

Summaries

IRENA BAGIŃSKA, RYSZARD JERZY IZBICKI

Optimaliation Geometry of the Collapse Mechanism in the Generalized Kinematic Element Method • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper deals with the generalized kinematic elements method. In particular the rules for constructing the optimization object out of the power equilibrium equation is explained. The procedure for optimizing geometry the collapse mechanism is presented. The work describes both: application of constraints in the form of the punishment function and adoption of Nelder-Mead's nongradient method for global optimization.

Keywords: *slope stability, upper boundary of limit analysis, generalized kinematic element method, optimalization*

FRANTIŠEK BALIAK, IGOR STRÍČEK

Special Purpose Engineering Geological Maps of Slope Failures in Slovakia • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The territory of Slovakia is characteristic with extremely frequent occurrences of various types of slope failures. Especially landslides are one of the major geotechnical problems in Slovakia. The landslides significantly affect building and operation of large amounts of transport, watermanagement and underground constructions. Results of regional research of slope stability of certain areas are perfectly illustrated in the special purpose engineering-geological maps of slope failures, which are usually made in scales from 1:5000 to 1:50 000. Slope failure maps can be classified by the content, type of compilation and their purpose. The most prevalent are large scale ($M = 1:10\ 000$) maps of engineering geological conditions and medium scale ($M = 1:50\ 000$) landslide susceptibility maps. Special purpose engineering geological maps of slope failures appear to be the most appropriate information for investors, city planners and developers.

Keywords: *geological maps, slope failure, landslide, zoning maps*

ANDRZEJ BATOĞ, MACIEJ HAWRYSZ

The Usability of the Sand and Ash-Slag Mixtures to the Construction of the Road Embankments • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents results of the investigations of the anthropogenic material created as the composition of sandy soil and the ash-slag. The wastes from burning of coal in one of heat and generating plants in Wrocław and the local sand were used. The obtained results determined the range of usability the two different mixtures to the construction of the road embankments. The discussion of the usability were

performed. The lack of compatibility in the technical guidelines and technical standards were underlined especially in case of the criteria used for the organic part contents determination.

Keywords: *soil mixtures, soil embankments*

ANDRZEJ BATOĞ, MACIEJ HAWRYSZ

The Estimation of the Characteristic Values of the Geotechnical Parameters According to Eurocode 7 • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The enclosed in the Eurocode 7 guidelines for the estimation of the characteristic parameters are commonly general and some of the essential definitions which used for the description of this problem are inaccurate for the geotechnical engineering. The acceptable and usable methods for the estimation of geotechnical parameters in case of small data set were not presented in EC7. In this paper compatible with EC7 methods of estimation based on the statistical analysis were presented and discussed.

Keywords: *geotechnical parameters, characteristic values*

JERZY BAUER, JANUSZ KOZUBAL, WOJCIECH PUŁA, MAREK WYJADŁOWSKI

The Influence of Random Variability of Soil Properties on the Reliability of Piles Subjected to Lateral Loading • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper presents probabilistic modeling of pile displacement under random lateral forces acting on the pile head. An original numerical model is presented incorporating a randomly varying elastic modulus with depth. The probabilistic computations take into account different values of the coefficients of variation as well as correlation coefficients of random variables. The probability of excessive displacements and corresponding reliability indices were evaluated. The computed examples show that the displacement exceeding the allowable value is determined by the force acting at the head of the pile and by the variation of the elastic modulus of the soil.

Keywords: *probabilistic modeling, pile displacement, reliability index*

DAMIAN BĘBEN

Deformation of Bridge Shell Made from Corrugated Plates during Backfilling • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper is presented the numerical analysis of corrugated steel plates (CSP) bridge during backfilling. Obtained calculations results were compared with the experimental ones. The analyzed bridge has a box structure and an effective span of 12.315 m as well as a clear height of 3.555 m. The paper is presented the application of the FLAC (Fast Lagrangian Analysis of Continua) program based on finite differences method (FDM) to determine behavior of the soil-steel bridge structure during backfilling. The assumptions of computational 2D model of soil-steel bridge structure with interface elements are also described. The method based on this computational model may be used with large success to design calculations of this specific type of structures instead of the conventional and little accurate analytical methods. The conclusions drawn from such analysis can be helpful mostly for the assessment of the behavior of the steel-soil bridge structures under load of backfilling. In consideration of an even more frequent application of this type of structure in for small and middle-sized road and railway bridges in Poland and in the world, conclusions of conducted analysis can be generalized to whole class of similar soil-steel bridge solutions.

Keywords: *soil-steel bridge, corrugated plate, FDM analysis, interface element, backfilling*

JAROSŁAW BRODNY

Preliminary Work Analysis of the Screw Connection in the Friction Joint Steel Arch Mining Support • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the article are presented the results of the stress analysis of the screws stirrups work in friction joint steel arch mining support. Analysis covered the determination of axial forces acting in the stirrup screws connector tighten by initial bending torque. Forces have been designated on the basis of position researches and numerical analysis of connectors work subjected to axial compression and static bending. Researches and analysis have been carried out for the joint consisting of two straight sections of Profile V29 combined two stirrups in accordance with SDO29 type PN-91/G-15000/11 and DIN 21530-4-2003-05.

Keywords: *mining support, screw connection, friction joint*

JAROSŁAW BRODNY

Analysis of the Friction Joints of Work of Steel Arch Mining Support Axial Compression and Static Bending • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the article friction joints stress analysis of steel frame of road support with axial compression and the static bending are presented. Analyzed joint consisting of two straight sections of Profile V29 combined two types SDO29 stirrups. With static bending two cases of load joint were examined. In the first loading force acted on the joint accordance with PN-91/G-15000/11 through traverse, in the second case the force acts directly in the middle of the connector according to DIN 21530-4-2003-05. The results of position experiments and numerical analysis, carried out by finite elements method, were presented. On the basis of the analysis characteristics of connector work and the most exposed places of particular elements of friction joint have been determined. Presented numerical models are creating great simulation potential in the changeability of the value and the load speed as well as structural changes in the analyzed joints.

Keywords: *mining support, friction joint*

MIROŚŁAWA BUKOWSKA, JERZY GAWRYŚ

Physical Properties of Coals in the Upper Silesian Coal Basin in the Aspect of Coal and Methane Outbursts • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the article there were presented the results of research of physical properties, including mechanical and technical ones, of coals within the USCB in the aspect of their susceptibility to outbursts. Coals were represented by libiąskie, łaziskie, orzeskie and rudzkie beds. They were divided into two groups — susceptible and non-susceptible to outbursts — on the basis of compression strength value and consistency, in accordance with previous knowledge gained empirically with reference to gas-dynamic occurrences. The analysis of physical parameters values, including mechanical ones, showed explicit variety of values of some of them. Taking into account physics of coal and methane outburst phenomenon the authors propose a new parameter of coals susceptibility to outbursts such as friction coefficient. Its limit value between coals susceptible and non-susceptible to outbursts initially was empirically established on the level of 0.65.

Keywords: *coal, physical properties, outbursts of coal and methane*

ZBIGNIEW BURTAN

Seismic Hazard in the Copper Mining Area Adjacent to the Faulty Zone in Rudna Główna • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Seismic hazard is one of the major risks faced in the Polish copper mining sector. Factors responsible for generating high-energy shocks include the tectonic features of the deposit being mined, manifested mainly

by dislocations of considerable thrust. Experience gathered to date shows that mining in the region of major tectonic disturbances might lead to high-energy tremors and often rock bursts, when the faulting activity is enhanced. The study explores the tectonic features in the copper mines of the Polish Copper Holding KGHM Polska Miedź S.A., revealing major thrusts and large extents of the faulty zone in the mining area. The fault zone in Rudna Główna is most characteristic of faults encountered in KGHM Holding mines in the mined-out regions, hence this study uses that example to show the registered seismic activity and explore the potential impacts of mining operations. Development of the seismic hazard in the areas adjacent to the fault zone in Rudna Główna reveals the major risk of high-energy tremors and, potentially, of major rock bursts as well.

Keywords: *copper ore mining, rock burst and tremor hazards, fault displacement*

MAREK CAŁA, MICHAŁ BETLEJ

Three-dimensional Slope Stability Analysis in Complicated Geological Conditions • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

His paper show the method of stability analysis of complex geology slopes. Application of two-dimensional calculations (assuming plane strain conditions) is not always correct for complex geology slopes. Only the three-dimensional numerical calculations allow accurate and sensible stability analysis taking under consideration complex geology and structural surfaces localization. This work deals with three-dimensional stability analysis of complex geology slope. The factor of safety was estimated to fit for real landslide range. Presented method of calculation may be utilized for calibration and validation of three-dimensional numerical models and its application for slopes of similar geology.

Keywords: *slope stability, numerical methods, three-dimensional analysis*

MIECZYŚLAW CHALFEN, TADEUSZ MOLSKI

Influence of Ślęza River on Groundwater Level in the Area of a New Cemetery Planned in Wrocław • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Localization of a new municipal cemetery in the area between the Ślęza river and the Awicenny street in Wrocław was planned. Because of the change in the land usage from agricultural to a municipal, it was necessary to investigate influence of unstable water level of Ślęza river on the ground water levels occurring in the analyzed area. The paper presents the results of model researches, which used a mathematical model of water flow in the totally saturated zone. Calculations were done for high and middle water level in Ślęza river as well as for periodic water damming up (of 1% probability) — and shore waters. Also the influence of increased infiltrating water flow from the aeration zone was studied. The numerical results analysis led to the conclusion, that for low groundwater level, in some quarters of the planned cemetery, the appropriate groundwater level is not assured. It was also found, that the periodic increase of a water level of Ślęza river results in a small, 0.10–0.20 m, elevation of the water table. In the recapitulation it was stated, that the new investment requires a permanent groundwater lowering system on the terrain of the cemetery.

Keywords: *groundwater, new cemetery, mathematical model*

JERZY CIEŚLIK, MARIUSZ MLYNARCZUK

Preliminary Analysis Results of LGOM Dolomite Samples Structure Modification Based on Stereological Investigations and Irreversible Strain Measurements • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The results of preliminary analyses of the LGOM dolomite samples concerning on internal structure modifications are presented in this paper. The analyses were based on the stereological investigation of

structure modifications of the compressed and uncompressed rock samples and also on the macroscopic measurements of irreversible axial and lateral strains. The results have shown the damage anisotropy i.e. the anisotropy evolution of fractures during loading.

Keywords: *fracture propagation, laboratory investigations, LGOM dolomite*

BARTŁOMIEJ CZADO, ELŻBIETA KORZENIOWSKA-REJMER, JAN S. PIETRAS

An Analysis of Subsoil Bearing Resistance Changes Caused by Oil Contamination in Example of Sandy Soils • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents the results of research made on the influence of diesel-oil soil contamination on one of the main soil shear resistance parameters — an effective angle of internal friction (φ') — and, as a result, on subsoil bearing capacity. Laboratory studies have been performed on the fluvial sand samples, drawn from the quaternary sediments of higher terrace of Wisła valley in the Kraków area. The data that have been gathered allowed to derive a linear dependence of the effective angle of friction on the oil contamination content in medium sands. The results of calculations of the subsoil resistance caused by the oil contamination have been presented.

Keywords: *oil pollution, sandy soils, angle of internal friction, bearing capacity, subsoil resistance*

LEOPOLD CZARNECKI, BARBARA ORGANIŚCIAK, ŁUKASZ KRYWULT, ANDRZEJ CHROST

Stability of West Final Slope of Belchatow Mine in Light of Geological Observation and Specialized Measurements with Consideration of Salt Dome • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This article describes the method of monitoring of rock-mass behavior in west final slope of mining pit Belchatow in area of salt dome Debina. Presented are the results of measurements conducted during time period 2005 — December 2009. These are the measurements of fixed survey points constituting the terrain surface observation network, that is intensified on west final slope, leveling network of observation points deployed on terrain surface in area of salt dome, deep deformations monitored using inclinometers and measurements of pressure changes in salt dome measured using Glootzl probe device. Results of above listed measurements are presented in accordance with mining works advances. During this period the final west slope of the pit was formed in the scope of elevations +198/+110m a.s.l. which allowed for also presenting the brief description of geological structure revealed in area of Debina salt dome. Also presented are results of macroscale observations conducted on the final pit benches of west slope. To-date results of the measurements allowed for correlation between the observed deformations and mining works advances and also allowed for designating of two areas of slide hazard on the west final slope of the Belchatow pit.

Keywords: *mining pit, slope, monitoring, survey and measurements, deformations, salt dome, inclinometers, fixe survey points, leveling, probe*

AGNIESZKA DĄBSKA, PAWEŁ POPIELSKI, ALEKSANDER B. FADEEV, ELENA V. GORODNOVA

The Analysis of New Constructed Buildings Influence on Underground Constructions • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the article there is discussed problem following to additional loadings, which is applied on stress-deformation condition existing in the ground. There are presented results of the numerical analysis of new

object influence on underground constructions on several examples of objects realized in Poland (Warsaw): the tunnels and stations of the underground and Russia (Saint Petersburg): the main collectors of city in Saint Petersburg. The numerical analysis, based on finite elements methods, has been used for calculations, what allow to draw conclusion concerning the safe construction.

Keywords: *influence on underground constructions, numerical analysis, finite elements methods, safe construction*

RAFAŁ DĘBKOWSKI, ZDZISŁAW IWULSKI, MARIUSZ KIREJ, MARCIN SZPAK

Cooper Ore Exploitation Experience in Pillar of the Central Inclined Drift 9–12 • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the article was described basic geological and mining technology condition in pillar of the Central inclined drift 9–12 Rudna cooper mine. The primary objective was present the exploitation history between 2003–2009, seismic activity in this region and analysis results of rock deformation measurements with different methods.

Keywords: *rock deformation, rock mass stability, measurements methods*

JAN DRZEWIECKI

Rock burst hazard in aspect of occupational risk • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The underground mining is determined by particular environmental system which is connected with hazards on the different levels of influence for workers and working environment. Hazards in underground mines were dividing into hazards connected with mining machinery and mining systems and hazards which are connected with mining environment. In the paper are presented the elementary methods of estimate of occupational hazard. The main attention attends to rock burst hazard which is connected with mining environment and is an effect of underground mining. It is not fully possible to estimate of occupational risk connected with the symptoms of rock burst hazards. Data base in Central Mining Institute shows that in the underground mining are rock burst cases with apparent deficiencies symptoms like small energies and seismic activities or lack of strata movement. From this reason for rock burst hazard is estimate an occupational risk not as definitively set variable but as a variable change in the time. This change is effect of changes in a shape and volume of rock in the strata which is in this case defined as a work environment.

Keywords: *rock mass, longwall mining, rockburst hazard, occupational risk*

ZENON DUDA, KATARZYNA KRYZIA

Use of Geodetic Monitoring to Assess the Technical Condition of the Historic Building and Architectural Design • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper describes research carried out during repair work in the West Wing of the Castle in Malbork. Presented geodetic monitoring of displacements and distortions of the historic architectural and building construction. Describes the technical condition of the stability of this part of the historic building on the background of geotechnical and geodetic surveys, and work security.

Keywords: *geodetic monitoring, geodetic measurements, geotechnical research, historic structure*

ARTUR DZIEDZIC, PAWEŁ ŁUKASZEWSKI

Ultrasonic Wave Measurements During Triaxial Compression Tests • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents general description of novel system designed to measure of ultrasonic waves. Measuring module is implemented as an extending tool for Rock and Concrete Mechanics Testing System MTS 815. This equipment is capable to perform automatic measurements during triaxial tests and it automatically gathers data in real time. Measurements are carried out in the direction parallel to direction of axial stress. Ultrasonic transducers are connected directly to the MTS channels. This integration ensures full compatibility of ultrasonic data with other parameters measured by MTS system. For example, changes of ultrasonic velocities can be investigated with relation to entire path of deformation with respect to temperature and pressure conditions.

Keywords: *ultrasonic wave, triaxial compression, metrology*

PAWEŁ FEDCZUK

The FEM-CBEM Analysis of Nonlinear Interaction Problem of Continuous Footing and Subsoil • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The following paper presents the concept of using a combined method (consisting of finite element method FEM and contact boundary element method CBEM) to analyze the 3-D interaction problem of system “continuous footing-subsoil”. It comprises elementary theoretical basis, considering formulation of global equation of equilibrium and presentation of the method of solution this relation (using a step-iterative technique based upon the Raphson-Newton method). Calculation results for specific example of system “continuous footing-subsoil” (with using elasto-plastic soil model Modified Cam-Clay) was presented.

Keywords: *Finite Element Method, Contact Boundary Element Method, system “continuous footing-subsoil”*

LIDIA FEDOROWICZ, JAN FEDOROWICZ

Influence of the Overconsolidation on Phenomena Observed in Loaded Subsoils • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The *in situ* stress state is generally defined in numerical analyses by overconsolidation ratio OCR and coefficient of earth pressure at rest $K_o^{(NC)}$ or earth pressure for preconsolidated subsoil $K_o^{(OC)}$. Practical application of the modern techniques *in situ* (CPTU — Cone Penetration Test Undrained, or DMT — Dilatometer) enables identifying OCR-values for the analyzed profiles in the nearly continuous manner. Finally the above techniques make possible spreading critical state models for numerical analyses of the bases engineering problems. Examples in the paper show the influence of adequate description of preconsolidation phenomena on numerical solutions obtained for foundation-subsoil tasks.

Keywords: *overconsolidation state, numerical model, coefficient of earth pressure, contact tasks foundation-subsoil*

LIDIA FEDOROWICZ, JAN FEDOROWICZ

Evaluation of Structure-Mining Subsoil Cooperation-Range in the Critical State Model • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In mining areas some geometrical parameters of a deformed free surface have been first by methods of mining geology forecasted. During mining process surveying service continuously controls those param-

ters. But the state of the additional subsidence of a building structure in mining area (different from subsidence of a deformed surface) is usually not rightly trace. State of the additional subsidence depends both on subsoil and construction conditions and influences an additional effort of the structure. In the paper there are shown that the phenomenon is connected with a cooperation-range of the system building structure-mining subsoil and we are able to evaluate this range in critical state model used to mining subsoil.

Keywords: *mining subsoil's model, structure-mining subsoil cooperation range, critical state model, modified Cam-Clay Model*

JERZY FLISIAK, SEBASTIAN OLESIAK

Stability Analysis of the Kanal Strumień River Dikes • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Changes of water level in a river and accompanying changes of ground water level in dikes are very crucial for stability analysis of flood embankments. Unfortunately a designer not always has a complete knowledge about water levels changes and time for when water stays on the certain level. The paper shows a proposal of complex analysis of the problem in case of lack of hydrogeological data. Stability calculations of were made as a supplement of reconstruction of embankments. One of the elements of the project was construction of a impermeable vertical hermetic dividing wall with application of DSM ground columns.

Keywords: *geotechnical engineering, stability analysis, hydrotechnical construction*

LUCYNA FLORKOWSKA

Buildings Damages and Ground Deformation Caused by Mining Operations in a Highly Intact Rock Mass in the Wirek District in Ruda Śląska • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Mining operations in the Ruda Śląska region lasts from about 300 years. Therefore the surrounding rock mass are strongly affected. For this reason is very difficult to determine the effects of future exploitation. The paper describes the analysis of the influence of the underground exploitation on the land surface and the urban development. Analysis was related to the south area of the Wirek district. Considerations based on the results of geodesic surveys, *in situ* observations and photographic documentation of buildings. Geodesic measurements were carried out on the earth's measuring line and the points embedded in the walls of buildings. The analysis shows the large deformation of the surface and strong damage to buildings. The effects of the mining operation reached well above the forecast.

Keywords: *mining damage, mining exploitation, geodesic measurements, building damage, ground surface deformation*

STEFAN GAŁCZYŃSKI, ANDRZEJ WOJTASZEK

Engineering Criteria of Shaping the Underground Excavations • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The material (physical) phenomena of roof pressure arch in soils and rock masses are considered in the paper. A small soil-coating bridge is presented as an example of this problem. Such factors as correct compression or natural consolidation of the soils form the load-carrying ability zone above the mined space. So, as result of this research. the real rock-mass arches are described as the save protections of the underground excavations. Some formulas to calculate the dimensions and a load capacity of these arches are given too.

Keywords: *Geoengineering, real material arching*

GENNADIY GAYKO, LUDMILA GORBATOWA

Method for Drifting the Headings with Reliable Reserved Support • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The new concept of resistance regulated support is developed, that enables the initial fixing of heading with reserve on reliability, it allows making lighter the weight of construction in these sections, where a support is appeared to be unloaded. The way of designing the support of headings with high functional operation was shown, too.

Keywords: *a heading, heading's stability, reserve on support reliability, support bearing capacity, resistance regulation support*

WIESŁAW GRZEBYK, LECH STOLECKI

Identification of Thermodynamic Processes Performed in Rock Mass in Respect of Assessing the Dynamic Effect Risk • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The article describes the issue of utilization of thermodynamic process observation performed in rock mass in the inference about dynamic effect risk. A method of proper measurements realization with a hole measurement probe made uniquely to this end was presented. Also the preliminary results of observation performed in selected exploitation field were reported.

Keywords: *rock mass deformation, seismic events, thermodynamic processes*

JOANNA HYDZIK, DANIEL WAŁACH

The Research Work of Underground Objects Location along Town Walls in Bystrzyca Kłodzka • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents the research work which made in underground objects location along Town Walls from Water Tower to Knight's Tower in Bystrzyca Kłodzka. There were inventory control open basements under ten apartments houses, accommodations of old prison and Town Wall. All the underground objects was draw on the city map. There was realized detailed description of technical state with view, crosssections and photographic documentations. The realized work was part of city revitalizations plan.

Keywords: *underground monumental objects, Z-S method, old town district*

OLEKSII IVANOV, OLENA SDVYZHKOVA, DMYTRO O. SHASHENKO

Modeling of Mining Rate Effect on Rock Strength and Opening Stability • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Research results of rock mass strength depending on rate of mining are presented in the article. The connection between rock mass failure (*in situ* measurements) and the destruction of rock samples (laboratory tests) is shown. The statistical model considering change of rock mass strength depending on loading rate effect is resulted. The phenomenological failure criterion is developed taking into account the created statistical model. This criterion is used at numerical simulations of rock mass stress strain state. Outcomes of numerical modelling for «workings — rock mass — longwall» system are presented. Failure zones in rock mass at various working speed and the various coalface spaces are resulted as well.

Keywords: *statistical model, strength, rock mass, numerical simulation, stress strain state*

JACEK JAKUBOWSKI

Discontinuities Density and Intensity Parameters Estimated from Circular Sampling Windows • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Quantitative descriptions of joint sets and their interpretation are significant for discontinuous rock mass simulation models and results. Joint sets density, intensity and are among the major ones. They are also important parameters of discontinuity network statistical models and discontinuous rock mass stochastic simulations, including geomechanical simulations. A significant advance in jointed rock mass parameters survey and estimation methods has been achieved recently. Mauldon (independently by Zhang and Einstein) proposed a method for mean trace length and trace density estimation in circular sampling window. New estimators are based on joint trace endpoints counts so avoid trace length measurement, are not biased by censoring and length bias and are not dependent on traces orientation. They have been presented and discussed in the paper.

Keywords: *jointed rock mass, joint sets, geological surveys, rock mechanics, stochastic simulation, stochastic joint network models, circular sampling window*

JACEK JAKUBOWSKI

Finite Element Method Generalizations Applied to Numerical Simulations of Discontinuous and Discrete Solid Models • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Traditional finite element method is efficient and universal numerical simulation method, and implemented with many available software packages, also easy to use. Applied to simulations of discontinuities and discontinuous rock mass, it has got serious limitations. For the last several years some generalizations of this method have been developed with the use of new approximation techniques, particularly partition of unity. As a result of these developments meshfree methods (MFree), enriched approximation methods (GFEM, XFEM) and numerical manifold method has been developed, basing on finite element method and finite difference method approaches. All the three groups of methods listed above have ability to model discontinuities without challenging and expensive remeshing. All of them can simulate continuous medium, discontinuous medium and model disintegration within a single numerical schema (each of them within different one). Completed with contact detection algorithms, they meet criteria of discrete element method. The above mentioned methods are still in their very early stages of development and many theoretical and practical problems need to be solved before they will be used in Civil Engineering and Rock Mechanics for practical applications. In the future, due to their advantages, they can offer an alternative for finite element method, distinct element method and other popular engineering simulation methods. The article presents the above mentioned methods and their possible applications for discontinuous and discrete medium simulation, particularly for the simulation of discontinuous rock mass.

Keywords: *numerical simulation, rock mechanics, discontinuous rock mass simulation, finite element method, generalized finite element method, extended finite element method, mesh-free methods, element-free methods, manifold method*

NATALIA JEDRYSIAK, IRENA BAGIŃSKA

The Identification of Subsoil with an SCPTU Probe • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This article presents the identification of selected characteristics of subsoil based on measurements taken with an SCPTU probe. Profiles of soil were established by using several geological classifications. The estimation of the soils condition and shear module are based on the mandatory Polish Standards as

well as the correlations between measured and calculated values taken from professional literature. The methodology of seismic testing with the GEOTECH 220-04 probe is also presented.

Keywords: *geotechnical field investigation, static sounding CPTU, seismic sounding SCPTU*

MAREK KAWA, ADRIAN RÓŻAŃSKI, MATYLDA TANKIEWICZ

Reliability of Foundation in Varve Clay • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This work deals with reliability of foundation located in varve clays. Using anisotropic strength criterion relation between bearing capacity of foundation and lamination angle of soil in numerical way is obtained. This relation is then used to evaluate global safety factors for foundation assuming lamination angle to be random variable. Global safety factors are then presented as a function of mean value and deviation of lamination angle. As result, global safety factor is obtained, which grants safety of construction on given level for all values of lamination angle.

Keywords: *strength anisotropy, reliability, warve clays, global factor of safety*

ANTONI KIDYBIŃSKI

Energy alternations in the heading zone just before initiation as well as in the course of an outburst • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Results of computer modeling in 1:1 scale of coal and methane outbursts in the roadway driven heading zone were presented — using the Bonded Particle Model method with particular attention paid to energy alternations having place in the heading zone just before initiation as well as in the course of an outburst. Four types of modeling material were used as related to coal properties from this of very high compressive strength (A) down to the weakest coal (D). The necessity of further investigations is argued on longer BPM scale models as well as geophysical measurements applying in the mines in order to detect high coal's density zone within the seam occurring near the heading just before coal and gas outburst initiation.

Keywords: *BPM model, coal & methane outburst, inner energy, coal's density*

ROMAN KINASH, OKSANA KINASH

Determination Width of Opening Normal Cracks in Reinforced Concrete Beam on the Basis of Mechanics of Destruction • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The width calculation of opening normal cracks method is presented in a reinforced concrete beam from positions of destruction mechanics with using the finite-element method. The analysis of received results demonstrates fine precision in compare to conducted calculations according to existent normative documents.

Keywords: *reinforced concrete beam, normal crack, destruction mechanics, method of fine-element*

ZDZISŁAW B. KOHUTEK

Evidence of Identity Issued by Contractor — as Passport of Concrete Delivery to Construction Site • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In this article the notion of “identity” has been used for first time in relation to delivery of concrete (except for having used this notion in the norm). Advisability of the assesment of identity has been

motivated. The criterion of average has been broadened basing on German solution. The article includes also numerical example of the identity test of delivery of concrete made under production control — with and without certificate of notification body. The base constitute the results of compressive strength inquiry. According to EN 206-1 norm — evaluation of conformity is realized by the concrete producer, and the evaluation of identity — by the contractor; this evaluation is binding on him. The evaluation of identity can be treated as an autonomous supplement of evaluation of conformity.

Keywords: *concrete, compressive strenght, identity*

MILOSLAV KOPECKÝ, LUBOŠ HRUŠTINEC, MARTIN ONDRÁŠIK, JANA FRANKOVSKÁ

Deformation of Unstable Slope at the Reservoir Dam Nová Bystrica • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Water reservoir Nová Bystrica is located in the northern part of Slovakia, about 6 kilometers southward of the border with Poland and serves to supply the population with drinking water. Two landslides (slope deformations) have affected a slope adjacent to the water reservoir dam. The distance between the dam left-hand side and the landslides is about 250 m. The first landslide is active; its toe extends to the reservoir water and has destroyed the forest road. The second slope deformation, which is considerably larger than the first one, is a block deformation allocated above the forest road. In the contribution, basing on the ongoing monitoring the authors described the stability of both landslides. According to the slope stability calculations they also analyzed the activity of both landslides and forecasted their further development with regard to the operation of the water reservoir itself. In conclusions there are recommendations for further monitoring of both slope deformations and also there are suggests for additional research works.

Keywords: *landslides, geotechnical monitoring, water reservoir*

GRZEGORZ KORTAS

Lining of Shaft in Salt Massive, Preliminary Model Research • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The lining of a shaft in the salt mine is build according to the norms applied for elastics properties of the massive. However, salt massive creep can cause lining break down. Increase of stresses which is progressive in time is a reason of lining material effort and its flexibility. In this case convergence of the shaft is observed. The modelling research of lining behaviour in viscous — elastics medium was carrying out. Its results show that maximal stress in lining grows with decrease of its flexibility. Obtained results also show, that effective stress of lining can be easily described by specific function forms of shaft radius, thickness of lining as well as flexibility of lining to flexibility of rock massive ratio. This paper points out an important problem in mining sciences. The solution of this problem allows reducing the costs of lining construction and increase operational reliability of the shafts in the salt mines.

Keywords: *shaft lining, salt mine, viscous-elastics medium*

TOMASZ KOSIŃSKI, TOMASZ MICHALSKI, JACEK BOSAK

Terramesh as a Source of Savings in the Reconstruction of Road Embankments • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper presents a road landslide caused by an unusual nowadays culvert. Culvert was constructed as a mark of rocks in the valley, where the high road embankment was built. Landslide

was a result of the imposition of several factors that led to adding up to in his speech. In addition presents, a geotechnical technology characteristics used in the reconstruction of the damaged road section.

Keywords: *landslide, soil reinforcement, gabions, culvert, geogrid, deep soil mixing*

ANDRZEJ KWINTA

Non-Compressibility Condition of Medium in Deformation Prediction Along a Shaft • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

To count coefficients of deformation along a shaft it's used the theory of Knothe-Budryk and Dzięzła's function of range of influence radius in rock mass. The result don't satisfied non-compressibility condition of a medium. It's possible to eliminate that inaccuracy by use active point of the attraction centre model.

Keywords: *deformation prediction, non-compressibility medium condition*

GARRY G. LITVINSKY

Fundamental Laws and New Classification of Rock Pressure Occurrence • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Abstract: The essence of fundamental laws of rock pressure occurrence in underground workings is revealed in the paper. New classification of rock pressure occurrence around development workings on the basis of local norm criterion of destruction is offered. Conditions of natural equilibrium for pressure arch formation and zones of out-of-limit rock deformation are introduced.

Keywords: *rock pressure, underground development working's stability, classification of rock destruction, fundamental laws, roof pressure arch, a zone of out-of-limit rock deformation*

DOMINIK ŁUKASIAK

Strength Variability of Godula Sandstones from Brenna under Uniaxial Compression Conditions • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents characteristics of Godula Sandstones from Brenna on base of uniaxial compressive strength. Analysed influence paleostress and zones of airing of rocky massifs on rocks from Brenna Glebiec quarry.

Keywords: *Brenna, Godula Sandstones, uniaxial compression, strength, anisotropy*

DARIUSZ ŁYDŻBA, ADRIAN RÓŻAŃSKI

Sample Size and Representativity of Microstructure Geometry of Random Composities • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper analyses geometrical representativity of samples randomly chosen from statistically homogeneous two-component composite. Quality of 2-point probability function replica is used as a measure of geometrical representativity of the sample. It is pointed out that there exists a minimal sample size beyond which a satisfactory replica of 2-point probability function could not be obtained. The condition

for minimal sample size is formulated in the paper. Numerical simulation conducted for three different kinds of microstructure confirm effectiveness of the condition proposed.

Keywords: *random media, statistical homogeneity, minimal sample size, 2-point probability function*

TADEUSZ MAJCHERCZYK, ZBIGNIEW NIEDBALSKI, PIOTR MAŁKOWSKI

Reinforcement of Heading Support in Complex Mining and Geological Conditions • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Designing optimal support for underground headings in hard coal mines, particularly for the conditions with intensified rock pressure, is a serious challenge for engineers and coal companies. Not only the already-existing technological practices are continually improving but also numerous innovative solutions related to such problems are implemented. The paper presents an analysis of heading support work. The applied support scheme consisted of steel yielding support reinforced with strand bolts and crown runners. Coal-mine research findings indicated the changes around the analyzed headings, during exploitation. It was carried on at considerable depths and in the areas of hard mining and geological conditions. The results of the field research and achieved experience provided a basis for designing a drift in combined standing-and-roof-bolting support. Such a solution was elaborated with the use of numerical methods. The drift is to become the main opening working at the depth of almost 1300 m.

Keywords: *mining support, field research, headings' design*

JANUSZ MAKÓWKA

Measures Interpretation and Preliminary Results of Investigations over Directed Hydrofracturing Use to Determine Stresses in Rock Mass • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In the paper, present research state over use of directed hydrofracturing to determine principal stresses in rock mass are presented. Measure procedure, two methods to determine hydrofracturing characteristic pressures and method to calculate values and directions of principal stresses on the basis of the pressures has been presented. Current results of research in form of principal major stress orientation in shaft area in "Wujek" mine are shown.

Keywords: *rock mass, stresses, measure, directed hydrofracturing*

MARIAN MARSCHALKO, TOMÁŠ PEŇÁZ, MILOŠ DURAJ

Evaluation of Terrain Subsidence in Relation to the Engineering-Geological Zones in a Territory of the Ostrava-Karviná District Affected by Mining • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The study deals with the evaluation of terrain subsidence (isocatabases) as one of the most important manifestations of mining exploitation. Development of human activities in various spheres of interest occurs also in such affected landscapes. In terms of the engineering geology there is a need for subsidence development assessment in time in relation to the engineering-geological zones representing the geological environment with similar characteristics. It's very essential for the foundation engineering. Overlay analyses in the Geographic Information Systems of the stated factors bring the necessary information for land-use decision-making and planning. The case study in the selected part of the Karviná section of the Ostrava-Karviná District (map sheet 15-44-02) was implemented in the cadastral district of the town of Orlová in the north-east of the Czech Republic.

Keywords: *engineering geology, terrain subsidence, space planning, GIS, engineering-geological zones*

JAKUB MAZUREK

The Forecasts of Rock Mass Deformations in the Field Pagory of Barycz Mine after Backfilling of Excavation Caverns • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The solution mining of salt was performed in (liquidated) Barycz mine for 75 years. It produced several sinkholes and continuous deformations. The excavation process was finished in 1999. In spite of partial backfilling of 10 excavation caverns in Tomana region sinkhole hazard is still active. This paper shows description of excavation process, the results of shape and geometry measurements with echosounder and the level of cavern backfilling. The forecast of deformations after the end of backfilling process is also presented.

Keywords: *solution mining of salt, rock mass deformations, forecast of deformations, sinkholes*

ANDRZEJ NIEROBISZ

Investigating the Mechanical Properties of Rocks by Hydraulic Borehole Penetrometer of New Generation • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper shows a method of determining the mechanical parameters of rocks by hydraulic borehole penetrometer of new generation. There are described technical parameters of the new generation's device and the way of doing the measurements. Author showed the example of investigation reports as well.

Keywords: *investigation of rock properties, borehole penetrometr, underground measurements*

SEBASTIAN OLESIAK

Swedish Weight Sounding (SWS) in Investigations of Miocene Krakowskie clay • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Polish Standards concerning field investigations with application of (among others) Swedish Weight Sounding (SWS) probe gives an interpretation of results only for non cohesive soils. Scarcity of results interpretation for non cohesive soils to some extent disqualifies this tool for estimation of strength parameters of those soils. Present paper shows a proposal of interpretation of SWS probe measurement results for Miocene krakowieckie clays. The paper can be a base for future, full interpretation of cohesive soils measurement with application of SWS probe and can be useful during works in next years on Polish Standards.

Keywords: *geotechnical engineering, geotechnical site characterisation, geotechnical laboratory investigations*

MARIAN PALUCH, MICHAŁ BETLEJ

Analysis of Influence Physical and Geometrical Constants on Deformations of Cylindrical Rubber-Elements in Construction • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper shows a wide analysis of relationships among elastic loading of incompressible cylindrical rubber-element, material constants and geometrical properties. This parameters have an influence on deformations of this elements. The formulas for stresses, deformations, displacements and reduced set of external forces N and M_s were derived for assumed deformational relationships using nonlinear theory of elasticity. This relationships allow analysis of influence of material constants on reduced external forces and estimation of geometrical properties influence on reduced external forces N and M_s with permanent material constants. This paper can be used during design process of any type rubber washers including neoprene bearings.

Keywords: *material constants, deformation, elastic material*

DOROTA PAWLUŚ, PIOTR WITAKOWSKI

The Geotechnical Virtual Laboratory as Information System of Geoengineering Research Management • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper presents the research management system using virtual laboratory. This system enables planning, organizing and controlling researches. This system allows to make measurements remotely, monitor, do laboratory research, do analysis of research's results, use of knowledge from database and help cooperate with another research center through Internet. It describes work on the Geotechnical Virtual Laboratory in the Department of Geomechanics, Civil Engineering and Geotechnics at AGH — University of Science and Technology, Cracow. It allows to do research and solve educational problems as well. This paper provides a brief overview of system's structure, its functions, activities, instruments and software within it.

Keywords: *research management, information system, virtual laboratory*

JÓZEF PYRA

Use of Millisecond Delay Time for Minimization of Influence of Blasting Works on Structures • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The systems of millisecond delays during detonation of explosive (or charge) placed in the rock mass are presented in this paper there. The examples analysis of vibrations induced with explosions MW are also shown. On the background of analysis and their results there was presented a method so-called Matching Pursuit completed spectrum response. The examples confirm the validity of this method and information obtained as a result of this analysis registered vibrations.

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

ADRIAN RÓŻAŃSKI, DARIUSZ ŁYDŹBA, MACIEJ SOBÓTKA

Numerical Determination of Effective Transport Properties on the Basis of Microstructure Digital Images • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In this work computationally efficient method of effective transport properties determination is proposed. The methodology is applied to digital images of random microstructures. It is shown that effective properties can be evaluated as mean values averaged over sufficient number of samples. The sample is assumed to be a finite-sized region which is a part of digital image. The condition regarding sample size, based on the variance of local volume fraction, is proposed. The variance is shown to be calculated on the basis of two-point probability function. Sample size criterion is verified for two different digital images of random microstructures.

Keywords: *effective properties, local volume fraction, two-point probability, variance*

OLENA O. SDVYZHKOVA, NATALIA V. KHOZJAIKINA, DMYTRO O. SHASHENKO

Justification of Safety Pillar Width at a Construction of Underground Transport Passage under the Kerch Strait • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The contract design of an underground channel construction under Kerch strait is stated in this paper. Underwater tunnels under the strait are important elements of transport channel. These tunnels should be placed in space as close to each other as possible. It provides smaller expenses for infrastructure creation. However the minimum distance between tunnels is limited by the width of

pillars, which should have a certain long-term stability. The technique is developed to determine the pillar width at which long-term safe operation of underground channel is provided. Researches are executed concerning mining-geological conditions of Kerch strait bottom. The technique is based on use of numerical simulation, the phenomenological strength theory and an integrated safety factor definition.

Keywords: *underwater tunnels, safety pillars, safety factor*

KRZYSZTOF SETLAK, ADRIAN GOŁDA, MIROŚLAW MOSZKO

Former Exploitation as the Factor of Shaping the Seismic Activity on the Example of the 207 Seem Exploitation E Block in Mining Area “Łędziny I” • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The article presents the results of seismic activity observations during exploitation of 207 seem in the E block conducted by Coal Mine “Ziemowit”. Collected informations were used to analyze the impact of the mining edges and 206 seem remains on the level of seismic and rockburst hazard in the course of mining works in the 207 seem. The results of the analysis indicates that the mining edges and 206 seem remains has a decisive influence on the generation of seismic activity during exploitation of 207 seem. The highest seismic activity induces the exploitation conducted in the vicinity of the mining edges of the course close to parallel to the front wall. This article describes also the specificity of the rockmass where coal mine “Ziemowit” conducts exploitation in the scope of geomechanic parameters affecting on the level of seismic and rockburst hazard.

Keywords: *rockburst hazard, seismic activity, mining edges, liability to rockburst*

S.A. SIDORENKO, A.A. SIDORENKO, O.V. TRUSHKO

Desk Study Into Stress Condition of Bottom Layer of Thick Coal Bed • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The examined problem is to assess the stress and strain state of the bottom layers in thick regular coal seams. Design diagrams are offered that allow assessment of the impact of primary mining of the 1st layer on the state of the 2nd layer under various geotechnical conditions. A concerns both zones of the active support pressure, the previously mined areas, completely mined sites and zones bordering on the undisturbed coal massif. Regularities are established in changes in the stress state of the bottom layer at the edges of the coal massif and the pillars between the longwall faces. Conclusions are made on the rational location of mining workings at the lower horizons. A significant influence of the neighboring worked out sections is shown on the state of mining workings at the lower horizons.

Keywords: *strain state, stress state, thick coal bed, bottom coal seam layer exploitation*

ANNA SOŁTYS

The Scales SWD — the Results of the Matching Pursuit Analysis to Assess the Influence of Vibrations on Objects • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The problems of analysis of vibrations induced by blasting works in open cast mines by the application of the various methods temporarily-frequency, giving information about during signal, its frequency struc-

ture as well as its energy in this paper. As a wide range of information makes it possible to propose the results of *Matching Pursuit (MP)* method to assess the impact vibrations on the building constructions.

Keywords: *analysis of signals, vibrations, the assessment of vibrations impact in to the environment*

CEZARY TOŚ, LESZEK ZIELINA

Optimization of Measurement Tasks for Geological Documenting of Landslides Areas • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Drawing up geological-engineering documentation for landslide areas is connected with carrying out the sequence of diverse geodetic tasks. If jobs enclose an area, which is vast and difficult for the measurement, the primary importance has the due assortments of the equipment, of applied methods and organization of measurements. On the basis of experience authors draw conclusions and formulate recommendations concerning the optimization of geodetic measurements.

Keywords: *landslide areas, geodetic measurements*

JAN WALASZCZYK, LUCYNA FLORKOWSKA

Computer Simulation of Stress Distribution around an Excavation Area, Considering Gas Flow • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

One of the natural dangers in coal mining in Poland is methane migration between rock layers. The following paper discusses that issue. The main aim of the paper was to obtain stress distribution around mining excavation area, considering the influence of methane pressure and the process of methane migration through gaps into layers previously without it. In particular, the paper presents a simulation of processes occurring in rock mass during coal exploitation when the migration of methane from lower layers is possible. The issue was solved by numerical modelling, using the Finite Element Method. MES-Abaqus code was used for calculations.

Keywords: *numerical modelling, coal mining exploitation, stress state, methane, gas flow, gaps*

DANIEL WAŁACH, JOANNA HYDZIK

Concept of Underground Tourist Route in Old Town District of Bystrzyca Kłodzka • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents concept of creation and development Underground Tourist Route in Bystrzyca Kłodzka. There were many interesting underground objects, which connecting might be create greatest tourist attraction of city. In further, presents about possibilities of adaptation existing underground objects and also spots where it seems to be necessary to create mining workings connecting certain objects. Alternative touristic routes are shown on current city plan. The work describes also the project of continuation mining research work connected with adaptation underground objects.

Keywords: *underground tourist route, underground objects*

ANDRZEJ WICHUR, KORNEL FRYDRYCH, MICHAŁ HAPKE

The Impact of the Concrete Vaulted Lining Thickness on the Values of Internal Forces in this Lining • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The article presents the results of computer calculations of underground workings models supported by concrete vaulted lining. Static calculations were carried out using a computer code Autodesk Robot

Structural Analysis Professional by FEM method. 189 models of different cross sections of the workings' parameters (the thickness of the lining, concrete class, the width of working, type of surrounding rocks) were tested. Computer models were based on analytical models previously designed in accordance with the design requirements of the Polish mining and civil engineering standards.

Keywords: *concrete vaulted lining, internal forces, lining thickness, underground workings, design*

ANDRZEJ WICHUR, ELŻBIETA ŁUCZEJKO

Nomographs to Evaluating the Values of Internal Forces in the Vault Concrete Lining • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The vault concrete lining takes a particular role in underground construction as a lining of excavations in very difficult hydrogeological conditions. The calculation of the values of the internal forces in the lining with regard of the elastic passive rockmass pressure causes the greatest difficulty in the designing process of the lining. The aim of the paper is the presentation of the main results of research on an elaboration of the nomographs to evaluating the values of the internal forces in the vault concrete lining which are necessary to check the bearing capacity of this lining in accordance with the regulations of the Polish Standards PN-G-05020:1997 and PN-B-03264:2002. The investigations executed have permitted also to express the conclusions which have been formulated in the end of the paper.

Keywords: *vault concrete lining, internal forces, nomographs*

DARIUSZ WIEWIÓRKA, JACEK SEPIAŁ

Analysis of storage bunker stability in the region of the shaft “Chrobry” ZGH Bolesław • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The paper presents the analysis of ore storage bunker stability locate next to the shaft “Chrobry” ZGH Bolesław. The analysis of loads on the storage reservoir walls was done, taking into consideration the various states of filling. The calculation were carried out based on branch standards and numerical models. Computer simulations allowed to describe the static and dynamic behavior of the storage bunker, drophole devices, and surrounding rock mass. Analysis of the stress state was used to calculate the strength factor and appropriate safety factors.

Keywords: *underground construction, stability of excavation, rock mechanics*

BOGUMIŁ WRANA

Space and Time-discontinuous Galerkin Finite Element Method Used to Solve Wave Propagation in Soil • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

This paper proposes a space and time — discontinuous Galerkin (TDG) finite element method for analyzing transient elastodynamic problems in soil. Based on the time-discontinuous Galerkin FEM, the unknown displacements and velocities are approximated as piecewise linear functions in the time domain, and are permitted to be discontinuous at the discrete time levels. This comparison reveals that the time-discontinuous Galerkin FEM is more stable and more accurate than the traditional HHT- α method.

Keywords: *transient elastodynamic problems in soil, finite element method, space and time- discontinuous Galerkin method*

BOGUMIŁ WRANA, BARTŁOMIEJ CZADO

Wavelets Transformation Used to Piles Identification Parameters • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

In this paper, a method is described for the non-destructive testing (NDT) signals by employing wavelet transform in the time-frequency plane. Wavelet analysis is a mathematical technique and a new signal-process tool that allows the signal to be viewed in the wavelet time-frequency domain. The main goal of this paper is to discuss the feasibility to use CWT methods in the time-frequency domain to sonic echo signal in piles. The results show that such an approach may provide a more complete way of viewing the signal.

Keywords: *non-destructive testing of piles, continuous wavelets transformation, Morlet wavelet*

XUE-YI YU, PING ZHANG, WEN-GANG SHI

Preliminary Studies on Deformation Characteristics and Prediction of Surface Movement in Loess Gully Region • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

Based on lots of surface movement and deformation observation data in loess gully region mine, the characters of surface movement and deformation caused by running activity are studied. Surface subsidence was up to 97% of the total subsidence in active period. Surface was moving with great crack and discontinuous deformation failure. The surface deformation developed rapidly, displacement angle is large, subsidence factor and horizontal movement factor is high. The results of surveying show that collapsible loess with the gully terrain lead to surface cracks which are quickly developed in loess. Crack failure are further intensified by mountain body slip induced by weight force. Meanwhile, subsidence factor and horizontal movement factor is gradually higher. Finally, the prediction model of horizontal strain and horizontal deformation were preliminarily established according to analysis results.

Keywords: *loess gully region; collapsible loess; discontinuous movement and deformation; subsidence prediction*

TYMOTEUZ ZYDRON, EWA KOZIELSKA-SROKA,
PIOTR MICHALSKI, DAMIAN DRYŚ, EDYTA KRUK, MAGDALENA PŁONKA

Investigations on the Abrasion Process of Czorsztyn-Niedzica Reservoir Banks • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2010

The results of tests and analyses carried out on the abrasion of non-protected banks of Czorsztyn Reservoir on the side of Pieniny National Park in the period of 2003–2008 are presented in the paper. Clear relationships between height and rate of removing of abrasion cliff, amounts of the material eroded out and inclination of original slopes, changes of water level in reservoir and granulation of soils in the banks were revealed.

Keywords: *abrasion, Czorsztyn-Niedzica reservoir*