Summaries

IRENA BAGIŃSKA, RYSZARD JERZY IZBICKI

Non-Homogeneus Soil in the Kinematic Analysis of the Stability of Slopes · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

Previous methods including the non-homogeneous soil in kinematic analysis of the stability of slopes are shown in the paper. The proposed computable algorithm including stratification of the soil in the generalized Kinematic Element Method is presented. The change of the critical high of the stratified slope with variable line demarcating the different soils is analyzed. The results of the numerical analysis are graphically illustrated.

Keywords: *limit analysis, kinematic analysis slopes stability, generalized Kinematic Element Method*

ANDRZEJ BATOG, MACIEJ HAWRYSZ

The Slope Stability Analysis of the Railway Embankments · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

In the paper the problems of the slope stability analysis in case of the railroad embankments were presented. There was outlined the current design approaches and codes did not consider the scale of dynamic effects which will appear after the train's speed increase to 160 km/h and over. The design procedure of load determination caused by the trains running at the speed 120 km/h and over was presented and the appropriate design approach for slope stability analysis for those speeds was proposed.

Keywords: *slope stability, embankments, railway*

JACEK BOSAK, MAREK BOSAK, TOMASZ MICHALSKI

Landslides Deep Dewatering Efficiency Using Drilling Methods · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

For already twelve years, authors, use landslides deep dewatering drilling method. Hereby, they would like to present its efficiency basing on some examples: Koronowo, Uherce Mineralne, Korytniki, Tyrawa Wołoska, Jarosław. Its main advantages are: water be interception before reaches the sliding area and executing dewatering works without negative influence on road dams and road traffic. Additionally, the sliding surface and colluviums are being dewatered. Method range is limited by the drilling technology only. Authors were installing horizontal drainages up to the length of 40 m. Drainage pipes being used have the specific construction: flexibility, high permeability (over 10%) and increase tensile strength. Entire problem is shown with the hydrogeology of the landslides area background. Authors are concluding, that using described technology, additional retaining structures are needed only for the road pavement restoration purpose and give additional safety factor. Each example project shows such structures.

Keywords: *landslides, dewatering, drainage, stabilization, roads, drilling*

WŁODZIMIERZ BRZĄKAŁA, KAROLINA GORSKA

Simplified Stability Analysis of a Slurry Supported Trench · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The paper presents an engineering method of the trench stability analysis basing on the three-dimensional limit equilibrium and comparing results with an elasto-plastic model. A short review of stability analyses is presented

focusing on a conclusion that the third dimension (the length of the trench section) can not be neglected. The shape of the wedge for the stability calculations is composed of pyramids and prisms such that minimize the value of a factor of safety. Five cases are investigated depending on positions of the sliding zone and ground water level. The factor of safety *FS* for the trench of the depth *H*, is the ratio between sustaining hydrostatic slurry pressure P_s and effective horizontal ground pressure P_h acting with a hydrostatic water pressure P_w. Effective lateral ground pressure (P_h) is found making use of the limit force equilibrium for the sliding wedge. One example deals with a searching of the extreme value of angle θ(versus depth *H*) which is the inclination of slip surface that minimizes the value of *FS*. Such critical values of θ are found to be slightly greater than $\pi/4 + \phi/2$. Furthermore, the values of factors of safety *FS* for the simplified calculations and the ones yielding from the numerical analysis (elasto-plastic) are compared.

Keywords: *slurry wall, bentonite slurry, stability analysis, limit equilibrium method*

MAREK CAŁA, MICHAŁ KOWALSKI

Reinforced Slope Stability Analysis • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

This paper deals with the reinforced slope stability analysis. It was assumed that soil profile of a slope consists of two layers. The strong soil (soft rock) is covered by weak soil (or weathered rock). Such slope geology determines the way of soil reinforcement. Usually nails or anchors are applied for to provide the overall stability of the slope. However the face reinforcement of soft soil must also be used. Generally, slope stability analysis for such case, is limited to nails or anchors interacting with the soil. The face reinforcement is usually not taken under consideration. The way of reinforcing the slope with pre-tensioned nails connected to wire mesh facing is described and applied. The nails are modeled by rockbolt elements, which can rupture. The wire mesh is modeled as beam element with resistance only in tension and connected to the soil by "unglued" interface. Factor of safety (FS) of a slope is calculated with shear strength reduction technique. Nails pre-tension were obtained by user-written FISH function. A series of FS calculations were performed to show, the wire mesh facing is not only local stability protection, but can significantly increase the overall slope stability.

Keywords: *soil nails, slope stability, wire mesh, reinforcement*

MIECZYSŁAW CHALFEN, TADEUSZ MOLSKI

An Influence of Earthwork Screen Parameters on Seepage Conditions in Hydro Technical Constructions • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

An anti flood screen on inner slope may be an important part of earthwork dike. Groundwater level fall, decrease of groundwater flow through aquifer and local increase of water velocity around screen are additional results of screen work. Such screen will effectively decrease water flow when its thickness and permeability is optimal to specific cross section. In the paper an influence of screen parameters on seepage conditions is investigated using a mathematical model. A linear relationship between flow characteristic and screen parameters was confirmed. The necessary conditions for effective work of earth screen is its workmanship according to projected parameters.

Keywords: *low permeability screen, seepage conditions, mathematical model*

MARCIN DERLACZ, KRZYSZTOF STERNIK

Application of Ground Anchors for Protection of Excavation in Area of Existing Collapse • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The ground anchors are generally applied as an element of the stabilization structures for embankments and slopes. Following description (based on an executed project) covers the design process and carry out of anchors which have been used to protect an excavation of an existing collapse area. The analyze of the collapse reasons (supported by parallel, various calculation set) gives a proper selection of required anchors (in case of their mechanical properties, lengths etc.). The prestressing of anchors has been provided there. The scheme of anchors have been designed as typical — the separated free length section and the fixed length of grouted section — which

gives (in our case) a suitable solution to keep the collapsed block against any of further removes. Efficiency of provided solutions has been confirmed by relevant surveying measures.

Keywords: *slope stability, soil anchors, landslide, limit equilibrium methods, FEM*

KRYSTYNA DZIDOWSKA, LECH NOGA

Assessment of Subsoil Geotechnical Conditions and Bottom Deposit Quality for the Upgrade of the Municipal Interceptor Sewer in Wrocław • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The paper describes the geotechnical conditions and the quality of the bottom deposits in the invert of the Municipal Interceptor Sewer in Wrocław in view of its upgrading to accommodate a great-flood water flow. On the whole, the soil subbase has been found to be able to carry the load. The Holocene and Pleistocene sand-gravel soils are medium-compacted and compacted. The ground moraine sandy clay is in a hard-plastic state verging on a compact state. The clay stratum should be considered as a tight base to be used in the construction of curtain sealing walls. The bottom deposits in the invert of the sewer, when extracted, would be dangerous to the environment due of their total cadmium, zinc, nickel and mercury content. Because of their pollution by heavy metals, the extracted deposits as waste will have to managed or disposed of. Considering their final destination, the potential and actual environmental hazard which the extracted bottom deposits pose should be assessed by determining the leachability of the heavy metals.

Keywords: *geotechnical conditions, bottom deposits, pollution*

LIDIA FEDOROWICZ, JAN FEDOROWICZ

Limiting Equilibrium Evaluation for Overconsolidated Mining-Deformed Subsoil • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Damage produced by mining - subsoil deformations appear in building structures both the linear (roads, highways embankments) and the cubature-type. Engineering, numerical evaluations — for building structure effort that arises during subsoil deformations — are usually carried out by using elastic perfectly plastic subsoil models. However analyses of the subsoil behaviour, which connects mining-forced deformations with building-structure loading is adequate only for advanced constitutive models. Considerations given in this paper deal with lateral pressure, the magnitude and distribution within the soil mass that have got loose horizontally; while plane strain conditions are assumed. Knowledge resulting from laboratory tests and in situ investigations shows the real complexity in stress-strain connections for subsoil statically and kinematically loaded. Illustration for the above statement is the well laboratories proved critical state that forms in subsoil while loosening and, which has been reproduced in Modified Cam-Clay model in chapter 3. Reasons, possible for damage of a building structure — subsoil mining deformed system, while the limit state zone beneath the structure forms, are illustrated by the example given in chapter 4.

Keywords: *mining produced subsoil deformations, mining-subsoil, loosening process, plastic-equilibrium state, critical state constitutive model, Modified Cam-Clay model, building-mining subsoil system*

JAN GASZYŃSKI

The Consolidation Process Oof Porous Media Under tThe Temperature Influence • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The paper presents solution of the system of equations for consolidation of porous medium where pores are filled by a low compressible liquid. The skeleton stress, pore pressure and field temperature are coupled. The solution of an initial-boundary value problem for an uniaxial strain state for the consolidating layer has been analyzed.

Keywords: *soil, consolidation, temperature*

TOMASZ GODLEWSKI, JOANNA FUDALI, JAKUB SALONI

Increase Global Stability of High Embankments by Soil Reinforcement by Application of CMC™ Concrete Columns • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Soil reinforcement by application of CMC™ columns to increase global stability of high embankments is the subject of this article. The technology of reinforcement by CMC™ is described. Soil conditions in which the column are justified can be applied are characterized. Basis design assumptions which leads to improvement of global factor of safety are presented. Proper design of column spacing, technology of execution that satisfied the EQU limit state for the subbase of embankment is show on exemple.

Keywords: *CMC™ column, global factor of safety, soil reinforcement*

KAZIMIERZ GWIZDAŁA, TADEUSZ BRZOZOWSKI

Dynamic Bearing Capacity Load Tests for Piles • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Some examples of dynamic load tests (DLT) of bearing capacity of piles installed in Poland are presented. The testing method shown allows a good estimation of bearing capacity of piles and can be treated as equivalent to static tests. Basic advantage of dynamic method for the assessment of pile's bearing capacity is an elimination of anchoring equipment as well as relatively short time of test duration which becomes of particular importance in difficult site and technical conditions, especially for carrying out static pile load tests (SPLT). The comparison of load-settlement curves from dynamic tests with corresponding static load test curves reveals good agreement of the results obtained. Dynamic load tests should be calibrated by static load tests treated as reference tests for a given foundation area analysed. According to Eurocode 7, larger number of DLT tests will enable in the future a determination dumping coefficients for polish conditions and introduction respective safety coefficients.

Keywords: *bearing capacity of piles, dynamic tests*

JACEK JAKUBOWSKI, KRZYSZTOF REIMAN

Numerical Simulation of Brick Chimney Felled by Explosives • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Numerical simulation of 67,6 m high brick chimney felled by explosives is presented. Models have been build and computed with the use of Distinct Element Method and 3DEC-Itasca system. The results of the dynamic simulation, chimney basement stresses estimations and the process of chimney damage collapse agrees in general with experience and observations.

Keywords: *numerical simulation, numerical models, civil engineering, construction mechanics, explosives, pulling down by explosives*

JANUSZ KACZMAREK

Laboratory Determination of Lateral Earth Pressure Coefficient Based on Friction Forces Moment Measurement — Results Interpretation • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

An original apparatus for determination of lateral earth pressure coefficient is presented in the paper. Details of its construction and methodology of test execution are discussed. Special attention is paid for distribution of friction forces acting on the sample in the apparatus since value of friction forces moment measured during the test is used for evaluation of lateral earth pressure coefficient. Two different cases of sample loading by friction forces are investigated in details. The first one assumes occurrence on a lateral surface of the sample friction forces acting only in circumferential direction whereas the second one takes into account also the friction forces acting in a vertical direction. Both cases are analytically solved. It is finally pointed out that both cases should result in a similar value of lateral earth pressure coefficient if some geometrical requirement specified in the paper is fulfilled by the soil sample.

Keywords: *soil property, lateral earth pressure coefficient, laboratory investigation*

JANUSZ KACZMAREK

Preliminary Investigation of Lateral Earth Pressure of Sediment Material of „Żelazny Most" Tailings Dam • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

New methodology of laboratory determination of lateral earth pressure coefficient proposed by the author is first shortly presented. The measurement is based on an evaluation of moment of friction forces acting on interfaces between soil sample and specially designed apparatus. This one had been made in Tailings Management Division of KGHM Polska Miedź SA. Detailed information concerning a construction of apparatus is also given. Photograph documentation presented in the paper illustrates a calibration process as well as process of laboratory measurements performed. The values of lateral earth pressure coefficient have been determined for two samples of sediment material of „Żelazny Most" tailings dam.

Keywords: *laboratory investigation, coefficient of lateral earth pressure*

MAREK KAWA, DARIUSZ ŁYDŻBA

Failure Criterion of Geomaterials with Microstructure of Layered Type • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The paper presents anisotropic failure criterion of geomaterials with microstructure of layered type. The microstructure is considered as composed of two constituents periodically distributed in the space. Both constituents are assumed to be isotropic with strength ruled by Drucker-Prager criterion. The overall strength condition proposed is a conjunction of Pariseau anisotropic failure criterion and critical plane equation. Usefulness of this description is verified based on the homogenization theory procedure. Material constants are defined, in an analytical form, as a function of strength parameters of the constituents. As an example of criterion application the results of load carrying capacity of layered soil are presented for different orientations of layers. The results clearly show influence of strength anisotropy of material on the solution of boundary-value problem.

Keywords: *microstructure of layered type, anisotropy, failure criterion, homogenization theory*

ROMAN KINASH

Methods of an Estimation of Reliability of Building Designs at Incomplete Parameters • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

In paper discrepancies of mathematical model of a design and application are presented to interval and histogram methods of calculation of reliability based on the account of initial heterogeneity of materials and to variability of loadings, and also the geometrical sizes, their probable changes in time, at insufficient quantity of entrance data (which reception is impossible or uneconomical). Results received are compared at the decision of the simple task - axial compression of a reinforced concrete column by different methods: interval, histogram, linearization and method Monte Carlo. On the basis of offered histogram factor of a stock it is possible to calculate reliability of a design definition of the area diagram.

Keywords: *a reinforced concrete column, reliability, Monte Carlo method, interval and histogram methods, histogram safety factor*

HALINA KONDERLA

The Slope Stability According to Eurocode 7 • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The shot characteristic of Eurocode 7 have been presented in the paper. General rules of the stability slopes analysis according to European Standard are presented. A influence different design approaches on the overall factor safety and an auxiliary factor ware considered in the numerical examples. Numerical calculations by own computer program FILAR were done. The Janbu's method was applied.

Keywords: *geotechnical design, limit states, slope stability*

JÓZEF KOSZELA, EWA KOSZELA-MAREK, ZDZISŁAW SYSAK

Verification of Water and NaCl Solution Compressibility Changes under High Pressures • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Paper presents results of water and salt NaCl (20 g/dm^3) solution compressibility under hydrostatic pressure from 50 up to 400 MPa, with 21ºC temperature conditions. In the presented range of pressures water decreased in volume from 2,1 to 9,4%, NaCl solution from 1,6 to 6,9%. Coefficients of compressibility β are unequal and nonlinear. Examinations have been made in especially designed equipment.

Keywords: *high pressures, water, salt solution, compressibility*

EDWARD KOWALSKI, MAREK ROTKEGEL, STANISŁAW STAŁĘGA

Geological and Mining Conditions for Construction Resuming of Pumped-Storage Power Station „Młoty" Near Bystrzyca Kłodzka • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

Underground mining operations of the construction of Pumped-Storage Power Station „Młoty" were launched in 70's of the 20th Century. About 2 km of underground excavation was done than, including partially accomplishment of 3 pressure adits, opening adit, main adit and passby adit. Now, after over 30 years of freezing, a construction resuming is considered. Authors of this paper have done the necessary investigations of the technical state of excavation and characterise the geological and mining conditions of freezing or resuming the construction of power station "Młoty".

Keywords: *geotechnics, hydrotechnics structure, lining support*

JANUSZ KOZUBAL, MAREK WYJADŁOWSKI

The Notation of Condition of Plasticity in Procedure-Oriented Language in FLEXPDE and FLAC2D Codes • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

In the paper the describing of linear-plastic material behaviour in Finite Elements codes: FlexPDE and MRS FLAC is presented. The discussion is restricted to linear elastic-perfectly plastic material, two-dimensional plane strain and associated flow rule. For describing linear-elastic material behaviour (for general stress states): stress-strain behaviour in elastic range, yield function or failure function, flow rule, definition of strain hardening (softening) are needed. In the solution the tension stresses are limited and showed like convex multi segment line.

Keywords: *procedure-oriented language, yield condition, associated flow rule*

JAROSŁAW KRĄŻELEWSKI, RYSZARD J. IZBICKI

Reinforced Soil — Numerical Analysis • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

This paper presents numerical and experimental results for reinforced soil structure. Comparison between experimental and numerical data for reinforced soil wall has affirmed the legitimacy of the attempt to describe actual polimer properties and, as a result of it, building of the model suggested by the author (J. Krażelewski). The numerical investigations conducted in this article and confronted with the results of the experimental examination of an entity object, allow for formulation of conclusions of significant practical importance.

Keywords: *reinforced soil, geosynthetics, rheology, construction deformation*

DONAT MILKOWSKI, ANNA GÓRECKA, MAŁGORZATA WÓJCICKA-MILEWSKA

Monitoring and Protection of Landslides on the North Slope, in Brown Coal Open Pit Mine BOT KWB Turów SA • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The open pit mine Turów excavates brown coal in a very difficult geological and geotechnical conditions. The most hazardous events for the mine, there are landslides of the slopes and dumps. In years 1993–2007, four landslides

arised on North Slope of the mine. This paper describes methods of prevention of slopes destabilization, to allows safe work of excavators and conveyors in the close to the landslides areas. The surface displacements were measured by GPS, deep-seated displacements were measured by inclinometer probe. Geostatic sounding were also performed at regular intervals. Frequency of measurements increased, when excavation was close to the hazardous area. The results of geotechnical analyses, geostatic calculations, sizes and velocities of displacements on the landslides areas are shown in this paper.

Keywords: *geotechnical hazards, landslides, GPS, geodetic measurements, deep-seated displacements, inclinometers, geostatic sounding, geotechnical hazards maps*

ZBIGNIEW MUSZYŃSKI, JAROSŁAW RYBAK

Application of Robust Estimation in Pile Load Failure Calculation · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

This work presents the results of the calculations of foundation pile load failure on the basis of the so-called 80%-method, formulated by Brinch Hansen. The approximation procedure has been analysed from the point of view of: the number of measurements of settlements, taken into account in the calculations, the weights of the settlement measurements and the change in the weights of particular settlement measurements (the elimination of errors by the resistant estimation). With the use of Mathcad environment, an algorithm was developed, which serves the calculating of load failure by the following methods: least squares method, when the same weights are assumed for all the analysed points; least squares method, assuming differentiated weights for particular points; Huber method, assuming the initial differentiation of weights; Danish method, with the assumption, that the weights for particular points are initially differentiated. In the computations, one made use of the last six observations in the aspect of elastic-plastic work of piles (the last six observations before the ending of the load test). The conclusions from the calculations are intended to constitute the starting point for the further development of the method of failure load computation on the basis of the results from the static load test, for the needs of calibrations — introduced, with growing frequency, into dynamic load tests.

Keywords: *pile, load test, failure load, robust estimation*

JAROSŁAW RYBAK

Methods of Computation of Foundation Piles Failure Load · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The introduction of dynamic load tests considerably increased the reliability of implemented pile works. For example: in the years 2005–2007 the number of tested pre-cast concrete piles already exceeded the average 2,5 for every 1000 running metres of driven piles. Comparatively, in Polish Code regulations it is required to test not much more than 1 pile for each 100 (which, by the average pile length of more than 10 m, gives the ratio of 1,0 for every 100 running metres). The fact that the dynamic tests have become widespread does not at all mean that the amount of static tests has decreased. They ceased to be, however, the basic load capacity tests, whose goal was to verify the design, since now, the static tests are rather the reference test for a larger number of dynamic tests. For that reason, the static load tests must be designed in such way, so that they lead to the determination of failure load, or — at least — so that they make it possible to obtain the data necessary for the identification of failure load by extrapolation. This work presents the methods of the computation of pile failure load and the results of failure load calculations for the previously tested piles. The 80%-method described in the work, after it has been examined on a larger amount of tests, may be, in future, a functional tool in the computing of pile failure load on the basis of static tests.

Keywords: *pile, load test, failure load*

ANNA SOBOTKA, MARTA PAJĄK

Foundations Reinforcement Methods of the Antique Building and Their Assessment with Multicriteria Analysis · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The paper presents problem connected with designing of procedure foundations reinforcement Foundations reinforcement for presented case (The Antique Church) may be performed by using variety technologies. There is

possibility of using forced Mega piles, injected Jet Grouting piles or Continuous Flight Auger piles. Selection of the best technology could be done with multicriteria analysis method. This method facilitated doing a depth analysis and marked varietable technologies solutions with group of standards. The analysis was made for two groups of standards. Marks connected with irrational standards — technical standards — were made with using Baas–Kwakernaak Method.

Keywords: *fuzzy number, piles, multicriteria Analysis, foundations reinforcement*

TOMASZ STRZELECKI

Numerical Calculations of Darcy Permeability Tensor Based on the Asymptotic Homogenization Technique · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The paper deals with numerical determination of Darcy permeability tensor for periodic porous medium with VRE being the unit cell. The calculations are performed for 2D and 3D cases. The influence of porosity on the permaeability tensor is studied by considering a simplified geometry of porous medium. It is pointed out, for instance, that values of permeability tensor obtained are of the same order as for natural rocks as sandstone if the size of VRE is of the order of diameter of sandstone grains.

Keywords: *homogenization theory, Darcy permeability tensor, filtration, porous media*

CEZARY TOŚ, BOGDAN WOLSKI, LESZEK ZIELINA

Inventory of Geotechnical Structure on the Example of the Cracow J. Piłsudski Mound · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

Inventory surveys of shape and deformation measurements of geotechnical structures can be effectively carried out by scanning technology which integrates data produced by scanning tacheometry, digital photographs and tacheometrical surveys of break lines. This technology the authors applied surveying and analysing the geotechnical structure of The J. Piłsudski Mound in Cracow. Results of the surveys have been worked out by three kinds of 3D models viz. TIN, solid body model and contour model. The accuray of the final model which has been achieved in presented research amounts to 2÷3cm. In the case of earth geotechnical structure so high accuracy can be achieved provided that a structure surface is regular and without local deformations.

Keywords: *monitoring of deformations, 3D models*

JAN WALASZCZYK, STANISŁAW HACHAJ, ANDRZEJ BARNAT

Identification of Physical Properties of Rock Mass Based on the Numerical Analysis of Tremor Connected with Building Demolition · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The following paper deals with the determination of rock physical properties based on comparison of the recorded tremor accompanying the demolition of a real building with the results from the numerical model based on the finite element method.

Keywords: *building demolition, numerical modeling, physical properties of rock mass*

EDWARD WIENCŁAW, ZBIGNIEW MAREK, TADEUSZ KACZAREWSKI, EUGENIUSZ KODA

Numerical Model of Groundwater Flow for Overburden Dump in Lignite Open Pit Mine · Kwartalnik Górnictwo i Geoinżynieria · z. 2, 2008

The paper presents the example of numerical modelling of groundwater flow during dewatering of excavation in the lignite open pit mine. Sufficient cubic capacity for overburden soils is necessary to continue operation of the lignite mine in Turów site. The FEMWATER model of the overburden bank from the lignite open pit mine consists

computer solution of groundwater flow for the design of the overburden heap in this site. The basis of numerical solution was the problem of groundwater flow described by Richard's equation, using 3-D finite elements method. The main, sophisticated purpose of the modelling carried out, taking into consideration this model, was the prediction of underflooding of the overburden bank and its surroundings. Modelling test results of the groundwater flow will be applied for extension of dewatering system and the design of monitoring system of potential threat of the overburden bank stability, constructed in the close vicinity of protected objects. The main objects which need special protection during overburden bank construction and dewatering are: the bank of Nysa Łużycka River, international road and industrial infrastructure around TURÓW lignite open mine. The modelling results also will be applied in designing of adequate technical safety solutions to protect these objects.

Keywords: *flow modelling, lignite mine, overburden dump*

BOGUMIŁ WRANA, BARTŁOMIEJ CZADO

Identification of Damping in Soil • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The first part of this paper describes a typical procedure of determining damping coefficients of a construction, using modal method. A short analysis of application of this method to soil is discussed. In the main part a procedure of determinig the damping of soil using half-power bandwidth methond and wavelet transformation is described. Some basic andvantages of this method referring to modal method were shown. Final part of the paper contains a numerical example of application of the described method.

Keywords: *damping, identification, hal-power banwidth metod, wavelets*

BOGUMIŁ WRANA, MICHAŁ KOWALSKI

Response of Reinforced Soil Slope to Dynamic Excitation • Kwartalnik Górnictwo i Geoinżynieria • z. 2, 2008

The article, deal with the methods of calculation of a geosythetic reinforced retaining wall to semi-earthquake excitation. A brief review of recent applications of sliding block is given. An example of geosynthetic reinforced embankment under semi-earthquake excitation was analyzed compared to non-reinforced embankment. Calculations were performed in plane-stress with Finite Difference Method program FLAC.

Keywords: *reinforced soil, geosynthetics, paraseismic excitation furnace slag, compactibility parameters*