Η Εκτελεστική Επιτροπή της ΕΕΕΕΓΜ σας στέλνει τις Θερμότερες Ευχές της για Καλό Πάσχα και Ανθοστόλιστη Πρωτομαγιά.
Ραφ Μπ. Πεκ (1912 – 2008) 3
Τακτική Γενική Συνέλευση της ΕΕΕΕΓΜ 3
Αρθρα (Συμμετοχής μελών της ΕΕΕΕΓΜ στο ΧVτο European Conference on Soil Mechanics and Geotechnical Engineering) 4
- A. Arapakou & V. Papadopoulos "Analysis of the behaviour of a deep excavation project with restraint bored piles" 4
- G. E. Mylonakis, C. I. Papantonopoulos & D. A. Chrysikos "New analytical solutions for retaining Structures under static and dynamic loads" 8
Περιλήψεις Προσφάτων Διδακτορικών Διατριβών Ελληνικών Πολυτεχνικών Σχολών 13
- Β. Μαρίνος «Γεωτεχνική Ταξινόμηση και Τεχνικαγωγική Συμπεριφορά Ασθενών και Σύνθετων Βραχο-Μαζών κατά τη Διάνοιξη Σηράγγων» 13
Ανασκόπηση Γεγονότων Γεωτεχνικού Ενδιαφέροντος 16
- Εθνοδιαστημική Επιστημονική Ταξία της ISSMGE "Preservation of Monuments and Historic Sites" 16
- FIGS was officially launched 16
- 5η Αθηναϊκή Διάλεξη Γεωτεχνικής Μηχανικής 16
- Διάλεξη Καθηγητή Antonio Gens 18
Μεταπτυχιακές Σπουδές Γεωτεχνικού Ενδιαφέροντος 19
- International NATM Engineer University Course 19
- Master of Advanced Studies (MAS) on Tunnelling 19
Προσεχείς Επιστημονικές Εκδηλώσεις: 20
- International Young Scholars’ Symposium on Rock Mechanics 2008 20
- International Symposium "Ground Anchors" 20
- International Conference on Geotechnical And Highway Engineering 21
- Workshop on Planning of Construction of Tunnels for High Speed Railway Connection AIS 21
- No-Dig 2008 22
- Geo-Environmental Engineering 2008 22
- 12th International Conference on Ground Penetrating Radar 22
- Geo-Environment & Landscape Evolution 2008 23
- Sixth RILEM International Conference on Cracking in Pavements 23
- DEBRIS FLOW 2008 24
- First European Conference on Unsaturated Soils 25
- GKK 08 – Geomechanics Colloquium Karlsruhe 25
- International Summer School on Rockslides and Related Phenomena 26
- ALPPS 2008 – Alpine Landslide Problems and Projects Switzerland 2008 26
- IDRC Davos 2008 International Disaster Reduction Conference 27
- 1st South American Symposium on Rock Excavations 28
- 19th European Young Geotechnical Engineers Conference 28
- Regional Conference on Geomorphology 28
- 1st Southern Hemisphere International Rock Mechanics Symposium 28
- International Symposium on Conservation of Ancient Sites 2008 29
- Τέταρτο Πανελλήνιο Συνέδριο "Διαχείριση και Βελτίωση Παράκτιων Ζωνών" 30
- 57th Geomechanics Colloquy 2008 30
- Management of Landslide Hazard in the Asia – Pacific Region 30
- 5th Asian Rock Mechanics Symposium 31
- 5th WBI-International Shortcourse Rock Mechanics 31
- 3rd International Conference on Geotechnical and Geoenvironmental Engineering, Rock Mechanics & Engineering Geology 31
- International Conference on Rock Joints and Jointed Rock Masses 31
- RGMA-09 International Symposium on Rock Mechanics and Geoenvironment in Mining and Allied Industries 32
- Geosynthetics 2009 32
- 7th International Conference on Ground Improvement Techniques 33
- SINOROCK2009 International Symposium on Rock Mechanics 33
- SINOROCK2009 Extra-terrestrial rock mechanics 33
- 3rd International Conference on New Development in Rock Mechanics and Engineering 33
- International Symposium on Prediction and Simulation Methods for Geohazard Mitigation 34
- The 3rd International Geotechnical Symposium on Geotechnical Engineering for Disaster Prevention and Reduction 34
- GeoAfrica 2009 Geosynthetics For Africa 34
- EUROCK’2009 35
- 12th International Congress on Rock Mechanics 35
- Νέα από τον Κόσμο 36
- Warsaw tower unveiled 36
- Ολυμπιακές Εγκαταστάσεις Πεκίνου 36
- Νέες Εκδόσεις στις Γεωτεχνικές Επιστήμες 38
- Ηλεκτρονικό Περιοδικό 41
Ralph B. Peck (1912 - 2008)

Ralph B. Peck, Professor Emeritus of Foundation Engineering at the University of Illinois at Urbana-Champaign died of congestive heart failure on February 18, 2008, at his home in Albuquerque, New Mexico. He was born in Winnipeg, Canada, to his American parents, Orwin K and Ethel Huyck Peck on June 23, 1912.

Ralph Peck earned a Civil Engineering Degree in 1934 and Doctor of Civil Engineering Degree in 1937, both from Rensselaer Polytechnic Institute in Troy, New York. In 1938-39 he attended the Soil Mechanics course at Harvard University and was a laboratory assistant to Arthur Casagrande. From 1939 to 1942 Peck was an assistant subway engineer for the City of Chicago, representing Karl Terzaghi who was a consultant on the Chicago Subway Project. He joined the University of Illinois in 1942, and was a Professor of Foundation Engineering from 1948 to 1974. Since 1974, Professor Peck was a Emeritus at the University of Illinois, and a consultant in geotechnical engineering.

In 1948, together with Karl Terzaghi, Ralph Peck co-authored the most influential textbook in geotechnical engineering, Soil Mechanics in Engineering Practice. In 1953 with Walt Hanson and Tom Thornburn, Ralph Peck co-authored the widely used textbook Foundation Engineering.

In 1942, Dr. Peck joined the Civil Engineering Department of the University of Illinois, where he remained as a teacher and mentor until his retirement as Professor Emeritus in 1974. After moving to Albuquerque, Dr. Peck continued his active consulting practice which included jobs in forty-four states in the USA and twenty-eight countries on five continents. His more than one thousand consulting projects include: the rapid transit systems in Chicago, San Francisco, and Washington; the Alaskan Pipeline System; the James Bay Project in Quebec; and the Dead Sea dikes. He authored over 250 technical publications, and served as the President of the International Society of Soil Mechanics and Foundation Engineering from 1969 to 1973. In 1974, he was awarded the National Medal of Science by President Ford. A few of his many honors include the Norman Medal, The Wellington Prize, and the Outstanding Lifetime Achievement Award in Education from the American Society of Engineers. His last project was the Rion-Antirion Bridge in Greece. It received the ASCE’s OPAL Outstanding Civil Engineering Award for 2005, and is the only project outside the United States to be so honored.

Ralph Peck married Marjorie E. Truby on June 14, 1937. He is survived by his daughter and son-in-law, Nancy Peck (Allen) Young, and son and daughter-in-law, James (Laurie) Peck, and grandchildren, Michael Young and Maia Peck.

(από την ιστοσελίδα www.geoengineer.org)

**ΤΑΚΤΙΚΗ ΓΕΝΙΚΗ ΣΥΝΕΛΕΥΣΗ της ΕΕΕΕΓΜ Τρίτη 13ο Μαΐου 2008 Αίθουσα Εκδηλώσεων Σχολής Πολιτικών Μηχανικών ΕΜΠ**

Αύξω μη απλότητα κατά τις προηγούμενες ημερομηνίες σύγκλησης της Γενικής Συνέλευσης της ΕΕΕΕΓΜ, αυτή θα διεξαχθεί αριτμητικά, με οποιανδήποτε αριθμού παρόντων μελών, την Τρίτη 13 Μαΐου 2008, στις 19:00, στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών του ΕΜΠ. Η συνέλευση αυτή έχει και εκλογική και η πράξη που συγκαλείται μετά την τελευταία τροποποίηση του Αρθρου 7 του Καταστατικού, με την οποία καθερώθηκε η δυνατότητα συμμετοχής στις ψηφοφορίες αρχαιεσιών και δε αλληλογραφία.

Τα θέματα της Ημερησίας Διάταξης είναι:

1. Απολογισμός πεπραγμένων της Εκτελεστικής Επιτροπής από την προηγούμενη εκλογική Γενική Συνέλευση της 24.05. 2005.
2. Οικονομικός απολογισμός οικονομικού έτους 2007.
3. Έκθεση Εξελεγκτικής Επιτροπής.
4. Έγκριση πεπραγμένων και οικονομικού απολογισμού και απολογισμού της Εκτελεστικής Επιτροπής από κάθε ευθύνη.
5. Διοργάνωση 15ου Πανευρωπαϊκού Συνεδρίου.
6. Ενημέρωση – Διάφορα Θέματα.
7. Εκλογή νέας Εκτελεστικής Επιτροπής και Εξελεγκτικής Επιτροπής

**ΥΠΟΨΗΦΙΟΙ ΓΙΑ ΤΗΝ ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ**

1. Αναγνωστόπουλος Ανδρέας
2. Βέττας Παναγιώτης
3. Βουζαράς Βέττας
4. Καβουνίδης Κομμουναλλί
5. Καβουνίδης Κομμουναλλί
6. Κούσουλης Κομμουναλλί
7. Μπαρδάνης Κομμουναλλί
8. Μπαρδάνης Κομμουναλλί
9. Ντουνιάς Ντουνιάς
10. Παπαγεωργίου Παπαγεωργίου
11. Υποψήφιος Χρήστος

**ΥΠΟΨΗΦΙΟΙ ΓΙΑ ΤΗΝ ΕΞΕΛΕΓΚΤΙΚΗ ΕΠΙΤΡΟΠΗ**

1. Καρυδάκης Αριστοτέλης
2. Κορινούλας Θεόδωρος
3. Παπαγεωργίου Θεόδωρος

ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ – Αρ. 12 – ΑΠΡΙΛΙΟΣ 2008 Σελίδα 3
Analysis of the behaviour of a deep excavation project with restraint bored piles

Analyse du comportement d’une excavation profonde affronté par pieux de soutènement

A. Arapakou & V. Papadopoulos
School of Civil Engineering
National Technical University of Athens, Greece

ABSTRACT

In the present study, the stability of deep excavated slopes of a Cut & Cover project has been examined. Due to the fact that part of the construction have run very close to a habitable area, the minimization of the soil displacements should be indispensable. The stability conditions have been improved by the construction of restraint bored piles. Through back – analyses, which have been based on measurements of the displacements on the head of the piles, the laboratory parameters have been confirmed, and the safety factors as well as the bending moments have been estimated. Finally, main conclusions, deduced by parametric analyses, concerning safety factors and maximum bending moments, have been mentioned.

RÉSUMÉ

La stabilité des talus des excavations profondes, qui sont construites par la méthode ‘cut & cover’ est étudiée. Une partie de l’ouvrage était très proche d’une zone urbaine et la diminution des déformations du sol était nécessaire. Pour cette raison, la solution des pieux de soutènement est adoptée. Des analyses numériques (back analyses), en utilisant les mesures des déformations réelles à la tête des pieux, ont été conduites. Les résultats ont confirmé les paramètres géotechniques des essais du laboratoire. Les facteurs de sécurité et le moment fléchissant sont estimés. Enfin, les conclusions des analyses numériques soulignent la relation du facteur de sécurité avec le moment fléchissant maximale des pieux.

Keywords: deep excavation, habitable area, restraint piles, bending moments, safety factors

1 INTRODUCTION

The construction of a Cut & Cover closed canal which belongs to the work concerning the bed deviation of Alfeios River in lignite mines of the Public Power Corporation in Megalopolis (Central Peloponnese, Greece) has been examined, in this study. The bed deviation has been considered essential in order for the mines to be extended. The fact that a large part of the canal runs very close to habitable area (community of Triapotamos) deep excavations should be controlled. The whole project has been already constructed and until today no geotechnical problems have been arisen. The design for the improvement of the stability conditions has been drawn up by Papadopoulos V. and Anagnostopoulos A. (1997), based on the geotechnical investigations of the P.P.C.

The total geometrical and geotechnical data, the observations during construction and the measurements of soil deformations, have been evaluated after the construction by Arapakou A. (2004). The present study refers to the main points of the work, as well as the methodology of the back analyses and the sensitivity analyses of the results due to possible fluctuation of geotechnical parameters.

2 GEOMETRICAL DATA AND GEOTECHNICAL CONDITIONS

During the construction of the closed canal, of 25m width and 12m height, deep excavated slopes have been created (almost 40m) in the side of the habitable area. The inclination of the natural surface in this area has been generally between 1:5 and 1:7. After the recover, permanent slopes of about 27m height and 1:3 inclination, would have been remained, according to the general stability investigation.

Abrupt slopes of great height would have been necessary to be formed in the lowest section of the general excavations. In order for the stability conditions to be improved until recover, restraint bored piles, of 1,20m diameter, have been designed to be placed within distances of about 3,33m to 4,00m. The construction phases are illustrated on Figure 1. Directly after the construction of the bored piles points for the measurement of the displacements have been installed on the head of the piles. During the whole construction, additional measurements of the convergences of slopes as well as the raising of the bottom of the general excavation have been received.

Figure 1. Typical cross – section and main phases of excavation

According to the geotechnical investigations underground, until the influence depth, consists of the following main layers:

- Layer (I): Clay or sandy clay CH, overconsolidated, brown or brownish yellow.
- Layer (II): Clay CL or CH, overconsolidated, grey or brownish grey, with cohesionless thin zones of ML – SM.
- Layer (III): zones of lignite, organic clay OH or marl.

Percussion number N (SPT) has been noted generally with high values N>50 though the lowest one has been N=34.

A representative geotechnical profile, in which back stability analyses have been carried out, as well as the results from triaxial compression tests CU, concerning soil layer II, have been given on Figure 2. Results from a previous systematic investigation for lignite of Megalopolis (Anagnostopoulos A., 1980) have been re-evaluated in order for the lignite properties to be determined.

3 STABILITY ANALYSES

Stability analyses have been based on the geometrical data of the examined cross-sections, the geometrical data which have been deduced by geotechnical investigations carried out within two phases, the observations during construction phases, and finally the measurements of the displacements on the head of the piles.

Analyses have been conducted within two phases:
Figure 2. Geotechnical profile and representative triaxial CU tests results

a) Stability analyses according to the simplified Bishop method, by using TALREN program, in order to find out the minimum possible shear strength parameters. Analyses have been based on the excavation data, concerning mainly the lowest level of 11m height and 2:1 inclination. Failure conditions have not been observed, thus the minimum possible shear strength could be defined (set of parameters I, according to Table 1). Furthermore, maximum possible parameters (set of parameters II) have been estimated through all data. Stability analyses have been carried out for the two worst kilometer positions.

Table 1. Minimum and maximum values of soil parameters

<table>
<thead>
<tr>
<th></th>
<th>Set of parameters I</th>
<th>Set of parameters II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>c (kPa)</td>
<td>φ (°)</td>
</tr>
<tr>
<td>Clay I</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Clay II</td>
<td>32</td>
<td>17</td>
</tr>
<tr>
<td>Silty sand</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Lign.</td>
<td>100</td>
<td>27,5</td>
</tr>
</tbody>
</table>

b) Analyses based on finite element method, by using Plaxis V.8 Professional. Soil has been simulated as elastoplastic medium, according to Mohr – Coulomb's criterion. The first leading analyses have been conducted according to the corresponding set of parameters of Table 1. The main purpose of these analyses has been to confirm the horizontal and vertical displacements developed on the head of the piles as well as the vertical displacements occurring on the bottom of the general excavation. The results from the above analyses and the measured values of the deformations are given on Table 2.

Table 2. Comparing the results from the analyses with the measured values

<table>
<thead>
<tr>
<th></th>
<th>Measured values</th>
<th>Anal. I</th>
<th>Anal. II</th>
</tr>
</thead>
<tbody>
<tr>
<td>K.P. 1+800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$U_x$ (cm)</td>
<td>3.1</td>
<td>9.320</td>
<td>2.917</td>
</tr>
<tr>
<td>$U_y$ (cm)</td>
<td>1.2</td>
<td>1.096</td>
<td>1.265</td>
</tr>
<tr>
<td>K.P. 2+010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$U_x$ (cm)</td>
<td>4.1</td>
<td>8.615</td>
<td>2.934</td>
</tr>
<tr>
<td>$U_y$ (cm)</td>
<td>1.4</td>
<td>1.332</td>
<td>1.770</td>
</tr>
</tbody>
</table>

Measurements on the head of the piles

4 SENSITIVITY ANALYSES

4.1 General

For a better understanding of the measurements and the project’s behaviour, it has been essential to investigate the sensitivity of the results in relation to the variability of soil parameters. A simpler section – than the two previous, has been studied, in which no ground water table has been appeared so as to avoid any uncertainty on the results. The influence of the rigidity of the piles on the displacements and on the bending moments has been examined in order to comprehend the contribution of the piles on the slope stability. Then, the influence of the phreatic – level has been also searched. In order for the vertical deformations to be estimated, an ideal excavation phase of 4m height has been simulated during the last phase.

4.2 Influence of Poisson's ratio

The effect of Poisson’s ratio has been studied only according to linear elastic theory. The whole section – section has been separated into two different districts: a) The largest one where insignificant horizontal displacements can occur ($ν=0.35$), b) The district where great horizontal displacements can develop because of unloading ($ν=0.175$).

Furthermore, the first simplified acceptance where $ν=0.30$, has been taken into account. The results from the two different analyses which are shown on Table 3, are related to horizontal $U_x$ and vertical $U_y$ deformations developed on the head of the piles as well as on the bottom of the excavation. It is observed that there are not any important differences between the two different analyses.

The divergences, though, between the calculated deformations and the measured ones are shown to be depended on the elastoplastic and not elastic soil behaviour.

Table 3. Influence of Poisson’s ratio

<table>
<thead>
<tr>
<th></th>
<th>Linear - Elastic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analysis 1</td>
</tr>
<tr>
<td>$ν = 0.30$</td>
<td></td>
</tr>
<tr>
<td>Vertical phase displacement cm</td>
<td>2.057</td>
</tr>
<tr>
<td>$U_x$ (horizontal displacement) cm</td>
<td>1.725</td>
</tr>
<tr>
<td>$U_y$ (vertical displacement) cm</td>
<td>1.798</td>
</tr>
</tbody>
</table>

Displacements of the head of the piles
4.3 Influence of cohesion and safety factor versus deformations

From the corresponding analyses, it should be concluded that high values of cohesion $c$ can lead to relatively low horizontal displacements $U_x$. However, if cohesion values are lower than 30KPa, the $U_x$ may be greatly increased as cohesion decreases. The variation of $U_x$ versus cohesion $c$, is illustrated on Figure 3, from which the average value of cohesion could be indirectly estimated relied on the measured $U_x$ values. It has been noted that there is no substantial difference between the resulted value, $c=38$KPa, and the laboratory one ($c=34$KPa).

The variation of the horizontal displacements $U_x$ versus safety factor MSF is shown on Figure 4. For MSF = 1,40, $U_x$ values remain relatively low, though for MSF values lower than 1,25, $U_x$ values have shown to increase very rapidly. It should be cleared up that parametric analysis has been carried out for various cohesion values but for constant modulus of elasticity $E$.

4.4 Influence of cohesion and safety factor versus bending moments

The estimation of the bending moments should be directly connected with the dimensions of the piles, whose aim is to improve the stability conditions that are the safety factor. The variation of the maximum bending moment versus safety factor is given on Figure 5. It has been concluded that for relatively high values of safety factor against that based on the linear elastic analysis, there is little reduction on the bending moment values. On the contrary, for low values of MSF, lower than 1,25, bending moment values seem to arise. The corresponding results are given on Table 4.

The maximum bending moment resulted from the analysis according to linear elasticity, in most cases, has been higher than the respective one resulted from the second analysis. This could be interpreted by studying the point where bending moment becomes maximum (point where shear forces are zeroed). As far as the first case is concerned (linear elastic medium), this point seems to be lower than that of the second case.

According to the limit equilibrium mechanisms (which correspond to safety factor MSF=1), the maximum bending moment has been calculated as follows: a) According to Broms B.B (1972): $maxM=2588$KNm and b) According to Viggiani C (1981): $maxM=4206$KNm.

**Figure 3. Variation of the horizontal displacement versus cohesion**

**Figure 4. Variation of the horizontal displacement versus safety factor**

**Figure 5. Variation of the maximum bending moment versus safety factor**

A great difference has been remarked between the calculation of the bending moments according to finite element method and the calculation based on the limit equilibrium mechanisms. The maximum values based on the latter case have been concluded to be 8 – 9 times higher than those which have been really developed. The bending moment design of the piles relied on the above analysis has been considered as an average value computed according to Broms and Viggiani.

4.5 Influence of the rigidity of the pile

The effect of the pile’s rigidity has been studied in order for its contribution to the stability conditions to be better comprehended. Two different analyses based on linear elastic medium as well as on two values of the clay cohesion ($c=38$KPa and $c=23$KPa), have been examined. According to the first analysis, the inertia moment $I$ has been considered 10 times greater than that of the previous analyses, that is $E_1/E_0=10$. According to the second analysis, this moment has been considered much lower so that $E_1/E_0=0.10$, where $I_0$ is the first value of the inertia moment.

4.6 Influence of the phreatic level

During parametric analysis the influence of the ground – water table, which has been considered to arise on the level of the general excavation, has been also examined. The bending moments and the developed deformations of the piles as well as the soil displacements have been calculated. According to the above analyses, it should be noted that there are no significant differences between the calculated values and the measured ones. Therefore, it could be concluded that a possible presence of the phreatic level has not any important effect on the results deduced from finite element analyses.

5 CONCLUSIONS

From the above analyses, it has been concluded that the laboratory values of the shear strength parameters of the clay layers could well justify the developed and measured soil deformations. Thus, the reliability of the finite element model as
Table 4. Linear elastic analysis and analysis according to variation of the cohesion

<table>
<thead>
<tr>
<th>Linear Elastic</th>
<th>Mohr - Coulomb</th>
</tr>
</thead>
<tbody>
<tr>
<td>c (KPa)</td>
<td>-</td>
</tr>
<tr>
<td>maxM (KNm)</td>
<td>5.97</td>
</tr>
<tr>
<td>MSF</td>
<td>-</td>
</tr>
</tbody>
</table>

well as the considered geotechnical profiles have been greatly confirmed.

The general conclusions from the whole analysis are the following:

- The detailed analysis concerning the Poisson’s ratio (separation in two different districts) has not actually lead to different results from those based on the single value. However, this distinction has been taken into account in the next analyses due to the fact that it comes closer to reality.

- Horizontal displacements developed on the head of the pile as well as bending moments have shown to be greatly influenced by the variation in cohesion value (constant modulus of elasticity). The safety factor against failure, which has been calculated according to a “phi – c reduction” procedure, that is, proportional reduction of shear strength and tanφ parameters, has also seemed to influence horizontal displacements and bending moments. Results have been noted to be much more sensitive when safety factor is lower than 1.25. Then, horizontal deformations and bending moments have been greatly increased.

- Enough lateral support of the pile on the bench has been also observed, as it had been firstly supposed. However, lateral earth pressures have resulted to be much lower than the passive ones.

- Bending moments computed based on the measured horizontal displacements have resulted to be much lower (8 – 9 times) than those according to limit equilibrium mechanisms. Therefore, the safety factor of piles would have been expected to be 8 – 9 times higher than the respective one according to the latter mechanisms. Consequently, great attention is required as far as design is concerned and especially when conditions are far from limit equilibrium states.

- The comprehension of soil behaviour and measured displacements has been the main purpose of the investigation of this project through back – stability analyses. An additional aim has been to examine the parametric investigation of the influence of some parameters against general stability, in a sensitive place which is very close to a habitable area.

REFERENCES


New analytical solutions for retaining structures under static and dynamic loads

Nouvelles solutions analytiques pour des structures de soutènement soumises à des charges statiques et dynamiques

G.E. Mylonakis, C.I. Papantonopoulos & D.A. Chrysikos
Dept. of Civil Engineering, University of Patras, Greece

ABSTRACT

In this paper, a family of new simple "design-oriented" analysis methods for retaining structures subjected to both static and dynamic loads is proposed. While retaining analytical and conceptual simplicity, the proposed methods offer enhanced predictive power over existing simplified approaches (e.g., Rankine, Coulomb and their dynamic extensions). They include certain features which are currently available only in numerical solutions. Three such methods are outlined in the paper, namely: (1) stress limit analysis solutions, (2) elastodynamic solutions and (3) solutions for retaining walls with geofoam interface. The solutions are simple and accurate, and can be easily implemented by means of hand computations.

RÉSUMÉ

Dans cet article on propose une famille de méthodes analytiques orientées sur la conception des structures de soutènement soumises à des charges statiques et dynamiques. Tout en conservant une simplicité conceptuelle et analytique que les méthodes proposées offrent une capacité de précision accrue par rapport aux méthodes simples existantes (Rankine, Coulomb et leurs extensions dynamiques). Elles possèdent quelques caractéristiques actuellement disponibles qu’aux méthodes numériques. Trois de ces méthodes sont décrites dans cet article, notamment: (1) solutions du type analyse limite, (2) solutions elastodynamiques et (3) solutions elastodynamiques des murs de soutènement avec des interfaces en "geofoam". Les solutions sont simples, et précises et elles peuvent facilement être effectuées par des calculs manuels.

Keywords: Retaining walls, limit analysis, elasticity, elastodynamics, geosynthetic materials, geofoam

1 INTRODUCTION

Current design procedures for retaining structures can be roughly classified into two main groups: (1) simplified methods, based on the Coulomb-type solutions and their various derivatives, (2) rigorous computational methods based mainly on the finite-element and the finite-difference approaches. Methods in the first group are computationally inexpensive and offer insight in the physics of the problem. However, they lack predictive power, especially for complex geometries, elastic conditions and distribution of earth pressures on the wall. On the other hand, computational methods have superior predictive power and can handle complex configurations and different types of material behaviour. Their underlying mathematical principles are complex and unfamiliar to the Geotechnical Engineer. Consequently, use of these methods is restricted to specialized users.

In this paper, a new family of simple "design-oriented" analysis approaches for retaining structures is presented. While retaining analytical and conceptual simplicity, the proposed methods offer enhanced predictive power over existing simplified methods (Rankine, Coulomb), which is currently available only in rigorous numerical solutions. Three such approaches are outlined below, namely: (1) stress limit analysis solutions; (2) elastodynamic solutions; (3) solutions for retaining structures with geosynthetic in-

 interfaces. The solutions are simple and accurate, and can be easily implemented by means of hand computations.

2 AN ALTERNATIVE TO THE MONONOBE-OKABE EQUATIONS FOR SEISMIC EARTH PRESSURES

The classical equations of Coulomb (Coulomb 1773) and Mononobe-Okabe (Matsuo & Okabe 1924) are being widely used for determining earth pressures due to gravitational and earthquake loads, respectively. Given their practical nature and reasonable predictions of actual dynamic pressures, solutions of this type are expected to continue being used by engineers for a long time to come.

It is well known that the Mononobe-Okabe solutions can be interpreted as kinematic solutions of limit analysis. Solutions of this type are inherently unsafe as they underestimate active pressures and overestimate the passive (Chen 1975). A second group of limit-analysis methods, the stress solutions, make use of stress fields that satisfy equilibrium equations and stress boundary conditions, without violating the failure criterion anywhere in the medium. Formulations of this type are inherently safe, as they overestimate active pressures and underestimate the passive. To the best of the Authors’ knowledge, no simple closed-form solution of the stress type has been derived for seismic earth pressures.

The problem under investigation is depicted in Figure 1: a slope of dry cohesionless soil retained by an inclined gravity wall, is subjected to plane strain conditions under the combined action of gravity (g) and seismic body forces (ah x g) and (av x g) acting in the horizontal and vertical direction, respectively. The problem parameters are: the height (H) and inclination (ω) of the wall, inclination (β) of the slope; roughness (δ) of the wall-soil interface; friction angle (φ) and unit weight (γ) of the soil material, and surface surcharge (q).

Figure 1. The problem under investigation

The resultant body force in the soil is acting under an angle ψe from vertical

$$\tan \psi_e = a_h / \left(1 - a_v\right)$$  (1)

To analyze the problem, the backfill is divided into two main regions subjected to different stress fields, as shown in Figure 1: the first zone (A) is located close to the soil surface, whereas the second (zone B) close to the wall. In both regions soil is assumed to be in a condition of impeding yielding under the combined action of gravity and earthquake loads. The same assumption is adopted for the soil-wall interface.
Fundamental to the proposed analysis is the assumption that stresses close to the soil surface can be well approximated by those in an infinite slope, as shown in Figure 1. In this zone (A), the inclined soil element shown is subjected to cancelling actions along its vertical sides. Thus equilibrium is achieved solely under body forces and contact stress acting at its bottom face. For points in zone B, it is assumed that stresses are functions exclusively of the vertical coordinate and obey the strength criterion of the frictional soil-wall interface.

To determine the separation of mean stresses \( S_A \) and \( S_B \) in the two zones, a logarithmic stress fan is adopted in this study, centered at the top of the wall. In the interior of the fan, principal stresses are gradually rotated by the angle \( \theta \) separating the major principal planes in the two regions.

### 2.1 Solution without Earthquake Loading

The total thrust on the wall due to surcharge and gravity loading is obtained by the well-known expression:

\[
P = K_q q H + \frac{1}{2} K_f \gamma H^2
\]

Using the above model, Mylonakis et al (2007) showed that the earth pressure coefficient due to self weigh, \( K \), is given by

\[
K_f = \frac{\cos(\omega - \beta) \cos \beta}{\cos \delta \cos^2 \omega} \times \left[ \frac{1 \pm \sin \phi \cos(\Delta_2 + \delta)}{1 \pm \sin \phi \cos(\Delta_1 + \beta)} \right] \exp(\mp 2 \theta \tan \phi)
\]

where

\[
2\theta = \Delta_2 + (\Delta_1 + \delta) + \beta - 2\omega
\]

is twice the angle separating the major principal planes in zones A and B. \( \Delta_1 \) and \( \Delta_2 \) denote the corresponding Caquot angles given by (Chen 1975):

\[
\sin \Delta_1 = \frac{\sin \beta}{\sin \phi} \quad \text{and} \quad \sin \Delta_2 = \frac{\sin \delta}{\sin \phi}
\]

Regarding the double signs in Eqn (3), the upper one corresponds to active conditions and the lower to passive.

It is also straightforward to show that the surcharge coefficient \( K_q \) is related to \( K_f \) through the simple expression

\[
K_q = K_f \frac{\cos \omega}{\cos(\omega - \beta)}
\]

which coincides with the kinematic solution of Chen & Liu (1990), established using a Coulomb mechanism. Equation (6) represents an exact solution for a weightless material. Note that for a horizontal backfill (\( \beta = 0 \)), coefficients \( K_q \) and \( K_f \) coincide regardless of wall inclination and material properties. Simplified versions of the above solutions have been derived by Powrie (1997), Lancelotta (2001) and Muir Wood (2004).

### 2.2 Solution including Earthquake Loading

Recognizing that earthquake action imposes a resultant thrust in the backfill inclined by a constant angle \( \psi_e \) from vertical, it becomes apparent that the pseudodynamic problem does not differ fundamentally from the corresponding static problem, as the former can be obtained from the latter through a rotation of the reference axes by the seismic angle \( \psi_e \). Application of this concept to the problem at hand yields the following solution (Mylonakis et al 2007)

\[
K_{E_f} = (1-q_e) \frac{\cos(\omega - \beta) \cos(\beta + \psi_e)}{\cos \psi_e \cos \delta \cos^2 \omega} \times \left[ \frac{1 \pm \sin \phi \cos(\Delta_2 + \delta)}{1 \pm \sin \phi \cos(\Delta_1 + \beta)} \right] \exp(\mp 2 \theta E \tan \phi)
\]

which can be used in the context of Eqn (2). In the above equation,

\[
2\theta_E = \Delta_2 + (\Delta_1 + \delta) + \beta - 2\omega - \psi_e
\]

is twice the revolution angle of principal stresses in the two regions under seismic conditions; \( \Delta_1* \) is equal to \( \arcsin \sin(\beta + \psi_e)/\sin(\beta) \), following Eqs (5).

Evidently, the above equations are simpler than those of Coulomb and Mononobe-Okabe and possess a solid physical basis. Since equilibrium is not rigorously satisfied in the interior of the fan, the solution should not be viewed as a rigorous bound. It will be used in this work as an approximate bound, or merely as predictor of earth pressures. Nevertheless, extensive comparisons against rigorous numerical results presented in the following section, indicate that the solution consistently yields safe predictions for both active and passive pressures.

Results for active seismic earth pressures are given in Figure 2, referring to cases examined in the seminal study of Seed & Whitman (1970) for a reference friction angle of 35°. Naturally, active pressures increase with increasing levels of seismic acceleration and slope inclination and decrease with increasing friction angle and wall roughness. The conservative nature of the proposed analysis versus the Mononobe-Okabe (M-O) solution is evident in the graphs. The trend is more pronounced for high levels of horizontal seismic coefficient (\( a_h > 0.25 \)), smooth walls (not shown), level backfills, and high friction angles. Conversely, the trend becomes weaker with steep backfills, rough walls, and low friction angles.

---

**Figure 2.** Comparison of active seismic earth pressures predicted by the proposed solution and from conventional M-O analysis (modified from Seed & Whitman 1970)
3 ELASTODYNAMIC SOLUTION FOR SEISMIC EARTH PRESSURES ON GRAVITY WALLS

The limit analysis solutions discussed above rely on the implicit assumption that the wall can displace sufficiently, so that active or passive condition can develop in the backfill. This assumption, although reasonable in many cases, is not always realistic. There are numerous examples of retaining walls (e.g., basement walls, bridge abutments) that do not fulfill this requirement. For such cases, elastic methods can be employed as the one outline below.

The system investigated is shown in Figure 3. A rigid wall retaining a semi-infinite soil layer that is free at the upper surface and bonded to base, is excited by uniform earthquake acceleration imposed at the base of the layer. Soil is considered a linear viscoelastic isotropic material of mass density $\rho$, shear modulus $G$, Poisson’s ratio $\nu$, and material damping $\delta$, which is assumed to be independent of frequency.

For harmonic seismic excitation, the governing equation of motion of the medium in the horizontal direction may be written as (Arias et al 1981)

$$\chi_s \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \kappa^2 u = \frac{X_s}{V_s^2}$$  \hspace{1cm} (9)

where

$$\kappa^2 = \omega/V_s^2 , \quad \chi_s^2 = \frac{2(1-\nu)}{(1-2\nu)}$$  \hspace{1cm} (10)

in which $V_s^2 = V_s \sqrt{1 + 2i\beta_s}$ is the complex propagation velocity of damped shear waves in the soil medium, $\beta_s$ represents the corresponding damping coefficient, which is analogous (yet not identical) to the critical damping ratio of simple oscillators.

The above equation was derived based on the (reasonable) assumption that no vertical normal stresses develop anywhere in the medium during dynamic response. A direct solution to Eqn (9) has been presented by Arias et al (1981) and later by Veletsos & Younan (1994). Due to mathematical complexity associated with the use of infinite trigonometric series, that solution has been proven difficult to use in practical applications. An alternative approach is presented here: instead of solving Eqn (9) directly, the partial differential equation is integrated along the vertical direction (thickness of soil layer) and transformed to an ordinary differential equation, which is amenable to elementary analytical treatment.

As shown in Langousis et al (2006), the total soil thrust on the wall is obtained by

$$Q_b = -\frac{\omega^2 G}{\psi_e} H 0 \int \int \frac{1}{2} \left( \frac{a_s}{a_s}$$. The cutoff frequency of the system below which no stress waves propagate in the medium, and a modal participation factor of the dynamic system, $\Phi = \Phi(z)$ is an appropriate modal function (shape function). The negative sign in front of the solution indicates negative base shear for positive ground acceleration and vice versa.

Figure 4 shows the accuracy of the proposed solution in comparison with the Veletsos-Younan analytical solution and Wood’s finite-element solution. It is obvious that the proposed solution is extremely close to Wood’s solution and it is even more accurate than Veletsos-Younan’s solution.

Figure 5 presents the dynamic base shear of the proposed solution for a sinusoidal shape function ($\Phi$) and for a rigid wall in comparison to Veletsos-Younan solution. The maximum discrepancy of these solutions is 5%, observed at resonance.

Figure 6 shows the application point of the base shear, which has been calculated as the ratio $M_b/Q_b$. The application point for the proposed solution is constant and equal to $2/n$ (0.637). Veletsos-Younan solution and the proposed solution are in reasonable agreement (discrepancy less than 10%) for all excitation frequencies $\omega/\omega_1$ below 2, which cover most cases of practical interest.
DIMENSIONLESS FREQUENCY $\omega / \omega_1$

$$F = \frac{1 - \nu_1 G^*_m m_2}{1 - \nu_2 G^*_m m_1}, \quad \Lambda = \frac{1 - \left(\frac{a_{01}}{a_{0c}}\right)^2 \left(\frac{v^*_{s1}}{V^*_{s2}}\right)^2}{1 - \left(\frac{a_{02}}{a_{0c}}\right)^2},$$ (14)

$$m_1 = \frac{a_{0c}}{\chi_{s1}} \sqrt{1 - \left(\frac{a_{01}}{a_{0c}}\right)^2}, \quad m_2 = \frac{a_{0c}}{\chi_{s2}} \sqrt{1 - \left(\frac{a_{02}}{a_{0c}}\right)^2}$$ (15)

where $s$ denotes the thickness of geofoam material and $G_1$, $V_{s1}$, $\nu_1$, $a_{01}$ its shear modulus, shear wave propagation velocity, Poisson's ratio and dimensionless frequency, respectively. $G_2$, $V_{s2}$, $\nu_2$, $a_{02}$ denote corresponding parameters for the soil material.

Numerical results are shown in Figures 7 and 8, for static and dynamic conditions, respectively. The dramatic reduction in seismic thrust is evident in the graphs. Interestingly, the reduction is smaller at frequencies close to the resonant frequency of the layer, as shown in Figure 8.

Figure 5. Comparison of the proposed solution with the theory of Veletsos-Younan, for the base shear of a rigid wall; $\nu=0.3$

Figure 6. Comparison of the point of application of seismic thrust on a rigid wall computed with the proposed solution and with that of Veletsos-Younan, for different values of soil damping; $\nu=0.3$

4 ELASTODYNAMIC SOLUTION FOR RETAINING WALLS ENHANCED BY GEOFOAM MATERIAL

Research conducted at University of Patras (Athanasopoulos et al. 2007) and elsewhere has demonstrated that use of a compressible interface of Geofoam material at the back of the wall, greatly reduces the forces on the wall, at the expense of a small increase in backfill displacements. In this section we outline an enhancement of the elastodynamic solution presented earlier, to account for the presence of the geosynthetic interface.

The reduction in base shear can be described by the following index (Mylonakis 2005)

$$I_f = \frac{1 - F \left[1 - \cosh(m_2 \frac{s}{H}) - \Lambda \sinh(m_2 \frac{s}{H})\right]}{\cosh(m_2 \frac{s}{H}) + \Lambda^{-1} \sinh(m_2 \frac{s}{H})}$$ (13)

which defines the ratio of soil thrust with and without geofoam, respectively. In the above equation,
The enhanced elastodynamic solution for the geofoam interface indicates that a reduction in seismic thrust of about 50% is possible for geofoam thickness of only 5% of the wall height. The reduction is not as effective for frequencies close to the fundamental natural frequency of the soil layer. Nevertheless, given the small thickness of the backfill, this case is minor importance from a practical viewpoint.

ACKNOWLEDGMENTS

The authors would like to acknowledge the help of P. Kloukinas, M. Langousis and C. Kandarakis, as well as Profs D. K. Atmatzidis and G.A. Athanasopoulos for many valuable discussions.

REFERENCES


Langousis, M., Mylonakis, G. 2006. Elastodynamic Solution for Seismic Earth Pressures on Gravity Walls, 5th Greek Conference in Geotechnical Engineering, Xanthi, June, 2, 279-286


Muir Wood, D. 2004 Geotechnical Modeling, T&F

Mylonakis, G., 2005 Analytical solutions for retaining walls with Geofoam interface, Unpublished Research Report, University of Patras


και την αναλύση της περιπέτειας της διεξαγωγής των προκλητικών τεχνικο-γεωλογικών συνθηκών και τις δυσκολίες που τις ερμηνεύουν. Τα περισσότερα ταξινομήματα αυτών των συνθηκών είναι κατασκευής επιβάλλουσας στην κατασκευή των ορυκτών και οικοδομικών εργασιών.

Το περιεχόμενο της διεξαγωγής της αναφοράς στην κατασκευή των ορυκτών και οικοδομικών εργασιών. Το περιεχόμενο της διεξαγωγής της αναφοράς στην κατασκευή των ορυκτών και οικοδομικών εργασιών.
Σχήμα 1. Παράδειγμα ανάλυσης της βάσης δεδομένων TIAS

Για την παρουσίαση και ανάλυση των προαναφερθέντων, για κάθε ένα από τα εξεταζόμενα γεωλογικά δομικά, δημιουργήθηκε ένα τυπολόγιο ώστε να μπορεί να γίνεται εύκολα η αναζήτηση των στοιχείων αυτών ανά γεωλογικό και τύπο βραχώματος.

Για κάθε κατηγορία υλικού ερευνάται το γενικό γεωλογικό πρότυπο του περιβάλλοντος των βραχωμάτων τους με βάση τη λιθολογία, τη δομή των σχηματισμών, τις κύριες τεκτονικές επιφάνειες, τις υδρογεωλογικές συνθήκες, το βαθμό της αποσάρας και το μορφολογικό ανάγλυφο. Στα πλαίσια αυτά αναλύεται το προσωμόωμα της βραχώματος με το χαρακτηριστικό του κεραμισμού, της αποσάρας, και ακόμη της αποδιοργανωμένης, χακτικής ή διαστημένης δομής.

Η γεωτεχνική ταξινόμηση των υπόψεις βραχώματος αποτελεί σημαντικό τμήμα της διδακτικής διατριβής. Τα αποτελέσματα της αξιολόγησης των χαρακτηριστικών δομής και συστάσεων οδηγούν στην πρόσβαση νέων διαγραμμάτων ποσοτικού χαρακτηρισμού μέσω του συστήματος GSI για τις βραχώματος του φλούγα, της μολάσας, των γενειών (στις καταπομπέντες κυρίως δομές του) και δίνονται τα εύρη προβολής των διαφόρων παραλλαγών για τους ασβεστολιθούς και τους οροφίλους. Συγχρόνως, δίδονται συστάσεις εφαρμογής του συστήματος GSI, συζητούνται γενικότερα οι περιορισμοί εφαρμογής των ταξινομήσεων στις αθρεφής βραχώματος καθώς και οι περιπτώσεις λανθασμένης χρήσης της ταξινόμησης.

Σχήμα 2. Τεχνικογεωλογικό μοντέλο της δομής στην περιοχή της σήραγγας Ανθοχωρίου όπου φαίνεται η πολυπλοκότητα της γεωλογικής δομής σε περιβάλλον φλούγα σε ένα μέτωπο επιβίωσης.

Σχήμα 3. Τεχνικογεωλογικοί τύποι βραχώματος σε φλούγα περιβάλλον

Σχήμα 4. Νέο διάγραμμα ταξινόμησης GSI για ετερογενείς βραχώματες όπως ο φλούγας

Επιπλέον της γεωτεχνικής ταξινόμησης της βραχώματος και σε συνδυασμό με αυτή, πραγματοποιείται περαιτέρω και μία ταξινόμηση των ασθένων και σύνθετων γεωλογικών που εξετάστηκαν, με βάση τη τεχνικογεωλογική τους συμπεριφορά κατά τη διάνοια των σημερινών, σε σχέση με την μηχανική αστικής και το κατά περίπτωση τακτικό πεδίο. Αντιστοιχούνται συνεπώς, οι μηχανικοί πιθανοί αστικάς (παραμορφώσεις λόγω υπερφόρτησης, καταπτώσεις ισχύος ή ολισθήσεις σφηνών, εκτεταμένες καταπτώσεις τύποι κιμωλίας, καταρροή γεωλογικού) καθώς και η κλίμακα της αστικής.
Γενικώς, η χρήση των γνωτών συστημάτων ταξινόμησης έχει το μειονέκτημα να μην συνοδεύεται υποχρεωτικά από πληροφορίες αυτοδομίας της βραχώματος στις σήραγγες. Έτσι πολλές φορές χάνεται η γεωλογική τουστίτικη του χωματικού, αφού αυτή δεν συνοδεύεται πλήρως την ανάλυση και είναι δυνατόν να αναγνωρίζονται οι ιδιαιτερότητες που πιθανόν αυτό να παρουσιάζει. Σε κάθε περίπτωση τονίζεται ότι η τεχνικογεωλογική κρίση έχει ιδιαίτερη σημασία όταν επιχειρείται ποσοτική εξασφαλίστηκαν των χαρακτηριστικών της βραχώματας. Στο πλαίσιο αυτού δημιουργήθηκε ένα σύστημα εκτίμησης των μηχανισμών - τύπων συμπεριφοράς της βραχώματας για αναπτυκτική διατομή σήραγγας, με βάση συγκεκριμένες τεχνικογεωλογικές παραμέτρους και το τακτικό περιβάλλον.

Αυτές είναι η δομή (σύμφωνα με το GSI), οι ορισμένες συνθήκες της αντοχής σ0 και η πίεση των υπερδερμένων. Η εκτίμηση αφορά εύρος υπερδερμένων έως 300m. Αφού ορίζονται οι κατά περίπτωση πιθανότητες μηχανισμών αστικής, για κάθε τύπο αναμενόμενης βραχώματας προσδιορίζονται οι κατάλληλοι παράμετροι σχεδιασμού (είτε της βραχώματας n,x,GSI, σ0, m ή αυτή συμπεριφέρεται ιδότροπα, είτε συνεχείων αν αυτή συμπεριφέρεται ανισόστροπα). Τα ανωτέρω συνδέονται και αντιστοιχούνται ενδεικτικά με τυπικές διατάξεις υποστήριξης σφράγων με συγκεκριμένες προτάσεις για κάθε τύπο τεχνικογεωλογικής συμπεριφοράς. Με αυτόν τον τρόπο, η ορθότητα των ταξινομήσεων και το σύστημα υποστήριξης μπορούν να ελέγχονται έμεσα από τις χαρακτηριστικές τους αστικής κατά τη διάρκεια της εκσκαφής της σήραγγας.

Σχήμα 5. Προτεινόμενο διάγραμμα εκτίμησης της τεχνικο-γεωλογικής συμπεριφοράς της βραχώματας

Δημοσιεύσεις σε διεθνή επιστημονικό περιοδικά και πρακτικά συνεδρίων


2004. B. Π. ΜΑΡΙΝΟΣ, Π. Γ. ΜΑΡΙΝΟΣ, Ε. ΗΟΕΚ. "Γεωλογικός δείκτης αντοχής GSI. Εφαρμογή, συστάσεις, περισσοφος και πεδία μεταβολών ανάλογα με τον τύπο του πετρώματος." Πρακτικά 10ου Διεθνούς Συνεδρίου της Ελληνικής Γεωλογικής Εταιρείας, Αθήνα, 1773-1780, Θεσσαλονίκη.


2006. Β.Π.ΜΑΡΙΝΟΣ. et al. Η δημιουργία γεωτεχνικής βάσης δεδομένων σφράγων για τη Εγνατία Οδό ΑΕ. Πρακτικά 5ου Πανελληνίου Συνεδρίου Γεωτεχνικής και Περιβαλλοντικής Μηχανικής, 3, 525-531, Σάμος.


TABLE OF CONTENTS

1. Preservation of Monuments and Historic Sites

2. Terms of Reference

3. FIGS was officially launched

FIGS was officially launched

The inaugural meeting of FIGS took place in London, on 25 January 2008 (see photo). The activity developed until now was reviewed. The main achievement so far has been to form 7 Joint Technical Committees (JTCs) with members from the 3 societies, which are already working. Another 4 JTCs are now being established. With the formal start of operation of FIGS it is expected that its activities will be significantly increased during 2008.

Following a procedure approved at that meeting, Prof. William van Impe was elected the President of FIGS for 2008-2011.

5th ATHENAIKH ΔΙΑΛΕΞΗ ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Ομότιμος Καθηγητής Ε.Μ.Π. ΑΝΔΡΕΑΣ ΑΝΑΓΩΝΩΤΟΠΟΥΛΟΣ

The inaugural meeting of FIGS took place in London, on 25 January 2008 (see photo). The activity developed until now was reviewed. The main achievement so far has been to form 7 Joint Technical Committees (JTCs) with members from the 3 societies, which are already working. Another 4 JTCs are now being established. With the formal start of operation of FIGS it is expected that its activities will be significantly increased during 2008.

Following a procedure approved at that meeting, Prof. William van Impe was elected the President of FIGS for 2008-2011.
Ο καθορισμός τέτοιων κριτηρίων εμπεριέχει μεγάλο ποσοστό υποκειμενικής κρίσης και υφίσταται δυσκολία για ενιαία κριτήρια.

Η εκτίμηση της επίδρασης των μεταποίησεων στις θεμελιώσεις / βάθρων στην ανωδόηρη των γεφυρών μπορεί να αξιολογηθεί με δύο τρόπους:

- Κριτήρια δομοστατικού σχεδιασμού
- Καταγραφή της επίδρασης των μεταποίησεων από υπάρχουσες γέφυρες

Βάσει των αρχών του δομοστατικού σχεδιασμού προκύπτουν εξωτερικά ευτυχισμένα κριτήρια σε σχέση με καταγραφές μεταποίησεων που θεωρούνται αποδεκτές σε πραγματικές γέφυρες. Πραγματικές όμως καταγραφές της συμπεριφοράς γεφυρών μέσω μετρήσεων των μεταποίησεων, αποτελούν σήμερα το πλέον αξιόπιστο τρόπο για τον καθορισμό μέγιστων ανεκτικών αριθμών στη φάση λειτουργίας.

Η σύγχρονη μεθοδολογία για τον καθορισμό των ανεκτικών μεταποίησεων για τις γέφυρες περιλαμβάνει την εκτίμηση: α) των ανεκτικών ζωνών μεταποίησης και β) την αντίστοιχη επιμήκη γεφυρών.

Μετακινήσεις χαρακτηρίζονται ως ανεκτές ακόμα και εάν προκύπτουν μεταποίησεις. Προκύπτουν επηρεάζονται την ανωσόστολη ζωή των παλαιών γεφυρών, επικεντρώνονται στην ανωσοστολή της ζωής καθώς και στις καταστάσεις της συνεχούς και εποπτικής αξιολόγησης των σεισμικών καταστάσεων των κτιρίων.

Παραμετρικά υπάρχει συνέχεια διεξαγωγής δομοστατικού κριτήριον σε ανεκτές και συνεκτικές περιοχές που προκύπτουν από την συνέχεια της επιδημίας και η εκτίμηση της επίδρασης διακρίνεται σε συνεκτικά και ανεκτικά σημεία που παράγονται από την συνέχεια της επιδημίας και της επιδημίας και της ανωσοστολής των κτιρίων.

Η εκτίμηση της επικυκλοφορίας των ανεκτικών μεταποίησεων για τις γέφυρες περιλαμβάνει την εκτίμηση: α) των ανεκτικών ζωνών μεταποίησης και β) την αντίστοιχη επιμήκη γεφυρών.
1) Η ροή προσομοίωση των γεωτεχνικών συνθηκών και της συμπεριφοράς των εδαφικών υλικών αποτελεί τον κυρίαρχο παράγοντα για την εκτίμηση των καθιζήσεων και λοιπών μεγεθών.

2) Τα γνωστά κριτήρια των επιπεπειμένων καθιζήσεων αντιμετωπίζουν επιτυχώς τα προβλήματα της καθιζήσεως πρακτικής συνθηκών (κτιριακών) δομικών έργων. Απαιτούν όμως ιδιαίτερη προσοχή:
   α) Οι περιπτώσεις όπου η καμπύλη των καθιζήσεων παρουσιάζει “κύρτωση”.
   β) Η πιθανή ανάπτυξη οριζόντιων μετατοπίσεων πεδίων.
   γ) Η περίπτωση των ανοιμαγοένων εδαφικών απόθεσεων, κατ’ έκταση και σε βάθος.

3) Η θέωρηση της αλληλεπίδρασης εδάφους – κατασκευής οδηγεί σε πειραματικές εκτιμήσεις καθιζήσεων, στροφών κλπ. Θα πρέπει να εφαρμόζεται κατά τη μελέτη αξιόλογων έργων, ή ακόμη κατά τη διερεύνηση οικονομικών λύσεων από απόδειξες θεμελιώσεως σε συνήθη έργα.

4) Η εκτίμηση της επιδράσης των μετατοπίσεων των θεμελιώσεων των βάθρων στην ανωδομή των γεφυρών μπορεί να βασισθεί σε συστάσεις που έχουν ως βάση πραγματικές καταγραφές της συμπεριφοράς των γεφυρών. Η μεθοδολογία αυτή αποτελεί σύγχρονο και αξιόπιστο τρόπο για τις καθορισμούς των μέγιστων ανεκτικών ορίων μετατοπίσεων στη φάση λειτουργίας των γεφυρών.

5) Κατά την περίπτωση της εκτίμησης της επικινδυνότητας των κτιρίων λόγω διανοίξεως ανράγγων παρατηρούνται ότι:
   α) Η περιοχή κύρτωσης της ελεύθερης επιφάνειας των εδαφών αποτελεί την πλέον επικινδυνή ζώνη.
   β) Η επιδράση των οριζόντιων αντιχωμάτων παραμορφώσεων στη ζώνη αυτή είναι σημαντική.
   γ) Η συνεκτίμηση της ακμάμας του κτιρίου, καθώς και άλλων παραγόντων, μείνει γενικά τόσο το μέγεθος των οριζόντιων παραμορφώσεων, όσο και το λόγο της σχετικής μετατόπισης. Οι προτάσεις όμως των Potts-Addenbrooke (1972) και Franzius- Potts–Burland (2006) αποτελούν αξιόλογη συμβολή (για εδαφικές συνήθεις ανάλογες προς την άργιλο του Λονδίνου).
   δ) Στις ανωτέρω προτάσεις, όπως και για την περίπτωση αλλούθρου σε χαμηλές συνθήκες, για την εκτίμηση της Επικινδυνότητας των κτιρίων συστάσεων των τοίχων συστατικών των Σκυρός, Βουλαρδο-διάλεξη παρουσιάστηκε, Απριλίου Έγιστων της Πειραματών και της Σκυρός – Wroth (1974), με λόγο E/G = 12.5.
   ε) Για την περίπτωση κτιρίων από Ωπλισμένο Σκυρό-δέμα:
      ii) Πλέον δόκιμος τρόπος στην περίπτωση αυτή οποτέλει η αναλύση με αλληλεπίδραση εδάφιων – κατασκευής.

Διάλεξη
Καθηγητή Αntonio Gens
Technical University of Catalonia, Barcelona, Spain
Soil-environment interactions in geotechnical engineering
(2007 Rankine Lecture)

Η διάλεξη παρουσιάστηκε την Πέμπτη 17 Απριλίου 2008 στην Αίθουσα Εκθέσεων του Κτηρίου Διοίκησης του Εθνικού Μετσοβίου Πολυτεχνείου, στο Ζωγράφου. Στη συνέχεια παρουσιάζεται περίληψη της.

The range of problems that geotechnical engineers must face is increasing in scope and complexity. Some examples are the collapse of unsaturated soils, foundations on expansive clays, tunnelling in sulphate bearing materials, control of subsidence due to oil or gas extraction, and containment of toxic or hazardous waste. In addition, potential climate change may pose new problems in areas such as slope stability or permafrost thawing as well as placing new emphasis on topics such as radioactive waste disposal or deep CO2 sequestration. Classical saturated Soil Mechanics is often insufficient to provide the understanding and tools to tackle these issues effectively.

In the lecture, a number of developments incorporating the effects of new phenomena and new variables on the behaviour of soils were described and discussed. Recent developments in Unsaturated Soil Mechanics were reviewed first. It was shown that they provide a consistent framework for understanding the engineering behaviour of unsaturated soils and the effects of suction and moisture changes. Building on those developments, soil behaviour was further explored by considering the effect of high and low temperatures as well as of chemical variables. The resulting generalised view of soil behaviour was then applied in the analysis of field situations.

The lecture presented documented case histories that demonstrate the relevance and implications of the developments described for geotechnical engineering practice.
International NATM Engineer University Course

1st October 2008 – 27th June 2010

Graz & Leoben, Styria, Austria

Organizer: Graz Univ. of Technology, and Univ. of Leoben
Contact Person
Mrs Dagmar Ritter
Inst. für Felsmechanik und Tunnelbau
Technische Univ. Graz
Rechbauerstr. 12
A-8010 Graz, AUSTRIA
Telephone: (+43)316/8738114
Fax: (+43)316/8738618
E-mail: NATM@tugraz.a

The continuously increasing worldwide demand for qualified tunnel engineers cannot be covered by the standard education at universities.

The University course aims at increasing the skills of the participants in the fields of geotechnical engineering and tunnelling, with an emphasis on the "New Austrian Tunneling Method" (NATM). The degree holders shall be enabled to accomplish tunnelling projects on their own in the face of geotechnical, structural, organizational, contractual and economic needs according to the latest state of the art.

The Course addresses civil engineers, geotechnical engineers and engineering geologists who do have a distinctive technical education and aim at a specialization in tunnelling.

Future fields of work may be planning, design and consulting of underground projects for engineering offices, or construction management for contractors and owners.

The University Course lasts 4 semesters and will take place between April 2009 and October 2010. Registration will be open from July 1st 2008.

Master on Advanced Studies (MAS) on Tunnelling
August 2008 to April 2009
EPFL – Switzerland

Organizer: Swiss Federal Institute of Technology, Lausanne
Contact Information:
MAS Tunnelling
EPFL – LMR
Station 18
CH-1015 Lausanne, SWITZERLAND

The application for the 2008-2009 MAS on tunnelling can be send back until June 2008.

Master of Advanced Studies (MAS) on Tunnelling at EPFL is an international advanced training program, jointly organized by the Swiss Federal Institute of Technology Lausanne (Ecole Polytechnique Fédérale de Lausanne, EPFL) and the International Tunnelling and Underground Space Association (ITA).
INTERNATIONAL SYMPOSIUM
GROUND ANCHORS
Limelette test field results
14 May 2008, Brussels, BELGIUM
www.bgqg-qbms.be
www.wtcb.be/go/anchorsymposium

Ground anchors have been used for several decades to anchor retaining walls and submerged structures, to stabilise slopes, quay walls, tunnel faces.

The originating installation techniques and the used material and tools are in general well known. However, this is less the case with alternatives and new anchoring systems that have more recently appeared on the market. As a consequence, current design rules are in general not adapted to these new developments.

Besides this market evolution, Belgium had no geotechnical standards in the past, which has resulted in the integration of different design and test methodologies, mostly based on French and German standards or documents, in the project specifications of different owners.

As European standardisation is fully developing, and because the Belgian Building Research Institute (BBRI-CSTC-WTCB) is co-ordinating the establishment of the national annex of the Eurocode 7 in Belgium, it identified the need to take the initiative to organise a national research project on Ground Anchors.

The research programme was initiated by the end of 2004, and is financially supported by the Belgian Federal Public Service “Economy” and the Belgian Normalisation Institute. The project is guided by an interprofessional Working Group under supervision of the project partners K.U.Leuven (Prof. J. Maertens) and UCL (Prof. A. Holeynan).

Backbone of the research project is the extended real scale load test campaign on approximately 50 ground anchors performed at the proof station of the BBRI in Limelette.

Different ground anchor systems were tested to failure in the second half of 2006, in different soil layers encountered at the test site : silt, clayey sand with silex stones and tertiary Bruxellian sand. Many parameters have been integrated in this extended test campaign, a.o. maintained load testing versus cyclic testing, diameter of the boring tools...

An important added value is the excavation of approximately 30 of these tested anchors in order to observe their dimensions and to analyse their influence on the results obtained during the static load tests.

During this symposium the various aspects of the extended load test campaign in Limelette (B) will be reviewed : soil investigation, anchor installation methods, load testing and interpretation, as well as observations related to the excavated anchors. Suggestions for an approach to design and test ground anchors in Belgium following the Eurocode 7 principles will be put forward.

Moreover attention will be paid to the experience with ground anchors of three main organisations on the Belgian building market: Tuc Rail, the Federal Public Buildings Service, and the Ministry of the Flemish community.

Finally three contributions from neighbouring countries (NL, F & DE) will deal with developments in anchoring techniques and design approaches in their country and/or in Europe.

Information :

BBRI
Carine Godard
International Conference On Geotechnical And Highway Engineering
Advancement in Geotechnical And Highway Engineering

GEOTROPIKA 2008

26-27 May 2008, Kuala Lumpur, Malaysia
seminar.spaceutm.edu.my/geotropika2008

International Conference on Geotechnical and Highway Engineering GEOTROPIKA 2008 will be held on 26-27 May 2008 at Pan Pacific Hotel, Kuala Lumpur, Malaysia. The Conference will be organized by Universiti Teknologi Malaysia (UTM) and supported by Institute of Quarrying Malaysia, Institution of Engineers Malaysia (IEM) and Public Works Department, Malaysia.

The International Conference in Geotechnical and Highway Engineering, GEOTROPIKA 2008 is aimed to provide opportunities for participants to exchange ideas and experiences via technical papers and discussions on practical applications to generate better understanding amongst practicing Geotechnical and Highway engineers and other related professionals on the importance of their professions and the impact on construction industry.

Main Theme “Advancement in Geotechnical and Highway Engineering”.

Listed below are the topics to be discussed:

• Performance Prediction of Geotechnics and Highway Constructions
• Construction of Roads over Problematic Soils
• Soils Improvement, Stabilization and Reclamation
• Soil and Rock Slope Failures and Remedial Measures
• Innovation on Highway Construction and Pavement Materials
• Foundation Engineering
• Geological and Rock Engineering
• Other Related Topics

Conference Objective

Geotechnical and Highway engineers are always faced with problems related to the performance prediction of constructions as well as the diagnostic of past failures. Therefore the conference will be held with the following objectives:

• To provide opportunities to interact with world leading figures in geotechnical and highway engineering.
• To provide avenue to network and exchange ideas with stakeholders from industry.
• A chance to contribute and share knowledge, ideas and experiences on the practical applications in Geotechnical and Highway Engineering fields to enhance the prediction performance of construction and minimize or prevent future failures.

GEOTROPIKA 2008 Secretariat
School of Professional and Continuing Education (SPACE), Universiti Teknologi Malaysia, No. 40-50, Jalan Kebudayaan 1, Taman Universiti 81300 Skudai Johor Darul Takzim, MALAYSIA
Contact Person: Ms. Zarina / Ms. Hanim
Tel: +607-5218159/8170, Fax: +607-5211355
Website: http://seminar.spaceutm.edu.my/geotropika2008
Email: geotropika2008@spaceutm.edu.my

Workshop on Planning of Construction of Tunnels for High Speed Railway Connection AIS (AUSTRIA, ITALY, SLOVENIA)
May 30, 2008, Portorož, Slovenia
www.ita-slovenia.si

Sustainable development of European Union contains bold plans of construction of contemporary and energy saving economical railway connections that they include also construction of tunnels, very often. Planned are contemporary railway connections on directions north - south and east - west and some second development sections, so that construction of these connections in next decades won’t go around Republic of Slovenia.

Hilly and mountainous territory and other specialities, demand construction of tunnels often, which enables to keeping of natural and cultural heritages and possibility of development of more districts. That is why are Slovenian Society for Underground Structures and International Tunneling and Underground Space Association ITA-AITES organise International workshop on “Planning of construction of tunnels for high speed railway connection AIS (AUSTRIA, ITALY, SLOVENIA)”. It will light up more points of view of contemporary construction of railway tunnels and make transfer of newest technological solutions of construction possible for wider professional public. Lecturers, that they are internationally confessed experts for individual fields of construction of railway tunnels, will take part in foreseen debates between individual subjects in time of workshop actively.

For information regarding hotel accommodation and registration please contact:
Auditoria d.o.o.
Malnarjeva 10
SI-1000 Ljubljana, Slovenija
T: +386 1 2445 676
F: +386 1 2445 675
E: registration@auditoria.si
We were very glad to know about the decision of The International Society for Trenchless Technology (ISTT) to hold the International conference and exhibition NO-DIG 2008 in Moscow. The Russian Society for Trenchless Technologies was founded just several years ago but it has come a long way since that time.

I believe that this positive decision was influenced by both the progress of Russia in the application of trenchless technologies for placement, rehabilitation and repair of pipeline networks as well as by the potential of their development in Russia.

Being the Director General of Mosvodocanal I cannot avoid saying about our achievements in Moscow. New methods of construction, maintenance, rehabilitation and repair based on trenchless technologies, which until recently were considered to be a novelty, or a risky innovation, have now have become a part of our everyday work. And this is only the beginning. I am sure that this trend will continue to accelerate in Moscow, and will spread out to the other big cities of Russia and indeed to the other countries of former USSR.

On behalf of the Russian Society for Trenchless Technologies (RSTT) I have the honour to invite you to take part in the International NO-DIG Conference and Exhibition 2008 in Moscow. I am sure that participation in the conference and exhibition will be of great interest to you in your work to improve the quality of life for your clients and customers. We, for our part in the RSTT will do all that we can to make NO-DIG 2008 Moscow the world leading trenchless technology event for 2008.

Stanislav Khramenkov
President,
RSTT

Sessions
• New machines, techniques and developments for trenchless applications
• Trenchless techniques and practices of new installations
• Trenchless techniques for repair and renovation
• Micro-tunnelling – choices and practices
• Asset management and Life Cycle Analysis
• Utility corridor design construction and maintenance

For International support please contact:

The International Society for Trenchless Technology (ISTT)
Address: United Kingdom, LONDON, SW1X 8PS, 15 Belgrave Square
Phone: +44 (20) 7259 6755
Fax: +44 (20) 8850 7447
E-mail: info@istt.co.uk
Website: http://www.istt.com

Contact person:
Mr. John Castle
Executive Secretary
Phone: +44 (1608) 674 900 (dir.)
Fax: +44 1608 674 707
E-mail: mdwf17@dial.pipex.com

Geo-Environmental Engineering 2008
12-14 June 2008, Kyoto, Japan

The conference provides an international forum to discuss the problems facing the public and private sectors, the engineering and scientific communities, in terms of the waste management and remediation of contaminated lands, and related topics.

The conference venue is the Clock Tower Centennial Hall, which has come to symbolize Kyoto University.

The main goal of Geo-Environmental Engineering 2008 is to bring together international information, experience and research in order to give the conference participants a greater knowledge and ability to help revitalize their communities.

Conference Topics
• Waste / landfill management
• Landfill liner and cover
• Geosynthetics in geo-environmental engineering
• Geotechnical reuse of solid waste
• Contribution to global environmental problems
• Remediation of contaminated sites
• Environmental assessment
• Risk management
• Ground improvement technologies
• Lessons from the field and case studies

For more information Email:  inui@mbox.kudpc.kyoto-u.ac.jp


12th International Conference on Ground Penetrating Radar

GPR2008 seeks to showcase not only the best in terms of academic and applied papers and posters, but also the cutting edge of GPR and related technology. A full conference programme, technical exhibitions, practical demonstrations and poster sessions will combine to make GPR2008 a very successful conference.

“GPR2008 in Birmingham will include all the normal activities of a thoroughly professional academic conference. Supported by four GPR departments within the University of Birmingham and the GPR industry from both the UK and...
Europe it promises to be a very memorable event held in an exciting and vibrant city”

Dr Chris Rogers
Deputy Head of Civil Engineering, University of Birmingham
Co-Chairman GPR2008

Dr Richard J Chignell
Technical Director, PipeHawk plc
Co-Chairman GPR2008

“The University of Birmingham is one of Britain’s leading research institutions. We seek to promote academic excellence through research of the highest standard, partnered by strong links with industry and commerce to effectively transfer knowledge and technology to the wider community. The University enthusiastically supports the GPR2008 Conference and welcomes the opportunity to engage with such a prestigious international scientific organisation.”

Professor Mike Cruise
Pro-Vice-Chancellor (Research and Knowledge Transfer)

For information on registrations/bookings;
Rose Padmore
Tel: 01562 881013
Email: gpr2008@opening-doors.org.uk

Please send paper/abstract submissions to;
Michelle Web
Email: Michelle.Webb@pipehawk.com

For general enquiries or information on sponsorship/exhibitor packages please contact;
Kirsty Mack
Tel: 0121 414 7254
Email: k.a.mack@bham.ac.uk

GEO-ENVIRONMENT & LANDSCAPE EVOLUTION 2008
Third International Conference on Evaluation, Monitoring, Simulation, Management and Remediation of the Geological Environment and Landscape
16 - 18 June, 2008, The New Forest, UK
www.wessex.ac.uk/conferences/2008/geoenv08

This Conference aims to study the role of geosciences in environmental management. The geosciences understanding of natural systems and their process is of fundamental relevance for proper use of the land.

The study of the Earth’s materials and dynamic processes is essential for different fields of application, and to increase our knowledge of varying environmental problems, such as air, soil and water pollution, soil erosion, waste disposal, water quality, building materials and foundations, and many others. Understanding geologic processes is also essential to other fields of study, such as engineering, environmental management, land preservation and restoration, urban environment, land and ecosystem inventories and scenery assessments and landscaping.

The objective of the Meeting is to provide a forum for discussion of these topics among researchers, engineers, planners, decision-makers, consultants and other professionals interested in the contribution of geosciences and geo-information to environmental management, land preservation, remediation and sustainable development.

The first meeting of this successful conference series was held in Segovia, Spain in 2004 followed by one in Rhodes in 2006.

Topics:
- Environmental planning and management
- Environmental modelling
- Environmental monitoring
- Environmental pollution
- Remediation
- Climateological processes
- Geo-environment in urban settings
- Geo-ecology
- Hydrological studies
- Landscape analysis
- Natural hazards and risks
- Remote sensing
- Soil and rock properties
- Vulnerability studies
- Ecological restoration

Conference Secretariat:
Rachel Swinburn
Conference Manager
Geo-Environment & Landscape Evolution 2008
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA
Telephone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
Email: rswinburn@wessex.ac.uk

June 16 – 18, 2008, Chicago, Illinois, USA
www.ict.uiuc.edu/RILEM

This conference focuses on the causes, development, and maintenance / rehabilitation of pavement cracking, as well as techniques for abating pavement cracking. It will include contributions on theoretical modelling, experimental research, and case history studies on cracks in flexible, rigid, and composite pavements.

Topics:
- Initiation and propagation of cracks including modelling, calibration, and validation
- Top-down and bottom-up crack mechanisms
- Laboratory testing techniques and evaluation effectiveness
- In-situ experimental studies: field construction and rehabilitation techniques to inhibit pavement cracking
Debris and hyper-concentrated flows are among the most frequent and destructive of all water related processes. They mainly affect mountain areas in a wide range of morpho-climatic environments and in recent years have attracted more and more attention from the scientific and professional communities and concern from the public awareness, due to the increasing frequency with which they occur and the death toll they claim.

Higher population pressure on natural resources in hazard-prone areas and development of activities that have the potential to increase the magnitude of hazard call for improvements in the criteria used to identify debris flow risk areas and to design suitable prevention and mitigation measures.

The Conference will provide a forum for engineers, scientists and managers from laboratories, industries, governments and academia to interchange knowledge and expertise in the fields of erosion and slope instability, sediment transport, debris flow and debris flood data acquisition, debris flow phenomenology and laboratory tests, using the most advanced, state-of-the-art methodologies in monitoring, modelling, mechanics, hazard prediction and risk assessment.

Topics:
- Debris flow modelling
- Debris flow phenomenology
- Debris flow mobilisation
- Debris flow disaster mitigation
- Case studies
- Debris flow rheology and laboratory tests
- Debris flow and landslide phenomena
- Debris and hyper-concentrated flows
- Structures and their effects on debris flow
- Problems and mechanics of solid-liquid flows
- Shape failure and landslides

Conference Secretariat:
Rachel Swinburn
Conference Manager
Geo-Environment & Landscape Evolution 2008
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA
Telephone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
Email: rswinburn@wessex.ac.uk

Debris Flow 2008
Second International Conference on Debris Flow including all aspects of Debris Flow Monitoring, Modelling, Hazard Assessment, Mitigation Measures, Case Studies, and Extreme Events, Erosion, Slope Instability and Sediment Transport
17 - 19 June, 2008, The New Forest, UK
www.wessex.ac.uk/conferences/2008/debris08/index.html


10th International Symposium on Landslides and Engineered Slopes, June 30 to July 4 2008, Xi’an, China, www.landslide.iwhr.com

The 1st European Conference on Unsaturated Soils will be held in Durham, UK from 2-4th July 2008. The conference is intended to bring together researchers and practitioners involved in unsaturated soils in Europe. This is a time of increased activity in research and practice related to unsaturated soils within Europe (particularly through the MUSE project) and it will be an appropriate time to hold the first European conference. We would like to invite you to attend the conference and participate in the presentations and discussions.

The broad theme of the conference is the engineering behaviour of unsaturated soils and this covers a range of soil categories that includes expansive soils, collapsible soils, natural soils, compacted soils, residual soils, arid soils, pyroclastic soils, rockfill materials and fractured rocks. Papers are solicited under specific sub-themes including but not necessarily limited to the following:

- **Advances in Testing Techniques** based on new or improved methods for measuring/controling suction and determining the properties of unsaturated soils in the laboratory or in the field. These could include flow, mechanical, thermal or chemical properties.

- **Engineering Behaviour** of unsaturated soil observed during high quality laboratory testing with measurement/control of suction and during field characterization campaigns for the in-situ measurement of suction and other unsaturated soil parameters.

- **Constitutive Modelling** of deformation, water retention, permeability and chemo-osmotic processes in unsaturated soil. Formulations of coupled thermo-hydro-chemical constitutive models based on generalized definitions of stress and strains are particularly welcome.

- **Numerical Modelling** of boundary value problems in unsaturated soil by using analytical solutions or computational methods. Contributions are welcome on the development of specific computational algorithms relevant to unsaturated soils including, for example, integrators of complex constitutive relationship, solvers of large algebraic systems and techniques dealing with strain-localization.

- **Case Studies** involving monitoring of suction and other aspects of engineering or geo-environmental behaviour. These include classical applications such as foundations, road pavements, slopes, embankments, dams, retaining structures, waste disposal and pollutant transport as well as emerging applications of unsaturated soil mechanics like the underground storage of carbon dioxide, gas release from ocean seabed and enhanced oil recovery.

Contact by email at e-unsat@durham.ac.uk.

**ACADEMIC SECRETARIAT**
Dr David Toll: d.g.toll@durham.ac.uk

**ON-SITE SECRETARIAT**
Dr Charles Augarde
Email: charles.augarde@durham.ac.uk
Tel: (+44/0) 191 334 2504

South Road
Durham, DH1 3LE, UK
Fax: (+44/0) 191 334 2407

2008 Seismic Engineering International Conference commemorating the 1908 Messina and Reggio Calabria Earthquake (MERCEA’08), 8 – 11 July 2008, Reggio Calabria and Messina, Italy - www.mercea08.org

**GKK 08 - Geomechanics Colloquium Karlsruhe**
"Fundamentals and Applications of Geomechanics"
Scientific Symposium on the occasion of the 70th birthday of Prof. Dr.-Ing. Dr. h.c. Gerd Gudehus and the centenary of Baurat h.c. Prof. Dr. techn. Dr. mont. h.c. Leopold Müller
Karlsruhe, July 24-25, 2008
www.ibf.uni-karlsruhe.de/gkk08/gkk08_en.html

The Institute for Soil Mechanics and Rock Mechanics at the University of Karlsruhe (TH) honours two of its outstanding personalities.

In 1966, the university (at that time still Institute of technology) was able to enlist Professor Dr. Leopold Müller from Salzburg, the founder of the International Society for Rock Mechanics (ISRM), as honorary professor. Until his retirement in 1976 he headed the department of rock mechanics and has strongly influenced generations of students as academic teacher. With Prof. Leopold Müller we also commemorate a scientist who has established modern rock mechanics as an interdisciplinary science by his pathbreaking research work. In January 2008 he would be 100 years old.

In 1973, Professor Dr. Gerd Gudehus was appointed to the professorship for Soil Mechanics and Foundation Engineering. His competent familiarity with the fundamentals of theoretical mechanics soon resulted in the chair's international reputation as a centre for fundamental research in soil mechanics. Bridging the gap between soil mechanics, granular dynamics and physical chemistry has become the ultimate scientific challenge in the lifework of Prof. Gudehus. Over the years his research resulted in the emergence of a genuine "Karlsruhe school". Prof. Gudehus celebrates his 70th birthday in July 2008.

To mark these jubilees, you are invited to:

- Two days of scientific presentations from the areas of soil mechanics and rock mechanics, foundation engineering and rock engineering.
- the farewell lecture of Prof. Gudehus
- and an festive evening on July 24th, 2008

6th International Conference on Case Histories in Geotechnical Engineering and Symposium in Honor of Professor
International Summer School on Rockslides and Related Phenomena
20 August – 5 September 2008
Kokomeren River Valley, Kyrgyzstan

Rockslides (bedrock landslides) are among the most hazardous natural phenomena in mountainous regions. Though relatively rare, in comparison with landslides in non-lithified soils, they pose a threat to the vast areas due to enormous amount of rocks involved (sometimes up to billions of cubic meters in volume), their high mobility and ability to create large natural dams. The latter cause inundation of the valleys upstream and catastrophic outburst floods downstream. The aim of the International Summer School is to demonstrate various types of bedrock landslides and related phenomena to students and young landslide researchers. Annual training course includes field study of rockslides of different morphological types – long runout rock avalanches, intact and eroded rockslide dams. Various methods of rockslide identification, mapping, dating, detail study of their internal structure and of rockslide debris grain-size composition will be presented directly at the outcrops.

Numerous rockslides and rock avalanches of various types ranging from few millions to more than 1 billion cubic meters in volume are concentrated in the Kokomeren River valley (Central Tien Shan) within a limited area of about 40×40 km at a one-day trip distance from Bishkek city – capital of Kyrgyzstan. Most of them are located near a road along the Kokomeren River connecting villages in the Suusamyr and Djumgal depressions. Sites in tributary valleys without motorways require only a few hours of hiking to reach them. Due to arid climate and lack of vegetation rockslides’ morphological features are well preserved and clearly visible. Some of rockslide deposits are deeply dissected by erosion that allows studying their internal structure in detail. Along with the bedrock slope failures several very large landslides in non-lithified Neogene and Quaternary deposits can be found in the adjacent neotectonic depressions.

Besides rockslides and landslides, the study area is extremely rich in the expressive manifestations of Neotectonics and Quaternary tectonics such as active faults, one of which had been ruptured by 1992 M7.3 Suusamyr earthquake, and numerous examples of tilted and folded pre-Neogene planation surface.

The annual ICL International Summer School has been organized since 2006. It was attended by participants from Czech Republic, Italy, USA and Kyrgyzstan.

The 2008 ICL training course will be focused basically on the geological and geomorphic features typical of large rockslides in rugged terrain. It will be supplemented with the training course organized within the frames of the EU Specific Support Action "International Working Group on Natural Hazards in the Tien Shan" (NATASHA) focused more on the geophysical and geotechnical methods of rockslide field studies. These training courses will be carried out from August 20 till September 5, 2008.

The participation fee is 25 Euro/day, which includes all costs at the site: camping (in tents; participants will be asked to bring sleeping bags), food, local transportation, maps, guidebooks.

Organizers will provide help obtaining a visa if necessary. Participants should arrive to Bishkek connected with Moscow, London and Istanbul by direct daily flights. Arrival via Almaty is possible as well.

ICL Summer School guidebook can be downloaded from the International Consortium on Landslides homepage: http://icl.dpri.kyoto-u.ac.jp/Summer_School_Guidebook-2007-small.pdf (to diminish file size figures’ resolution was reduced to 75 dpi). The NATASHA Summer School Guidebook will be available in 2008 prior to the training course. Printed copies will be provided to the participants in Bishkek.

Those who are interested, please contact:
Alexander Strom
Institute of Geospheres Dynamics, Russian Academy of Sciences
Leninskiy Avenue, 38, Building 1, 119334, Moscow, Russia
e-mail: a.strom@g23.relcom.ru, a.strom2002@yahoo.co.uk
Abdrakhmatov Kanatbek
Institute of Seismology, National Academy of Science, Asanbay 52/1, 720060, Bishkek, Kyrgyzstan
e-mail: kanab53@rambler.ru

Welcome to the XII International Conference and Field Trip on Landslides (ICFL), the ALPPS 2008. Founded by members of the Japanese Landslide Society and the International Landslide Research Group, it has always been the intention of the ICFL to provide scientists, engineers and planners concerned with landslides with an environment, where they could discuss and exchange ideas about landslide processes, investigations and monitoring right in the field. After previously holding meetings in Japan, USA, Australia, New Zealand, Switzerland, Austria, Italy, Czechoslovakia, Spain, England, Poland and Norway, it is an honour for us to announce, that the XII ICFL, the ALPPS 2008, will again, be held in Switzerland. Through a variety of fieldtrips and a symposium, the ALPPS 2008 will use the surrounding Swiss Alps to provide an excellent environment to observe and discuss different slide phenomena.

Program
23.08.08 Opening of ALPPS 2008 in Bern, UNESCO World Heritage Site
24.08.08 Symposium at the Institute of Geography of the University of Bern
25.08.08 Excursion to the Landslides of Schwarzsee and Falli Höllli (Western Pre Alps, Canton Fribourg)
26.08.08 Excursion to the Landslides of La Frasse (Alpine Part of Canton Vaud) and Fully (Canton Valais)
27.08.08 Excursion to the Landslide of Randa (Mattetal, Canton Valais)
29.08.08 Excursion to the Ritigraben (Mattertal, Canton Valais) and Illgraben (Rhonetal, Canton Valais)

30.08.08 Excursion to the Gemmi, Alte-Gemmi Rock Glacier and the Ancient Landslides of Kandersteg (Bernese Oberland)

31.08.08 Excursion to the Lütschinentäler (Bernese Oberland) and Bäregg (Recent Rock Slide at Eiger Mountain)

01.09.08 Excursion to the Top of Europe: Jungfraujoch, UNESCO World Heritage Site (Engineering Geology in Permafrost)

02.09.08 Excursion to the Mountain Torrents of Brienz (Bernese Oberland). Closing of ALPPS 2008 in Bern

Contact:
Universität Bern
Geographisches Institut
Angewandte Geomorphologie und Naturrisiken
Hallerstrasse 12
CH-3012 Bern, Switzerland
Telephon: +41 31 631 47 18, Fax: +41 31 631 85 11

IDRC Davos 2008
International Disaster Reduction Conference
24 - 29 August 2008, DAVOS - Switzerland
from thoughts to action
www.idrc.info

We are pleased to invite you to the forthcoming International Disaster and Risk Conference IDRC Davos 2008. After the successful launching of the IDRC idea with the first global conference IDRC Davos 2006, held in Davos, Switzerland in late August 2006 and with the first regional conference hold in Harbin, China, the IDRC Harbin 2007 conference with the clear focus on China and South East Asia in late August 2007, we are back again in Davos, Switzerland, with its beautiful mountain surrounds, well known as host of the World Economic Forum WEF and place for visionary thinking and strategic discussions.

IDRC Davos 2008 will last from August 25th through August 29th, 2008 and will address global problems and attract participants from all over the globe. We expect more than 1300 participants from 130 countries.

The conference will take an integrated, multidisciplinary approach when addressing the different kinds of risks affecting society today, risks which might be far beyond any particular stakeholder’s capacity to control and that may adversely affect multiple parties across geographic borders, sectors and industries.

The IDRC organising committee anticipates a very successful and worthwhile conference and invites you to join this global gathering of leading experts from fields such as the natural, engineering and social sciences, government, the private sector, civil society, international organizations, NGOs and other risk management professions.

We look forward to welcoming you in Davos in August 2008!

Dr. Walter J. Ammann
Chairman IDRC Davos 2008

Conference Topics

The conference motto for IDRC Davos 2008 is: “Public-private partnership – Key for integral risk management and climate change adaptation”.

Thus underlining the importance of the private sector in disaster reduction and risk management. Solutions for an effective and efficient global disaster and risk management and for climate change adaptation need the involvement of all stakeholders of the public and the private sector and success will only be achieved if public and private institutions share their interest and knowledge and cooperate closely in financing common solutions, in developing common standards and – most important for success - in sharing the benefits.

IDRC Davos 2008 will address a broad range of risks and threats including natural hazards, risks of a technical, biological and chemical nature, but also climate change, pandemics and terrorism, with a clear focus on a consistent and systematic risk management approach, to be able to take effective and efficient decisions for disaster risk reduction and mitigation measures, which lead to transparent and comparable results in different risk situations.

A particular focus will be set on disaster risk management policies, climate change, critical infrastructures and pandemic diseases, always with the perspective of public-private partnership and sustainable development.

To continue the discussion on issues committed in the IDRC Davos 2006 Declaration, special cross-cutting themes will be addressed.

We highly appreciate abstracts which focus on lessons learned, case studies or best practice examples, in particular also abstracts on experiences with public-private-partnership projects and initiatives.

Cross-cutting themes:

A. urban risks
B. risk governance
C. risk dialogue
D. sustainable livelihood
E. gender and disasters
F. ethics in risk management
G. environmental vulnerability
H. regional aspects in disaster reduction and risk management

Specific conference Topics for IDRC Davos 2008:

Topic 1: Integral risk management

Incomplete understanding of the substantial medium and long term benefits of effective risk management methodologies and implementation strategies is the most serious impediment to overcoming disasters that cause death, loss of property, destruction of the environment, damage to critical infrastructure and disruption of livelihood.

Topic 2: Climate change mitigation and adaptation

A holistic approach to address the impact of climate change and other disasters in the lives and livelihoods especially of the poor and vulnerable communities requires the integration of climate change mitigation and adaptation and disaster risk management. To bridge the existing gaps between the climate change and disaster risk management groups is a major challenge.

Topic 3: Pandemics, diseases

A pandemic will likely occur simultaneously throughout individual countries and strike the whole world, preventing shifts of resources. A critical shortage of personnel in im-

TA ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ – Αρ. 12 - ΑΠΡΙΛΙΟΣ 2008 Σελίδα 27
important sectors is likely to occur. How can society deal with a situation, which may last for months? Business continuity planning becomes a major issue.

Topic 4: Critical infrastructures

Critical infrastructures are institutions, part of our built-environment or services, which are of essential importance to society. Single local events may lead to transboundary, progressive failures and produce in our complex, global world dramatic consequences for countries, business and societies, thus being extremely susceptible to terrorist threats.

IDRC
International Disaster and Risk Conference
Flüelastrasse 11
CH - 7260 Davos Dorf, Switzerland
e-mail: info@idrc.info
tel. +41 (81) 417 03 72, fax. +41 (81) 417 01 10

1st South American Symposium on Rock Excavations
1 - 2 September 2008
Santa Fé de Bogota, Colombia
www.scg.org.co

Contact Person:
Mr Juan Montero Olarte
Telephone: (+57)1/6910659
E-mail: juanmontero17@etb.net.co


19th European Young Geotechnical Engineers Conference
4 - 5 September 2008, Gyor, Hungary
Contact person: Dr Emoke Imre E-mail: issmge@ymmfk.szie.hu; imreemok@hotmail.com

Regional Conference on Geomorphology
Landslides, Floods and Global Environmental Change in Mountain Regions
Brasov, Romania, 15-25 September 2008

The Conference will promote exchange of ideas and methods for the investigation of landslides, floods, and associated geomorphic processes in connection with Global Environmental Change. Mountain Regions are very sensitive geosystems to Global Change. At the same time, they offer a variety of goods and services to mankind.

Conference Secretariat
Marta Jurchescu, Lidia Garbiz
Institute of Geography, Romanian Academy, 12, Dimitrie Racoviță Street Bucharest, 023993 ROMANIA Telephone: 004 021 313 59 90/ 314 37 48 Fax: 004 021 311 12 42 E-mail: geoinst@rmc.ro Website: www.geoinst.ro

1st Southern Hemisphere International Rock Mechanics Symposium
16 - 19 September 2008, Western Australia
www.shirms.com

SHIRMS 2008 will be an innovative symposium bringing together rock mechanics researchers and practitioners from the main areas of earth sciences to exchange ideas and
lessons learnt, and to develop further collaboration and synergies. This symposium will set the agenda for future research and operational directions, and ensure the ongoing viability of the mining and civil engineering industries.

The technical programme will feature papers discussing the latest developments and improvements from around the globe.

SHIRMS will feature four main technical streams including:

- Mining rock mechanics
- Civil rock mechanics
- Fundamental rock mechanics
- Petroleum rock mechanics

Contact Person:
Dr Yves Potvin
PO Box 3296, Nedlands, WA 6009
AUSTRALIA
Telephone: (+61)8/64883300
Fax: (+61)8/64881130
E-mail: acq@acq.uwa.edu.au

---

ΤΕΤΑΡΤΟ ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΔΙΑΧΕΙΡΙΣΗ ΚΑΙ ΒΕΛΤΙΩΣΗ ΠΑΡΑΚΤΙΩΝ ΖΩΝΩΝ
Μυτιλήνη, 23 – 27 Σεπτεμβρίου 2008

Το Εργαστήριο Λιμενικών Έργων του Ε.Μ.Π. με την υποστήριξη δημοσίων και ιδιωτικών φορέων, διοργανώνει το Τέταρτο Πανελλήνιο Συνέδριο για τη ΔΙΑΧΕΙΡΙΣΗ ΚΑΙ ΒΕΛΤΙΩΣΗ ΠΑΡΑΚΤΩΝ ΖΩΝΩΝ. Το Συνέδριο θα πραγματοποιηθεί στην Μυτιλήνη στις 23 - 27 Σεπτεμβρίου 2008.

Αντικείμενο του Συνεδρίου είναι η παρουσίαση των νεοτέρων εξελίξεων στο χώρο των επιστημών και των τεχνολογιών που σχετίζονται με τις παράκτιες ζώνες στην Ελλάδα και την Κύπρο, την έρευνα, τον σχεδιασμό, την προστασία, την μελέτη, την κατασκευή και την διαχείριση των παράκτιων έργων, καθώς επίσης και την εκτίμηση των περιβαλλοντικών επιπτώσεων στις παράκτιες ζώνες.

Το Συνέδριο απευθύνεται στους ερευνητές, μελετητές, κατασκευαστές, ΑΕΙ, δημόσιους φορείς, ΟΤΑ, Λιμενικά Ταμεία, περιβαλλοντικές οργανώσεις και υπηρεσίες που ενδιαφέρονται και ασχολούνται με τις παράκτιες ζώνες, τους οποίους και προσκαλεί να παρουσιάσουν το έργο και τις εμπειρίες τους.

ΘΕΜΑΤΟΛΟΓΙΑ ΣΥΝΕΔΡΙΟΥ

- Παράκτιο φυσικό και ανθρωπογενές περιβάλλον
- Παράκτια γεωμορφολογία και διακίνηση ιζύματος
- Νέες μέθοδοι και τεχνολογίες για την παρακολούθηση των παράκτιων ζώνων
- Επίδραση κλιματικών αλλαγών. Συνέπειες από την ανύψωση της θαλάσσιας στάθμης
- Έργα προστασίας ακτών
- Χωροθέτηση παράκτων έργων
- Οικολογική διαχείριση παράκτιων ζώνων
- Θεματικά πλάσματα και νομοθεσία Οικονομική και κοινωνική πολιτική. Διεθνείς τάσεις
- Παράκτιος τουρισμός
- Περιβαλλοντικές επιπτώσεις από την κατασκευή και λειτουργία παράκτιων έργων και την χρήση θαλάσσιων πόρων
- Παράκτια οικοσυστήματα
- Πολιοδομικός και χωροταξικός σχεδιασμός παράκτιων ζώνων
- Αρχιτεκτονική παράκτιου μετώπου
- Προγραμματιζόμενα μείζωνα έργα στο θαλάσσιο μέτωπο

Θα παρουσιαστούν 58 εισηγήσεις και 4 προσκεκλημένες ομιλίες.

ΠΛΗΡΟΦΟΡΙΕΣ

Οι ενδιαφερόμενοι για περισσότερες πληροφορίες μπορούν να απευθυνθούν στο Εργαστήριο Λιμενικών Έργων ΕΜΠ. Τηλέφωνα: 210.7722367, 210.7722375, τομ. 210.7722368 (Ε. Αναστασάκη, Θ. Γιαντοφή, Β. Ζουκαλά), ηλ.δι. lhw@central.ntua.gr

The 12th International Conference of IACMAG - International Association for Computer Methods and Advances in Geomechanics, 1 - 6 October 2008, Goa, India


Despite the increasing level of understanding of landslide phenomenon and the recent scientific and technological developments in landslide forecasting, prevention and mitigation, landslides are still threat and continue to affect human life. Even in the early years of this new millennium, several large-scale landslides, such as those induced by the recent earthquakes in Pakistan and the rainfall-induced catastrophic landslide that occurred on Leyte Island in Philippines have devastated the lives and properties of large numbers of people.

The Asia-Pacific region is seriously affected by landslides. The combination of an extremely active but diverse tectonic setting, high rates of weathering, and abundant rainfall promotes an elevated level of natural landslide activity. Furthermore, the rapid growth of the population and development of infrastructure has led to an extreme vulnerability to landslides. For example, many parts of Japan experience many landslides. In 2004 an intraplate earthquake in Niigata prefecture triggered a high density of multiple landslides. In response, a concentrated program of mitigation and countermeasures had been undertaken to lessen the hazard in this area.

During its 45-year history the Japan Landslide Society has organized annual symposia on landslides in Japan and on landslide hazard management. Furthermore, the Society convened the International Conference and Field Workshop on Landslides (ICFL) in 1985, and in coordination with the Nepal Landslide Society, it co-hosted the “International Symposium on Landslide Hazards in Orogenic Zones, from the Himalaya to Island Arcs in Asia” in 2005 in Kathmandu, Nepal.

As global trends of climate change, environmental destruction and population explosion are likely to further increase the occurrence of landslide disasters, there is a pressing need to develop opportunities for the exchange between researchers, engineers and government personnel of the most up-to-date information on the nature of landslides and on techniques for their mitigation. In this regard, the Japan Landslide Society has decided to coordinate with the related organizations to convene an international conference. The aim is to provide an opportunity to present and exchange information on landslide hazard and management, with a particular focus on the Asia-Pacific Region. This conference will precede the First World Landslide Forum, Tokyo on 18-21 Nov. 2008.

OBJECTIVES

The conference is designed to provide a stimulating forum for geoscientists, engineers, programme managers, and other decision makers concerned with landslide hazards and their management.

It will provide a forum for landslide researchers in the international community to share knowledge and exchange ideas on how to undertake landslide hazard assessment; landslide movement forecasting and prediction; landslide management and landslide mitigation using state-of-the-art techniques.

KEY THEMES

1. Landslide mechanisms
2. Measurement, instrumentation, monitoring and modeling
3. Landslide hazard mapping
4. Countermeasure techniques for landslide stabilization
5. Non-structural measures and education on landslide problems

Contact Persons:

Prof. Dr. Toyohiko MIYAGI
E-mail: miyagi@izcc.tohoku-gakuin.ac.jp
Tel: +81-22-773-3505

Dr. Vishnu DANGOL
E-mail: vdangol@yahoo.com
Tel: +81-22-773-3509

Contact Address:
Tohoku Gakuin University
Miyagi Laboratory
2-1-1 Tenjinsawa, Izumi-ku
Sendai 981-3193, Japan
Fax: +81-22-375-1279


5th WBI-International Shortcourse
Rock Mechanics,
Stability and Design of Tunnels and Slopes
November 27 to 30, 2008
WBI, Aachen, Germany
www.wbionline.de

After four successful events in the past 4 years, we will organize our shortcourse in 2008 again.

Acknowledged experts in their field will
- share their knowledge with you,
- illustrate the basics of rock mechanics to you,
- demonstrate the application of the WBI-developed finite element computer codes for static and hydraulic analyses on the basis of case histories,
- present interesting case studies for tunnelling and construction in rock
during four consecutive days. There will be plenty of room for questions and discussion.

3rd International Conference on
GEOTECHNICAL & GEOENVIRONMENTAL ENGINEERING, ROCK MECHANICS & ENGINEERING GEOLOGY
“Recent Advances”
10 - 12 December 2008, Chiangmai, Thailand
www.cipremier.com/ciframeset.htm?index2.htm

In civil, geological, mining and petroleum engineering disciplines, the engineers face problems associated with geotechnical systems that are in or on jointed rock. Some examples for geotechnical systems are underground and surface excavations made for mineral extraction, hot dry rocks for geothermal energy extraction, underground fractured reservoirs for oil and gas recovery, hazardous waste isolation caverns, underground caverns for oil and gas storage, tunnels for hydropower and transport, foundations for various types of buildings, bridges and dams, and natural and man made slopes. In some of these rock engineering problems, the concerns are the stability and deformation of the rock masses. In some other cases, the fluid and heat flow, and transport through rock masses are of central importance. In a limited number of situations, notably the design of underground radioactive waste repositories, storage of liquefied natural gas or oil or geothermal energy recovery, coupled thermal, hydraulic, mechanical and chemical effects are of concern. Design and construction of the aforementioned geotechnical structures require a sound knowledge of rock mass mechanical, hydraulic and thermal behavior. Rock mass behaviors in turn depend on rock joint mechanical, hydraulic and thermal behaviors. The International
Conference on Rock Joints and Jointed Rock Masses along with pre-conference short courses/workshops, technical field trips and exhibits are planned to provide the state-of-the-art and the new developments on the aforementioned subject areas.

The conference and the related activities will be held in Tucson, Arizona, USA from 4th through 10th January, 2009. I would like to invite the educators, practitioners and researchers in geo-engineering who work in structural geology, Engineering Geology, rock mechanics and rock engineering disciplines associated with civil, geological, mining, petroleum, construction and environmental engineering projects to participate in the conference and other related activities, and to share their novel ideas, new developments, technologies, state-of-the-art practices and experiences. We expect you to benefit in your professional career from the knowledge gained through exchange of information and discussions that would take place at these gatherings.

A tentative list of the main sessions is given below. Other topics will be included based on the abstracts received. Attempts will be made to select a leading lecture for each session based on the quality of the submitted abstracts. These leading lectures will be named as special lectures. The three-day conference (January 7-9) will consist of a technical program of parallel sessions of Special & Regular Lectures.

- Origin and Morphology of Fractures
- In Situ Stress
- Applied Fracture Mechanics
- Geophysics Applications
- Fracture Geometry Characterization
- Joint Roughness
- Joint Aperture
- Physical Properties
- Mechanical Properties
- Thermal Properties
- Flow and Transport
- Chemical Properties
- Coupled Processes
- Dynamic Properties
- Rock Mass Classifications
- Rock Mass Surface Excavations
- Rock Mass Underground Openings
- Foundations
- Dams
- Tunnels and Shafts
- Geothermal Energy Production
- Oil and Gas Production
- Hazardous waste isolation
- Oil and Gas Storage
- Blasting and Rock Fragmentation
- Rock Mass Support
- Laboratory and Field Techniques
- Physical Modeling
- Numerical Modeling
- New Numerical Methods
- Application of Probability & Statistics
- Petroleum Applications
- Mining Applications
- Civil Projects

For inquiries please contact the following:

Prof. P.H.S.W. Kulatilake
Conference Chair

University of Arizona, USA
Tel: 1-520-621-6064, Fax: 1-520-621-8059
E-mail: kulatila@u.arizona.edu

Dr. Jinyong Park
Conference Secretary
Korea Institute of Nuclear Safety, Korea
Tel: 82-42-868-0797, Fax: 1-520-529-7116
E-mail: hjpark.ua@gmail.com

RGMA-09
International Symposium on Rock Mechanics and Geoenvironment in Mining and Allied Industries
12-14 February 2009, Varanasi, Uttar Pradesh, India
www.itbhu.ac.in/min/conferences

For more information contact:

Dr Sanjay Kumar Sharma
Convener RMGA-09
Dept of Mining Engineering, Inst. of Technology
Banaras Hindu Univ.
IND-221005 Varanasi, INDIA
Telephone: (+91)9450950078
Fax: (+91)542/2369434
E-mail: sksharma.min@itbhu.ac.in

25 –27 February 2009, Salt Lake City, Utah, USA
www.geoshow.info

At Geosynthetics 2009 you’ll explore important issues affecting the water resources, mining, construction, and regulatory communities in the US, Canadian and Mexican markets. As an engineer, environmental specialist, water or transportation regulator, you will have a menu of technical programs, workshops and courses to select from. You’ll walk away with hundreds of new ideas—from design and engineering strategies to cost-saving geosynthetics solutions. It’s everything you can use to grow your business.

Geosynthetics 2009
Industrial Fabrics Association International (IFAI)
Geosynthetic Materials Association (GMA)
1801 County Road B W
Roseville, MN 55114-4061 USA
+1 651 222 2508
800 225 4324 (U.S. & Canada)
Fax: +1 651 631 9334

Extra-terrestrial rock mechanics at SINOROCK 2009

Are you unworldly enough to tackle extra-terrestrial rock mechanics?

For almost 50 years now, the ISRM has studied rock mechanics on Earth – but do all the fundamentals that we have developed also apply on the planets?

Wanted: A theoretician to go through the fundamentals of rock mechanics and establish whether they all apply out of this world – and to give a report at the SINOROCK 2009 international ISRM symposium at the University of Hong Kong in May 2009. Hopefully, Newton’s Laws apply. What about poroelasticity? What about the Hoek-Brown failure criterion?

Volunteers please contact John Hudson at john.a.hudson@gmail.com

Conference Themes

A. Rock Mechanics and Engineering:
   · New ideas in geology & geophysics;
   · Earthquakes & other geological calamity;
   · Environment & rock or soil engineering;
   · Intelligent rock mechanics;
   · Numerical rock mechanics;
   · Experimental rock mechanics;
   · Analysis of the process of rock failure;
   · New techniques of design, construction & support in tunnels or large caverns;
   · Underground mining & subsurface storage of gas and oil;
   · Case studies or others in rock engineering;

B. Civil Engineering:
   · New ideas & new development of the plan of city construction;
   · Studies of base & ground foundation;
   · The construction of highway and road;
   · Researches & comparison between viaduct & subway;
   · New ideas, new techniques, new technologies of design & construction of civil engineering;
   · New building materials;
   · Environment & civil engineering;
   · Discuss of the art of the buildings at the beautiful Sanya;
   · Discuss of the plan of city construction at the beautiful Sanya;
   · Case studied or others in civil engineering;

Enquiries should be sent to: zhongqian.yu@hotmail.com, linym1234@yahoo.com.cn
Tel.: 86-24-83682448
Fax: 86-24-23915254
Mail address: Prof. Lin Yunmei
NDRM’2009 P.O. Box 265
College of Resources and Civil Engineering Northeastern University, Shenyang, Liaoning, P.R. China 110004
The mitigation of geohazards is an important problem in geotechnical engineering. Heavy rains, typhoons and earthquakes are the main causes of geohazards. Due to climate changes and extreme weather, geohazards are occurring around the world. It is critical to mitigation, therefore, to have an understanding of the mechanism of these geohazards which are brought about by various causes. Due to the limited experimental techniques available, simulation-based predictions, monitoring and the analyses of case records are playing increasingly important roles.

The Kansai branch of JGS (Japan Geotechnical Society) established the Technical Committee on the Mitigation of Geohazards in River Basins 2006 and has been doing site investigations on geohazards due to heavy rains and typhoons ever since. On the other hand, TC34 of ISSMGE has been working on prediction and simulation methods for geomechanics. In particular, TC34 focuses on analyzing unstable ground behavior, such as strain localization, which is a precursor to ground failure, liquefaction, landslides, seepage failures, etc.

The Kansai branch of JGS and TC34 of ISSMGE have decided to organize an international symposium on prediction and simulation methods for the mitigation of geohazards. The symposium will provide a forum for discussing new prediction and simulation methods for geohazards and for exchanging ideas and information of mutual interest. This symposium is being sponsored by the Japanese Geotechnical Society (Kansai branch), TC34 of ISSMGE and the TC34 supporting committee of JGS. The main theme of prediction and simulation methods for geohazard mitigation includes:

- Mechanisms of geohazards, namely, heavy rains, floods, typhoons, earthquakes, landslides, slope and snow slides, tsunamis, land subsidence, coastal erosion, etc.
- Numerical and analytical simulation methods for geohazards, including conventional and advanced methods, FDM, FEM, Extended FEM, DEM and SPH.
- Advanced constitutive modeling of geomaterials and numerical implementations and constitutive parameter determination using laboratory and field test results.
- Thermo-hydro-mechanical instabilities, namely, large deformations, strain localization, progressive failure, liquefaction, ground water flow analysis, the rapid flow of complex geofluids such as mud flow, etc.
- Monitoring and non-destructive investigation methods for geostuctures during floods, earthquakes, heavy rains, etc. and design methods.
- Evaluation of existing prediction methods, performance-based design methods aided by advanced numerical modeling, risk analysis and the management of mitigation programs.
- Case records of geohazards and mitigation projects

Information from:
Prof. F. Oka
Kyoto University, Department of Civil and Earth Resources Engineering
Nishikyo-ku, Kyoto Daigaku-katsura 4, C1 Bdg., Kyoto 615-8540, JAPAN

Tel. +81-75-383-3193, Fax. +81-75-383-3193
E-mail: foka@kambrock.kyoto-u.ac.jp

 nakisuna2.kuciv.kyoto-u.ac.jp/tc34/is-kyoto


The 3rd International Geotechnical Symposium (IGS2009) on Geotechnical Engineering for Disaster Prevention and Reduction
22-25 July 2009, Harbin, China

Contact person: Professor MC Zhao,
E-mail: maocai@mail.ru, zhao_maocai@sohu.com
Website: igs2009.hit.edu.cn

www.gigsa.org

Come to "The Fairest Cape In All The World" (Sir Francis Drake in 1580), and participate in a unique experience. GeoAfrica 2009 will present a forum for consulting engineers, manufacturers, installers and academics to exchange information about current and potential applications for geosynthetics in Africa.

This will be the first conference to be held under the auspices of the IGS in the region, and will present an opportunity to meet the top geosynthetics specialists and prospects on the continent. Every visitor to the exhibition floor will be a potential customer, and professionals seeking geosynthetics solutions to their challenges will attend each technical session. This will be the largest gathering of geosynthetics professionals seen in Africa to date.

The conference will include an exhibition for the specification and trade of geosynthetic products and technology to users throughout Africa, as well as those wishing to make an entry into the continent.

Details of the conference are currently being finalised. If you would like to participate in this major event and receive an invitation to submit a technical paper, please send an e-mail with your contact details to Kim Barnard at geo-

"Geosynthetics For Africa"

www.gigsa.org

TA NEA ΤΗΣ ΕΕΕΕΓΜ – Αρ. 12 – ΑΠΡΙΛΙΟΣ 2008 Σελίδα 34
texp@iafrica.com and we will put you on the conference mailing list. Visit www.gigsa.org for future updates.


EUROCK'2009
Rock Engineering in Difficult Ground Conditions - Soft Rocks and Karst
29-31 October 2009, Dubrovnik-Cavtat, Croatia

Contact Person:
Dr Ivan Vrkljan
Civil Engineering Inst. of Croatia
Janka Rakuse 1
HR-10000 Zagreb, CROATIA
Telephone: (+385)1/6125283
Fax: (+385)1/6125221
E-mail: ivan.vrkljan@igh.hr

IX International Conference on Geosynthetics, Brazil, 2010 - www.igsbrasil.org.br/icg2010
XVth European Conference on Soil Mechanics and Geotechnical Engineering, 12 – 15 September 2011, Athens, Greece.

The ISRM national Groups for China and Singapore warmly invite you to Beijing for the 12th ISRM International Congress on Rock Mechanics in 2011. The scheme for the ISRM 2011 Congress is "Harmonising Rock Mechanics and the Environment" to emphasize the critical roles of rock mechanics and rock engineering in sustainable development and environment preservation. In addition to the 4-day technical program, workshops, short courses, technical visits, exhibitions and social programs will be organised. Meetings and functions of ISRM Board, Council, Interest Groups and Commissions, and other ISRM related activities will also take place in conjunction with the Congress. We look forward to welcoming you to the ISRM 2011 Congress.

With the fastest growing economy and the largest population in the world, China’s economic and social growths require the development of resources and infrastructures. Rock mechanics research and rock engineering practice present unique opportunities as well as challenges to science and technology. The ISRM 2011 Congress in Beijing offers an excellent opportunity for the international rock mechanics and rock engineering community to exchange, to share, and to progress. The ISRM national Groups for China and Singapore pledge to do our utmost to make the ISRM 2011 Congress the most exciting congress. With the combined efforts and experiences of China and Singapore, and supports of other Asian countries, we can assure you that this will be the congress to long for and to be remembered for years.

The Congress will cover the entire scope of rock mechanics and rock engineering, with the emphasis on interfacing rock mechanics and rock engineering with the environment. The main topics include but not limited to the followings:

- Site investigation and field observation.
- Rock material and rock mass properties testing (laboratory and in situ).
- Analysis techniques and design methods, modeling and numerical methods.
- Information system, artificial intelligence and other advanced techniques.
- Rock engineering in hazardous geo-environments.
- Rock breakage and excavation techniques.
- Underground storage of petroleum, gas, CO2, and nuclear waste disposal.

Conference Secretariat:
Secretary General
Chinese Society for Rock Mechanics and Engineering (CSRME)
Beijing 100029 CHINA
Tel/Fax: +86-10-62008462
E-mail: secretariat@isrm2011.com
Website: http://www.isrm2011.com

www.isrm2011.com

The ISRM national Groups for China and Singapore warmly invite you to Beijing for the 12th ISRM International Congress on Rock Mechanics in 2011. The scheme for the ISRM 2011 Congress is "Harmonising Rock Mechanics and the Environment" to emphasize the critical roles of rock mechanics and rock engineering in sustainable development and environment preservation. In addition to the 4-day technical program, workshops, short courses, technical visits, exhibitions and social programs will be organised. Meetings and functions of ISRM Board, Council, Interest Groups and Commissions, and other ISRM related activities will also take place in conjunction with the Congress. We look forward to welcoming you to the ISRM 2011 Congress.

With the fastest growing economy and the largest population in the world, China’s economic and social growths require the development of resources and infrastructures. Rock mechanics research and rock engineering practice present unique opportunities as well as challenges to science and technology. The ISRM 2011 Congress in Beijing offers an excellent opportunity for the international rock mechanics and rock engineering community to exchange, to share, and to progress. The ISRM national Groups for China and Singapore pledge to do our utmost to make the ISRM 2011 Congress the most exciting congress. With the combined efforts and experiences of China and Singapore, and supports of other Asian countries, we can assure you that this will be the congress to long for and to be remembered for years.

The Congress will cover the entire scope of rock mechanics and rock engineering, with the emphasis on interfacing rock mechanics and rock engineering with the environment. The main topics include but not limited to the followings:

- Site investigation and field observation.
- Rock material and rock mass properties testing (laboratory and in situ).
- Analysis techniques and design methods, modeling and numerical methods.
- Information system, artificial intelligence and other advanced techniques.
- Rock engineering in hazardous geo-environments.
- Rock breakage and excavation techniques.
- Underground storage of petroleum, gas, CO2, and nuclear waste disposal.

Conference Secretariat:
Secretary General
Chinese Society for Rock Mechanics and Engineering (CSRME)
Beijing 100029 CHINA
Tel/Fax: +86-10-62008462
E-mail: secretariat@isrm2011.com
Website: http://www.isrm2011.com

www.isrm2011.com
Warsaw tower unveiled

UK-based Zaha Hadid Architects has unveiled its winning design for the Lilium Tower in Warsaw, Poland.

The 240 m high, 101200 m² tower for developers Lilium Polska, is a "light, transparent structure with a strong sense of identity and character", according to a spokesman for the architects.

It will feature an apartment hotel, residential apartments, spa facilities, underground retail area with an adjacent exterior mall, restaurant, and underground parking. On the ground floor, four separate lobbies provide access to the hotel, apartments, restaurant and delivery area.

A "low energy strategy" informs the design, which includes "low-energy services designed to cope with the extremes of the local climate", added the spokesman.

(INTernational Construction, March 5, 2008, Editor: Richard High)

Ολυμπιακές Εγκαταστάσεις Πεκίνου

Παραθέτουμε μια σειρά «φωτογραφιών» των εντυπωσιακών νέων αθλητικών εγκαταστάσεων του Πεκίνου:

Ολυμπιακό Στάδιο
Ολυμπιακό Κολυμβητήριο
Ground improvement is an established technique in foundation engineering. In recent decades, modern methods of ground improvement have utilised explosives, impact energy, thermal treatment of the soil, vacuum consolidation, vibratory compaction technologies, stabilization and solidification of soft soils, as well as combined systems of ingenious grouting systems and deep mixing technique. Internationally, deep mixing techniques are often the chosen method for dealing with increasingly-demanding foundation problems. Initial experiences, using inventive new developments of soft soil deep mixing technologies and various advanced high pressure mixing methods, have proved successful both onshore and offshore.

This publication illustrates a challenging example, sited in the Port of Antwerp, Belgium, of the design and construction of a large underwater embankment on very soft soil. This text will be a valuable reference case history for the geotechnical engineer, both from the academic’s as well as from the practitioner’s point of view.

(Taylor and Francis, 2008)
This work illustrates how the Analysis of Controlled Deformation in Rocks and Soils (ADECO-RS) is used in the design and the construction of tunnels.

The ADECO-RS approach makes a clear distinction between the design and the construction stages and allows reliable forecasts of construction times and costs to be made. It uses the advance core (the core of ground ahead of the face) as a structural tool for the long and short term stabilization of tunnels, after its rigidity has first been regulated using conservation techniques. Tunnels can consequently be driven in difficult stress-strain conditions to predetermined safety standards with operations industrialised and scheduled precisely.

Thanks to this approach design engineers have been able to employ industrial criteria in tunnel excavation, even under extremely difficult stress-strain conditions.

Written for: Practicing engineers, researchers and students

(Springer, May 2008)

Geotechnical Earthquake Engineering

Springer Series in Geomechanics and Geoenvironment

I. Towhata

This book presents all issues of earthquake geotechnical engineering in a comprehensive way. It summarizes the present knowledge on earthquake hazards and their causative mechanisms, experimental studies on nonlinear complex soil behaviour, an analysis to predict ground behaviour during earthquakes, field studies to determine nature of real ground as input data for analysis, and damage mitigation technologies. Information obtained from earthquake damage investigation (such as ground motion, landslides, earth pressure, fault action, or liquefaction) as well as data from laboratory tests and field investigation is supplied, together with exercises/questions.

Written for: Engineers, graduate students, and professionals in geotechnical engineering, civil engineering, earth sciences, soil and ground mechanics.

(Springer, April 2008)

Slope stability and erosion control: Ecotechnological solutions

Norris, J.E., Stokes, A., Mickovski, S.B., Cammeraat, E., van Beek, R., Nicoll, B.C., Achim, A., Editors

This book is designed to assist the civil and geotechnical engineer, geomorphologist, forester, landscape architect or ecologist in choosing ecotechnologi-
Blue Book - the complete ISRM Suggested Methods


The book was published by the ISRM Turkish National Group and can be purchased from them and also from the ISRM Secretariat (see Products and Publications on the website).
ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

INTERNATIONAL LANDSLIDE RESEARCH GROUP

http://ilrg.gndci.cnr.it

Κυκλοφόρησε το Τεύχος Volume 22, Digital Note 1, March 2008 του International Landslide Research Group Newslet-
ter.

www.geoengineer.org

Κυκλοφόρησε το Τεύχος #39 του Newsletter του Geoengine-
eer.org (Μάρτιος 2008) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωτεχνικής και ηχανικής. Υπενθυμίζε-
tαι ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).

www.geosyntheticssociety.org

International Society for Rock Mechanics

www.isrm.net

Κυκλοφόρησε το Τεύχος No. 1 - March 2008 του Newslet-
ter.