in the landfills, along with other substances, often leads to a fire hazard. The variety of factors that affect the spontaneous combustion and fires dump makes the protection of objects containing the waste coal a much more complicated task. An extremely important role in the prevention of fire dump plays particular attention to the regular monitoring and observation of the thermal and gases. Traditional techniques for monitoring the use of thermocouples and thermometers, which allow the measurement of temperature from point to point, so they are expensive and time consuming. Infrared thermography, compared against more traditional methods, has greater range and higher precision results. The article presents the possibility of using a thermo-graphic image taken from the plane to the detection of warm up on the surface of coal waste dumps in Silesia.

*Keywords: coal waste dumps, remote measurements of temperature distribution, thermo-graphic images taken from an aircraft*

*PIOTR ŻYCKOWSKI*

**An analysis of work of mine air compression refrigerator of indirect action with internal heat exchanger**

An analysis of work of mine air compression refrigerator TS-450P type with internal heat exchanger was described in this article. Influence of internal heat exchanger on main parameters of work of air compression refrigerator: refrigeration capacity, specific compression work and refrigerating capacity coefficient was demonstrated.

**Keywords:** *air-conditioning, internal heat exchanger, refrigerator, refrigeration capacity*