

Περού - Ισα



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Τα Νέα

44

της ΕΕΕΕΓΜ

ΠΡΟΣΚΛΗΣΗ ΤΑΚΤΙΚΗΣ ΓΕΝΙΚΗΣ ΣΥΝΕΛΕΥΣΗΣ

Καλούνται τα μέλη της Ελληνικής Επιστημονικής Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής να προσέλθουν στη Γενική Συνέλευση που θα γίνει την Δευτέρα 26 Μαρτίου 2012 και ώρα 7.00 μ.μ. στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών Ε.Μ.Π. στην Πολυτεχνειούπολη Ζωγράφου.

Σε περίπτωση που δεν επιτευχθή η απαιτούμενη απαρτία, η Γενική Συνέλευση θα γίνει την Δευτέρα 16 Απριλίου 2012 στον ίδιο χώρο και χρόνο, εφ' όσον υπάρξει απαρτία με συμμετοχή του ¼ των μελών που έχουν εκπληρώσει τις οικονομικές τους υποχρεώσεις (μέχρι και το 2010) προς την ΕΕΕΕΓΜ.

Σε περίπτωση που δεν επιτευχθή πάλι απαρτία, η Γενική Συνέλευση θα γίνει την **8η Μαΐου, ημέρα Τρίτη και ώρα 7.00 μ.μ.** στον ίδιο χώρο, οσαδήποτε οικονομικώς ως άνω ενήμερα μέλη και αν είναι παρόντα.

Τα θέματα της ημερήσιας διάταξης είναι :

1. Απολογισμός πεπραγμένων της Εκτελεστικής Επιτροπής από την τελευταία Γενική Συνέλευση της 21ης Δεκεμβρίου 2010 μέχρι σήμερα.
2. Οικονομικός απολογισμός των ετών 2010 και 2011.
3. Έκθεση Εξελεγκτικής Επιτροπής
4. Έγκριση απολογισμού πεπραγμένων και οικονομικών απολογισμών και απαλλαγή της Εκτελεστικής Επιτροπής από κάθε ευθύνη.
5. Διάφορες ανακοινώσεις.
6. Εκλογή νέας Εκτελεστικής Επιτροπής και Εξελεγκτικής Επιτροπής.

Αρ. 44 – ΑΠΡΙΛΙΟΣ 2012



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ΣΑΚΟΥΜΠΕΝΤΑ Ελένη – Πολιτικός Μηχανικός, M.Sc, Τμήμα Μελετών της ΕΓΝΑΤΙΑ ΟΔΟΣ Α.Ε.

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ΠΑΡΟΙΚΗΣ ΠΡΟΔΡΟΜΟΣ – Δρ. Πολιτικός Μηχανικός, Αναπληρωτής Καθηγητής στο Τμήμα Μηχανικών Αεροπορικών Εγκαταστάσεων (Πολιτικών Μηχανικών) Σχολής Ικάρων

Το άρθρο αυτό αποτελεί μια συνοπτική παρουσίαση της 6^{ης} Müller Lecture, η οποία παρουσιάστηκε από τον Nick Barton κατά την διάρκεια του 12th ISRM Congress που διεξήχθη στο Πεκίνο, Κίνα τον Οκτώβριο 2011 με την ευκαιρία της βράβευσης του ομιλητή με το The Müller Medal for 2011.

The 6th Müller Lecture

From Empiricism, Through Theory, To Problem Solving in Rock Engineering

Nick Barton, NB&A, Oslo, Norway

(Abridged by the author)

ABSTRACT

The behaviour of the jointed-and-faulted-anisotropic-water-bearing media that we call rock masses was an abiding pre-occupation of Leopold Müller. The author has been similarly pre-occupied. So starting with modest developments from tension-fractured physical models, and progressing to the real jointed and three-dimensional world in due course, a few of the numerous lessons learned and subsequently applied in rock engineering practice will be described. These include non-linear and block-size dependent shear strength, no actual cohesion, and the possibility of thermal over-closure if rock joints are rough. A six orders of magnitude rock quality Q-scale has proved essential. Discontinuous behaviour provides rich experiences for those who value reality, even when reality has to be simplified by some empiricism.

1. INTRODUCTION

The lessons learned during the development of the empirical parameters in the caption to Figure 1 on the previous page, which are now widely used in many countries, will be summarised in the following pages. Their application has been in widely diverse projects.



Figure 1. Confronted with this potentially unstable jointed rock slope, multiple reasons for the over-break and instability suggest themselves. There are clearly adverse values of JRC, JCS, and ϕ_r , and there are also adverse ratings of J_n , J_r , J_a (and J_w on occasion).

2. TWO-DIMENSIONAL ROCK MASSES SIMULATED WITH PHYSICAL AND NUMERICAL MODELS

The desire to model the behaviour of jointed rock slopes in late nineteen sixties Ph.D. studies at Imperial College led to tension-fracture models by the writer, and numerical mod-

elling developments (pre-μDEC) in the case of a student colleague Peter Cundall. The relative *inflexibility* and *flexibility* of the two approaches is readily imagined from Figure 2. The single numerical slope model demonstrates the influence of changed friction angles, and was reported some years later, in Cundall *et al.*, 1977 (1975 conference).

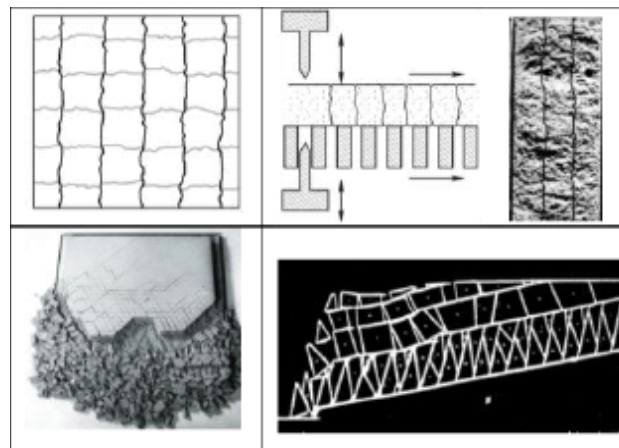


Figure 2. A study in contrasts: physical modelling using tension-fracture generation, and numerical modelling using μDEC: this example demonstrates a friction angle for the joints of $\phi = 20^\circ$.

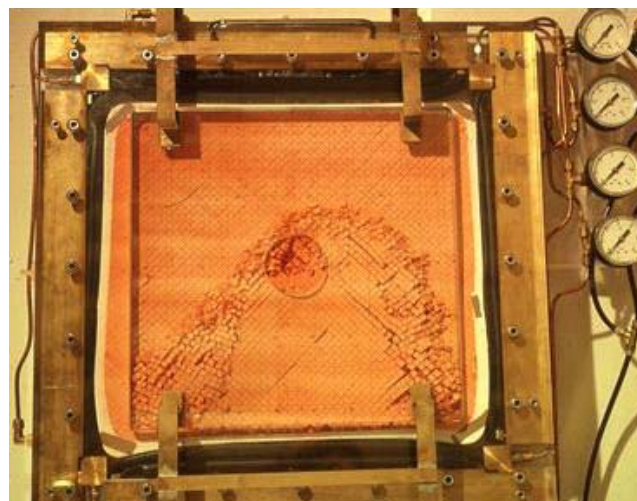
Despite the shortcomings of physical tension-fracture models, the writer nevertheless discovered that the peak shear strength of these rough and clearly unweathered tension fractures could be described by a simple relation involving the *uniaxial compression strength* (σ_c) of the model material (Barton, 1971). This was to prove useful.

$$\tau = \sigma_n \tan [20 \log (\sigma_c / \sigma_n) + 30^\circ] \quad (1)$$

This equation, and simple links to peak dilation angle, proved to be the unweathered and roughest “end – member” of the Barton and Choubey, 1977 equation for the peak shear strength of rock joints, which followed some years after the testing of tension fractures.

$$\tau = \sigma_n \tan [JRC \log (JCS / \sigma_n) + \phi_r^\circ] \quad (2)$$

Here the *joint roughness coefficient* (JRC), the *joint wall compression strength* (JCS) and the *residual friction angle* (ϕ_r) can each assume lower magnitudes, caused by roughness $JRC < 20$, and variable weathering ($JCS < \sigma_c$, and $\phi_r < \phi_b$). The first equation was based on *direct shear tests* of more than 200 artificial tension fracture samples, while the second equation was based on DST of 130 rock joint samples, some of them slightly weathered.



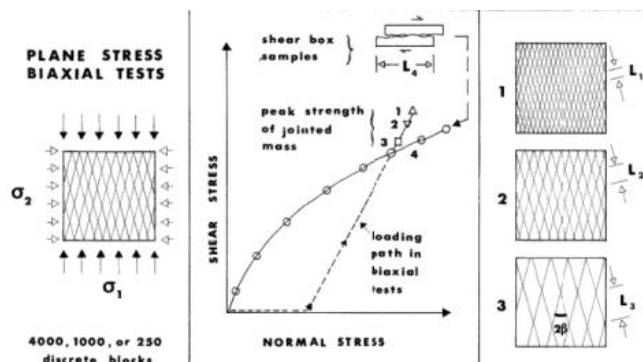


Figure 3. Biaxially loaded two-dimensional physical models with respectively 250, 1000 or 4000 discrete blocks helped to give clues about scale effects caused by different block sizes. These physical models were described by Barton and Hansteen, 1979, therefore predating UDEC-BB. It was noted that linear "stress-strain" curves resulted when loading 4000-blocks models in biaxial shear. Convex curves were registered with larger block sizes.

Physical models, each of 40,000 blocks, created for the rock slope stability studies by Barton, 1971, were followed some years later (Figure 4), by model studies of caverns for underground nuclear power plants, studying the generic effect of joint-set (fracture) orientation, anisotropy due to one dominant joint set, and horizontal stress variation in models with 20,000 blocks. This research was performed in NGI, Oslo. Barton and Hansteen, 1979 also compared the physic-cal "jointed" models with FEM continuum analyses.

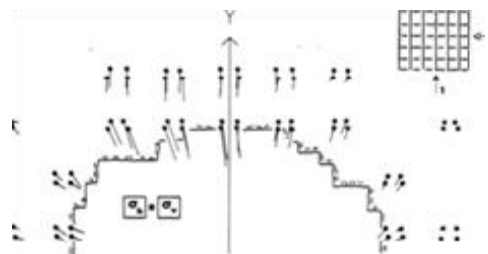
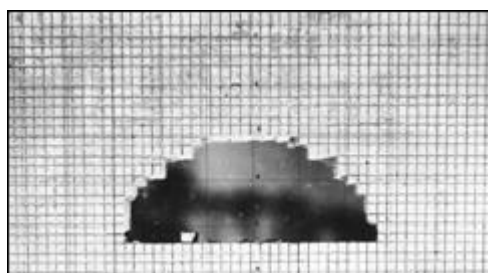


Figure 4. Tension-fracture models consisting of 20,000 blocks, with three different joint patterns, and two different levels of applied horizontal stress, demonstrated that excavation of large caverns near the surface could cause upward (heave) or downward (subsidence) of the overlying "rock mass". Joint orientation effects and horizontal stress effects were coupled.

Some ten years later, this physical model experience was put to the test in the modelling of the planned Gjøvik cavern of 62 m span, using UDEC-BB. Figure 5 shows the input data, including BB parameters, the joint geometry from observations in surrounding caverns, and application of a high horizontal stress based on local stress measurements.

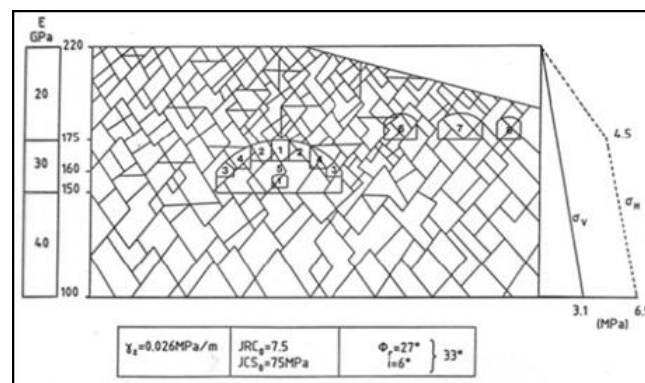


Figure 5. The UDEC-BB model shown above, gave a good (Class A) prediction of 7 to 9 mm down-ward movement. (Barton *et al.*, 1994). A view of the huge (stages 1 to 4) top-heading is shown.

3. SHEAR FAILURE AROUND MODEL OPENINGS

Joint oil-industry borehole stability studies performed at NGI in the late eighties, provided consistent evidence of shear failure development in the form of log-spiral surfaces, with physically measured shear displacements. The model studies involved drilling into anisotropically loaded model sandstones in a 0.5 x 0.5 x 0.5 m polyaxial cell. Drilling could be performed in various directions in relation to the three independent principal stress directions, by drilling through pre-welded holes in the flatjacks.



Figure 6. Log-spiral shearing with a 45° inclined hole drilled in the direction of σ_H into a stressed block of model sandstone, with principal stress ratios $\sigma_v = 1$, $\sigma_H = 0.8$, $\sigma_h = 0.4$. Addis *et al.*, 1990.

The log-spiral form of failure, Figure 6, has been seen when inspecting TBM headrace tunnels in massive sections of marble, and also in schists, where the estimated theoretical maximum tangential stress ($\sigma_\theta = 3\sigma_1 - \sigma_3$) was presumably

reaching the "limit" of $0.4-0.5 \times \text{UCS}$, i.e., increased SRF in the Q-system. The onset of stress-slabbing and even rock bursting is seen if the ratio of UCS/σ_0 continues to rise with depth of cover exceeding 1 and even 2 km. Norwegian road tunnels have exceeded 1 km depth several times, but reached 1.4 km at the Lærdal Tunnel of 24.5 km length, with three caverns of 30 m span at almost this depth. Stress failure may be extensional when in hard dilatant rocks.

4. MODELLING FAILURE IN A ROCK MASS

The tunnel break-out that developed when excavating the Canadian URL mine-by experimental tunnel by line-drilling, was in response to obliquely acting, high and strongly anisotropic stresses. It is shown in Figure 7. The accompanying shortcomings of continuum modelling with " c plus $\sigma_n \tan \phi$ " shear strength assumptions, as partially illustrated in the same Figure, should have alerted our profession for change already ten years ago.

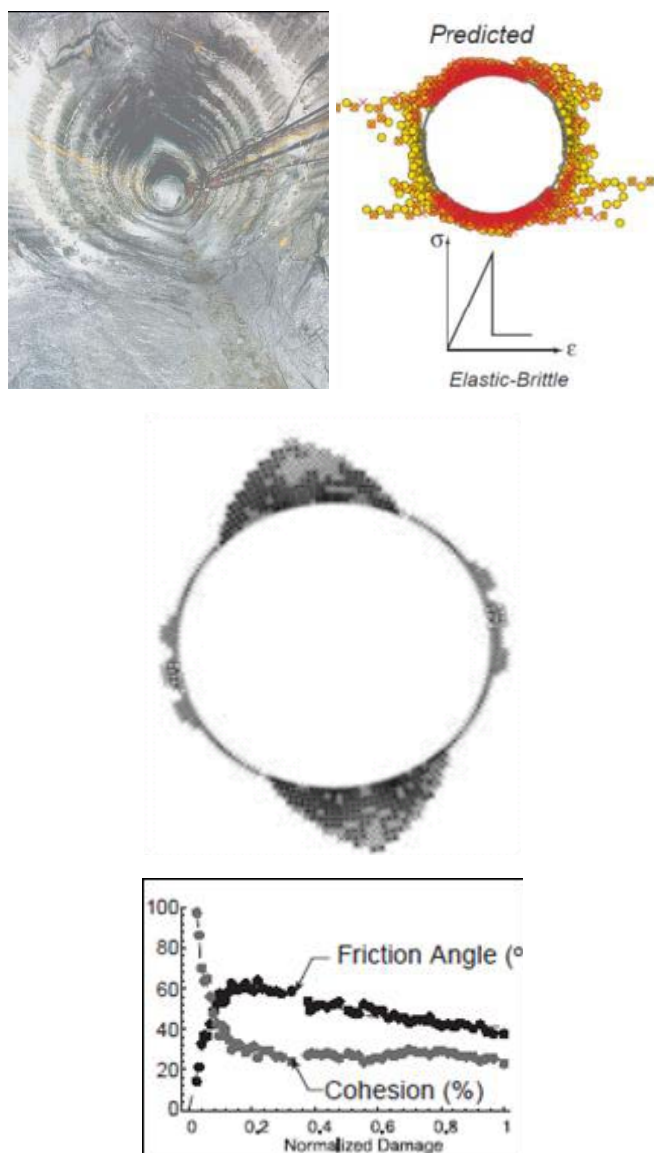


Figure 7. An important demonstration of unsuccessful modelling by "current methods", as given by Hajiabdomajid *et al.*, 2000. This is followed by their own more realistic degradation of cohesion and mobilisation of friction, which was applied in FLAC.

Attempts to model "break-out" phenomena such as those illustrated are not realistic with standard Mohr Coulomb or Hoek Brown failure criteria, because the *actual failure mode* is not following our long-standing expectation of " c plus σ_n

$\tan \phi$ " for the strength of rock masses. In fact Müller indirectly pointed this out already in 1966.

The intact rock fails at small strain (in tension if hard and dilatant), in shear (if less dilatant), followed by the mobilisation of friction along the new failure surfaces (if not ejected), followed by mobilisation of surrounding joint surfaces. This of course is a complicated test of our present numerical modelling capabilities, and complex-algebra input data for " c " and " ϕ " as in Table 1, cannot by any stretch of the imagination, solve this challenging problem.

Table 1. The remarkable complexity of the algebra for estimating c' and ϕ' with Hoek-Brown based formulations (equations 4 and 6) are contrasted with the simplicity of equations 3 and 5, derived by "splitting" the existing Q_c formula into two parts, as described in Barton, 2002. ($Q_c = Q \cdot \sigma_c/100$, with σ_c expressed in MPa).

FC	$\phi' \approx \tan^{-1} \left(\frac{J_r}{J_a} \times \frac{J_w}{1} \right)$	(3)
	$\phi' = a \sin \left[\frac{6am_b (s + m_b \sigma_{3n})^{a-1}}{2(1+a)(2+a) + 6am_b (s + m_b \sigma_{3n})^{a-1}} \right]$	(4)
CC	$c' \approx \left(\frac{RQD}{J_n} \times \frac{1}{SRF} \times \frac{\sigma_c}{100} \right)$	(5)
	$c' = \frac{\sigma_c \left[(1+2a)s + (1-a)m_b \sigma_{3n} \right] (s + m_b \sigma_{3n})^{a-1}}{(1+u)(2+a) \sqrt{1 + \left(6am_b (s + m_b \sigma_{3n})^{a-1} \right) / ((1+a)(2+a))}}$	(6)

Rock masses actually follow an even more complex progression to failure, as suggested in Barton and Pandey, 2011, who recently demonstrated the application of a similar " c then $\tan \phi$ " modelling approach, but applied it in FLAC 3D, for investigating the behaviour of multiple mine-stopes in India. A further break with convention was the application of peak " c " and peak " ϕ " estimates that were derived directly from mine-logged Q-parameters, using the CC and FC parameters suggested in Barton, 2002. For this method, an estimate of UCS is also required. CC (cohesive component) and FC (frictional component), Table 2, are derived from separate "halves" of the formula for $Q_c = Q \times \sigma_c / 100$.

Table 2. Illustration of parameters CC (seems to be MPa?) and FC° (friction angle), for a declining sequence of rock mass qualities, with simultaneously reducing σ_c (MPa). $VP \approx 3.5 + \log Q_c$ (km/s), and $E_m \approx 10 Q_c^{1/2}$ (GPa) were suggested in Barton, 2002.

RQD	J_n	J_r	J_a	J_w	SRF	Q	σ_c	Q_c	FC°	CC	V_p	E_m
100	2	2	1	1	1	100	100	100	63	50	5.5	46
90	9	1	1	1	1	10	100	10	45	10	4.5	22
60	12	1.5	2	0.66	1	2.5	50	1.25	26	2.5	3.6	11
30	15	1	4	0.66	2.5	0.1	33	0.04	9	0.3	2.1	3.5

The pairs of parameters RQD/ J_n and J_r/J_a are already being logged at a lot of tunnels and caverns, and also in mines, following the Potvin and Matthews method, and the subsequent Modified Stability Graph, now in common use for preliminary stope dimensioning in many countries. Relations between rock properties are shown in Figure 8.

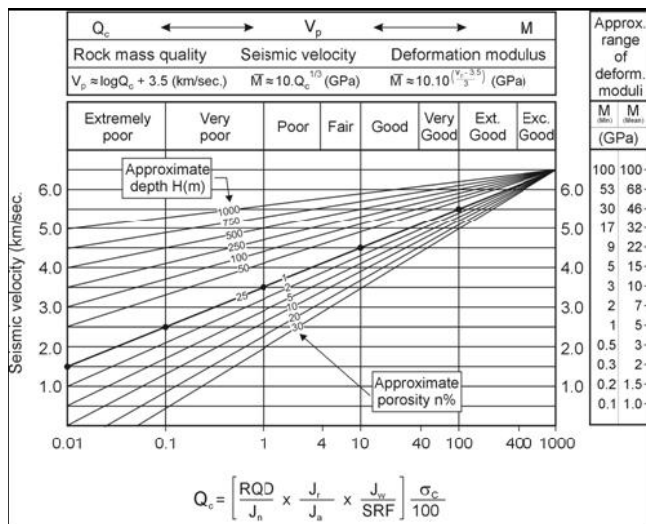


Figure 8. The integration of rock mass quality and seismic velocity, with adjustment (+ve) for depth (or stress level) and porosity (-ve), and rock strength. Estimates of static deformation modulus (right-hand column) should also be depth dependent. Barton, 1995.

5. MODELLING A COMPACTING RESERVOIR

Seabed subsidence above the Ekofisk reservoir resulted in the raising of all platforms by 6 m, and provision of a 100 m diameter protective wall, and final re-location of operations away from the centre of the 9 x 14 km field. Since 1986 compaction has at least doubled, despite extensive sea-water injection for pressure maintenance that also caused inevitable weakening of the chalk (Figures 9).



Figure 9. A view of the Ekofisk reservoir in the North Sea, where compaction of the jointed-chalk reservoir of 300 m thickness at 3 km depth caused increasing sea-bed subsidence that amounted to about 4 m when investigations began in 1985-1987. Now it is 10m.

The down-dip shearing that can occur despite one-dimensional strain, is a fundamental necessity for the continued conductivity of the dipping joints, as the matrix is of low permeability, and cannot otherwise be well drained (Figures 10 & 11).

During exploration, slickensided joints in the chalk were not observed. According to Philip's geologist (H. Farrell, pers. comm.), slickensiding was observed in some much later cored holes connected with the water-injection operations, after 1985. Production was causing joint shearing, and is presently a seemingly ignored part of 4D interpretation, by those focusing only on "continuum based" phenomena in producing reservoirs (Barton 2006).

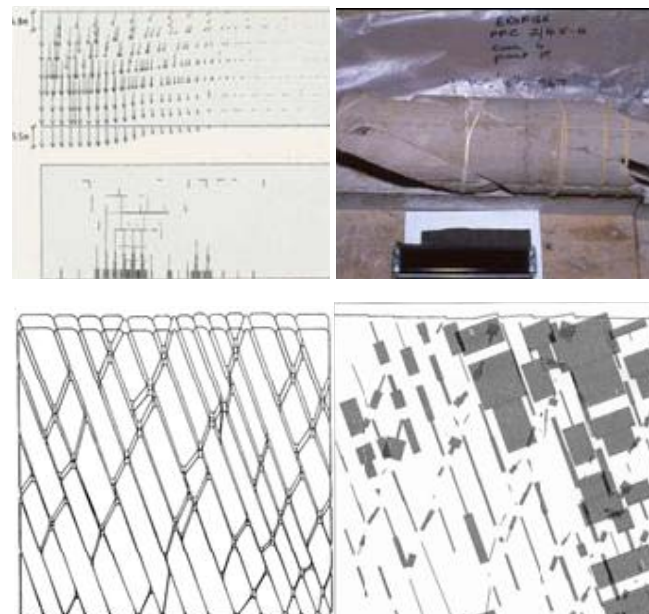


Figure 10. Top: Axi-symmetric UDEC-MC modelling of the ratio of subsidence/compaction (S/C) and two of the tested joint samples from Ekofisk. Bottom: UDEC-BB "uniaxial-strain" M-H modelling of a vertical 1.5x1.5 m 2D-element of jointed Ekofisk chalk, which had a porosity of 40%. Input data were obtained from JRC and JCS characterisation of numerous joint samples. Barton et al., 1986.

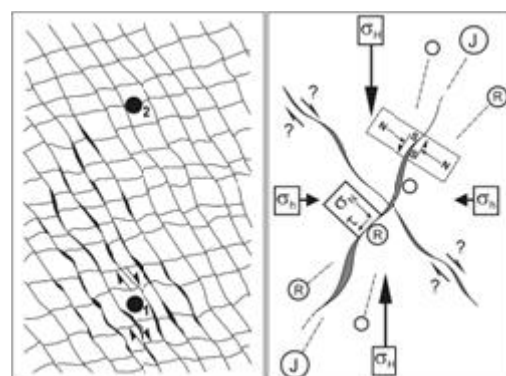


Figure 11. A scenario (exaggerated here) involving maintenance of permeability through shearing and slight dilation is also consistent with analysis of deep-well conductors and non-conductors, and should be relevant to continued production from weak reservoir rocks. Note the possibility of by-passing fluid with incorrect interpretation, as also in numerous geothermal projects.

6. SHEAR STRENGTH AT EXTREME STRESS LEVELS

In 1976, the author proposed a "critical state" concept for the shear strength of intact rock at high stress, which involved both the expectation and the actual horizontal orientation of the Mohr strength envelope. Recently, this concept has been applied to better define the curvature of intact rock strength envelopes. A few tests at low confining pressures provide all the data needed for extrapolation to high levels of confinement. The elegant Singh et al., 2011 shear strength criterion heralds a new era in rock mechanics understanding.

Since a blend of theory and empiricism has been promised in the title, with possible application to problem solving in rock engineering, the final figure to be presented will be of the tilt testing concept. This is at the other end of an extreme stress range, and has been widely applied (Figure 12).

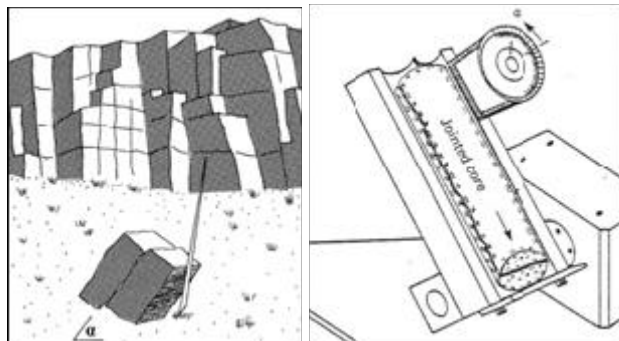


Figure 12. The tilt test result can be extrapolated from 0.001 to 10 MPa, and can be performed on samples of 10 cm to 1 m in size. The same method has also been used on 5m long as-built rockfills.

7. CONCLUSIONS

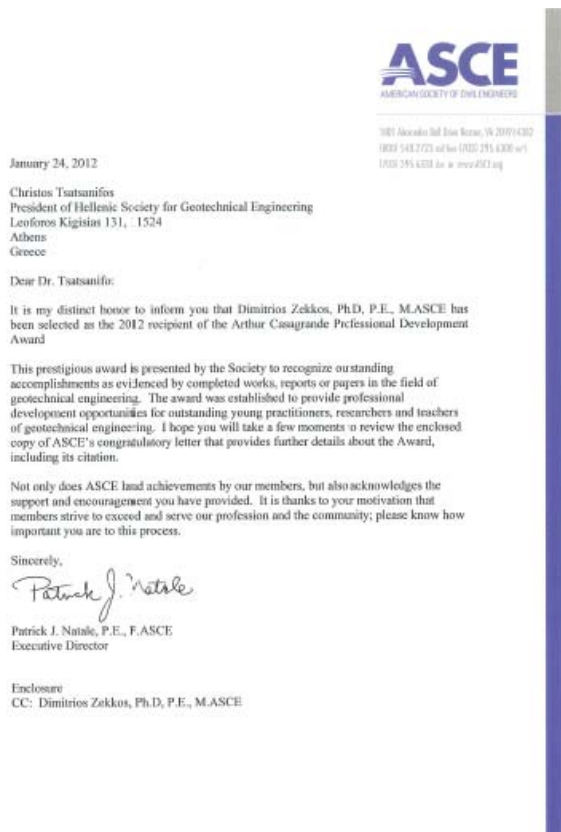
Those who restrict their rock mechanics experience to GSI-based isotropic continuum modelling, inevitably miss many exciting insights in the rewarding field of rock engineering, which is mostly executed in jointed, anisotropic, water-bearing rock masses, which usually vary from location to location. Complex algebra and multiple decimal places are irrelevant in such a variable medium.

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- (ISRM News Journal, Vol. 14, 2011, pp. 60-66, <http://www.isrm.net/qca/?id=206>)
- The video record of the lecture was made available to the ISRM by the NTNU and can be watched through the address <http://www.isrm.net/qca/index.php?id=1064>.
- A pdf of the presentation is also available through the address http://www.isrm.net/fotos/noticias/MULLER_LECTURE_2011_NBarton.pdf

ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΤΕΧΝΙΚΩΝ ΕΠΙΣΤΗΜΟΝΩΝ

**Βράβευση Δημήτρη Ζέκκου
με το Arthur Casagrande
Professional Developments Award 2012
της American Society of Civil Engineers**



Το μέλος της ΕΕΕΕΓΜ Δημήτρης Ζέκκος βραβεύτηκε από την American Society of Civil Engineers με το Arthur Casagrande Professional Developments Award για το 2012. Το βραβείο αυτό δίδεται σε αναγνώριση εξαιρετικών επιτευγμάτων που αποδεικνύονται από ολοκληρωμένα έργα, εκθέσεις ή άρθρα στον τομέα της γεωτεχνικής μηχανικής.

Θερμά συγχαρητήρια!



ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ ΓΙΑ ΓΕΩΤΕΧΝΙΚΟΥΣ ΜΗΧΑΝΙΚΟΥΣ



**DTP Terrassement
(BOUYGUES Construction Group)**

**is recruiting
Experienced Site Engineers and Project Directors
Positions based in France and Western Africa**

Description of the company

DTP Terrassement is a subsidiary of Bouygues Construction, operating in France and numerous other countries, specialised in earthworks and high-added value terrestrial infrastructures, as well as open-cast mining operations.

The company provides a comprehensive service: from participation in the design and financing of the projects that it undertakes, to the performance of complex works within an optimised deadline.

Projects undertaken cover the realisation of:

- roads, motorways and high-speed railway lines;
- airport hubs;
- industrial hubs;
- retaining walls;
- dams and water basins;
- waterway works;
- technical landfill centres;
- mining/quarrying works.

The company has a worldwide presence, both in France, where it is one of the industry leaders through its nationwide network organised into eight regional agencies, and internationally.

In 2011, DTP Terrassement completed projects worth more than €365m, over half of which were works abroad.

DTP Terrassement employs more than 2,200 staff, approximately 750 of whom are located in France.

Description of the position

- Experienced Site Engineer

A veritable linchpin of site operations, you will organise and monitor the construction process for one or more sites. You will be in ongoing contact with all key figures: clients, suppliers, subcontractors and support services. As an experienced manager, you will schedule human and material resources, and monitor and optimise the financial control for the site and procurement operations. Team management abilities are essential.

You must have a degree from an engineering school or have completed Site Engineer training, and you should ideally have five/ten years initial experience in an earthworks company.

You will have a meticulous approach, will be independent and will work well as part of a team.

Languages skills required: English, French, Spanish

- Project Director

Representing the company with regards to clients, the authorities, subcontractors and suppliers, the Project Director ensures that the teams are working in line with the contractual clauses governing the project.

You will confirm the objectives in terms of technical, financial and human resources choices, and supervise the performance of works down to the last detail: scheduling, technical options, etc.

You will create an appropriate team and, as coordinator, you will ensure that it remains cohesive and focussed.

You will ensure compliance with the QSE policy and take any steps necessary to maintain the highest possible standards.

You will be responsible for the financial management of your projects, validation of budgetary controls and reporting.

You will manage unforeseen situations such as serious accidents, strikes, protests, etc.

You must be a trained engineer, and you must have at least ten years' experience with an earthworks company.

You must be meticulous and methodical, possess a real ability to adapt, and have a taste for managing human relationships.

Languages skills required: English, French, Spanish

Positions available : As soon as possible

Contact : Applications should be sent to:

DTP TERRASSEMENT
Sylvia Leclercq
1, avenue Eugène Freyssinet
Saint-Quentin-en-Yvelines

or submitted by e-mail: s.leclercq@bouygues-construction.com



Ο συνάδελφος Άρης Ηλιόπουλος μας έστειλε την παρακάτω ανακοίνωση για προσφορά θέσης εργασίας:

Η μελετητική εταιρεία <http://www.vahanen.com> ψάχνει για Έλληνες μηχανικούς για να δουλέψουν στο Helsinki, Φινλανδία (min. 5 έτη).

Βασικό είναι να γνωρίζουν καλά Αγγλικά, να ασχολούνται με structural ή foundations και να έχουν προϋπηρεσία τουλάχιστον 3 έτη.

Μισθός σε επίπεδα Βόρειας Ευρώπης και αναλόγως προσόντων!

ΠΡΟΣΚΛΗΣΕΙΣ ΣΥΜΜΕΤΟΧΗΣ ΣΕ ΣΥΝΕΔΡΙΑ, ΟΜΑΔΕΣ ΕΡΓΑΣΙΑΣ Κ.ΛΠ. ΤΩΝ ΔΙΕΘΝΩΝ ΓΕΩΤΕΧΝΙΚΩΝ ΕΝΩΣΕΩΝ



International Society for Soil Mechanics and Geotechnical Engineering
Société Internationale de Mécanique des Sols et de la Géotechnique

Το 5ο Διεθνές Συνέδριο Νέων Γεωτεχνικών Μηχανικών θα διεξαχθεί στο Παρίσι στις 31 Αυγούστου και 1 Σεπτεμβρίου 2013, αμέσως πριν από την διεξαγωγή του 18ου Διεθνούς Συνεδρίου Εδαφομηχανικής και Γεωτεχνικής Μηχανικής.

Στα συνέδρια αυτά κάθε εθνική ένωση εκπροσωπείται επισήμως από δύο νέους γεωτεχνικούς μηχανικούς. Στο υπ' όψη συνέδριο δίδεται η δυνατότητα, πέραν των δύο επισήμων εκπροσώπων κάθε χώρας, να συμμετάσχουν και άλλοι νέοι γεωτεχνικοί μηχανικοί.

Στη συνέχεια παρατίθεται η πρόσκληση για την επιλογή των εκπροσώπων των εθνικών ενώσεων αλλά και των λοιπών ενδιαφερομένων να συμμετάσχουν στο συνέδριο.

Καλούμε τους νέους συναδέλφους να υποβάλουν στην γραμματεία της ΕΕΕΕΓΜ (geotech@central.ntua.gr), μέχρι την 30^η Νοεμβρίου 2012, περίληψη του άρθρου συμμετοχής τους, βάσει της οποίας θα γίνει η επιλογή των δύο εκπροσώπων της ΕΕΕΕΓΜ. Η ΕΕΕΕΓΜ θα καλύψει τα έξοδα των εκπροσώπων της.



5iYGEC'13 Invitation to Member Societies

We kindly request your Society to select and nominate two distinguished young geotechnical engineers (less than 35 years on December 31, 2013) with outstanding research/engineering projects to represent your Society at the Fifth International Young Geotechnical Engineering Conference (5iYGEC'13) from **August 31 to September 1, 2013**. The Conference venue is Ecole des Ponts ParisTech (see access map).

New: Upon the request from the ISSMGE, the 5iYGEC'13 will be open to other young participants, in addition to the official delegates. As a result, we also invite you to encourage other young geotechnical engineers of your Society to attend the Conference.

The conference will be held in two days (August 31 – September 1). There is no preference for themes. Sessions will be scheduled according to papers submitted. There will be one keynote lecture followed by parallel sessions.

Following the 5iYGEC, official delegates are invited to attend for free the 18th ICSMGE for the first two days (September 2-3).

With the help of the Student and Young Member Presidential Group (SYMPG), six delegates (by binomial) will be selected by the Organizing Committee to make reports on the sessions.

Two of them will be charged to present a general report at a plenary session of the 18th ICSMGE.

Important Dates:

The name of the author, paper title, and an abstract are to be sent to the 5iYGEC Organizing Committee before December 31, 2012.

Deadline for submission of full-length paper is March 31, 2013.

Acceptance is May 15, 2013.

All submission will be done through the conference website.

Registration:

Registration will take place through the conference website. A registration desk for participants will be open at the venue on August 31 from 8:00 to 12:00.

The registration fee is 280 Euros (banquet included) for official delegates and 310 Euros (banquet not included) for non official delegates, and must be paid before May 30, 2013. A receipt will be provided upon reception of your payment.

Accommodation:

A list of hotels will be provided to the participants on the conference website, and participants are free to make their choice. Note that accommodation is not included in the registration fee.

A 2-day pass transportation will be provided, allowing transportation between Paris and Ecole des Ponts ParisTech.

Visa:

Participants from countries requiring a visa to enter France are invited to contact the French Consulate for their visas application. Invitation letter can be provided to the registered delegates upon request.

Travel Instructions:

An access map to the conference venue can be found on the conference website.

Sincerely yours,

Prof. Yu-Jun Cui, March 9, 2012
Chairman





**ΠΡΟΣΚΛΗΣΗ ΣΥΜΜΕΤΟΧΗΣ ΣΤΗΝ
ISRM Technical Committee on Soft Rocks**

Από τον Πρόεδρο της Technical Committee on Soft Rocks
της ISRM λάβαμε την παρακάτω πρόσκληση:

Dear Dr. Tsatsanifos,

I would like to ask you in name of the Hellenic Society for Soil Mechanics and Geotechnical Engineering to please indicate names and email addresses of engineering geologists or geotechnical engineers who would like to join the ISRM Technical Committee on Soft Rocks and collaborate with the committee.

We are interested in the physical and mechanical properties of soft rocks (traditionally those rocks with a strength less than 25 MPa), but also with problems and solutions of workings on such rocks (like dams, tunnels, slopes, special foundations, etc.). In particular I would seek a specialist who also would be available to gather data on the subject and workings in your country.

I would thank you very much the indications.

Best regards,

Milton Kanji
Chairman, TC Soft Rocks

Όσοι εκ των συναδέλφων ενδιαφέρονται να πλαισιώσουν την επιτροπή παρακαλούνται να στείλουν στην γραμματεία της ΕΕΕΕΓΜ (geotech@central.ntua.gr) ηλ.μη. αναφέροντας το ενδιαφέρον τους και τα λεπτομερή στοιχεία επικοινωνίας τους.

ΠΡΟΣΦΟΡΑ ΥΠΟΤΡΟΦΙΩΝ ΣΕ ΓΕΩΤΕΧΝΙΚΟΥΣ ΕΠΙΣΤΗΜΟΝΕΣ



"GSI Fellowships for Students" Request for Proposals

The Geosynthetic Institute (GSI) is delighted to announce a worldwide call for requests-for-proposals (RFPs) focusing on innovative geosynthetics research and development projects. There will be multiple awards made, each for \$10,000 for the first year, and they are renewable for a second and third year up to a total amount of \$20,000 per student. It is important to note that students must have completed their candidacy examinations leading to a doctoral degree in engineering or science to be eligible. The proposals must be submitted in the following four page format (with no exceptions).

- Page 1 – Letter of recommendation from student's department head or advisor
- Page 2 – Title and detailed abstract of project
- Page 3 – Student's resume
- Page 4 – Documentation of completed candidacy examination

The RFPs for the 2012 - 2013 academic year must be submitted to both the undersigned by e-mail by June 15, 2012 and awards will be announced on, or before, July 15, 2012. Review of the proposals is by the nine-person Board of Directors of GSI. For information on the Geosynthetic Institute and past recipients, visit us at the following website: www.geosynthetic-institute.org/gsfellows.htm

Reported by Robert M. Koerner, Jamie R. Koerner, IGS members



Υποτροφίες Ιαπωνικής Κυβέρνησης

Υποτροφίες Monbukagakusho(MEXT)

Η Κυβέρνηση της Ιαπωνίας χορηγεί κάθε χρόνο υποτροφίες **Monbukagakusho(MEXT)** σε Έλληνες ερευνητές που επιθυμούν να συνεχίσουν μεταπτυχιακές σπουδές στην Ιαπωνία, για μια περίοδο ενάμισι ή δύο ετών από τον Απρίλιο ή τον Οκτώβριο.

Σύμφωνα με το καινούργιο πρόγραμμα υποτροφίας **Monbukagakusho (MEXT) για το 2013**, η ημερομηνία λήξης υποβολής αιτήσεων είναι: **31 Μαΐου 2012**.

Μπορείτε να δείτε με προσοχή, [τις αναλυτικές πληροφορίες](#), καθώς επίσης και να κατεβάσετε τις φόρμες ([application form](#), [study plan](#), [recommendation letter](#), [medical certificate](#)).

(<http://www.gr.emb-japan.go.jp/portal/gr/culture/scolership.htm>)

ΠΡΟΚΗΡΥΞΕΙΣ ΒΡΑΒΕΙΩΝ ΓΙΑ ΓΕΩΤΕΧΝΙΚΟΥΣ ΜΗΧΑΝΙΚΟΥΣ

2012 SHAMSHER PRAKASH ANNUAL PRIZE FOR EXCELLENCE IN THE PRACTICE OF GEOTECHNICAL ENGINEERING

Shamsher Prakash Foundation solicits nomination (no application) for the "2012 SHAMSHER PRAKASH PRIZE FOR EXCELLENCE IN THE PRACTICE OF GEOTECHNICAL ENGINEERING" for young persons (45 years) primarily from practicing engineers from all over the world. Nominations are invited so as to reach the Honorary Secretary on or before June 30, 2012. The candidates should be specialists in Geotechnical Engineering and/or Geotechnical Earthquake Engineering and it is necessary that they have significant independent contributions to practice and show promise of excellence. The Prize consists of US \$1100.00 and a plaque. The nominations may be made on plain paper. The age may be relaxed in exceptional cases at the discretion of the judging committee.

All nominations will be reviewed by a Judging Committee of International Experts from Canada, China, Hong Kong, and United States. The award will be announced by October 31, 2012. Suitable arrangements will be made for awarding the Prize at an appropriate ceremony in the country of residence of the winner.

Καλούνται οι συνάδελφοι που θεωρούν ότι εμπίπτουν στις προδιαγραφές του βραβείου να ενημερώσουν την ΕΕΕΕΓΜ το αργότερο μέχρι την 15^η Ιουνίου 2012.

Seismic response of historic monumental buildings in Turkey for different soil conditions

Την Δευτέρα 5 Μαρτίου 2012 παρουσιάσθηκε από τον Baki Ozturk, Δρ. Πολιτικό Μηχανικό, Associate Professor of Civil Engineering, Niğde University, Cappadocia, Turkey διάλεξη με τίτλο «Seismic response of historic monumental buildings in Turkey for different soil conditions».

This presentation focused on the investigation of seismic behavior of two monumental building constructed in historical Cappadocia region of Turkey. Both of the buildings were constructed on soft soil conditions. One of the buildings is located at the town of Ferteke which is two kilometers from the city of Nigde. It has been used as a worshipping temple since it was built in the year 1835. The other building, which was built in 1844, is located at the town of Konakli. It is 27 km. to the north-east of the city of Nigde. These two monumental buildings are suggested to be representative of many similar buildings which were built as worshipping temples during the same era in Turkey. Seismic behaviors of the monumental buildings are investigated using dynamic analysis procedures. Both of the buildings are subjected to ground motion records which were obtained during the recent earthquakes in Turkey. These ground motions were recorded during Ceyhan earthquake (1998) which occurred close to Nigde, Marmara earthquake (1999) and Duzce earthquake (1999). The dynamic analyses are conducted on the monumental buildings for the two cases of with wall and without wall which helps to consider the effect of structural walls on the seismic behavior of the buildings. In the light of the dynamic analyses results, expected levels of damage and the structural irregularities of the monumental buildings were presented.

Η παρουσίαση θα αναρτηθεί στην ιστοσελίδα της ΕΕΕΕΓΜ.



Η Ευστάθεια Φυσικών Πρανών και Ορυγμάτων σε Στιφρές Αργίλους

Την Δευτέρα 12 Μαρτίου 2012 παρουσιάσθηκε από τον συνάδελφο Γεώργιο Μπελόκα, Δρ. Πολιτικό Μηχανικό του Κέντρου Δομικών Ερευνών και Προτύπων ΔΕΗ διάλεξη με τίτλο «Η Ευστάθεια Φυσικών Πρανών και Ορυγμάτων σε Στιφρές Αργίλους».

Ο υπολογισμός της ευστάθειας των φυσικών πρανών και ορυγμάτων σε στιφρές και δομημένες αργίλους συνδέεται άρρηκτα με την επιλογή των παραμέτρων σχεδιασμού του εδαφικού υλικού. Η πιο διαδεδομένη μέθοδος ανάλυσης ευστάθειας πρανών είναι η μέθοδος οριακής ευστάθειας. Για την ανάλυση αυτή απαιτείται η εκτίμηση των παραμέτρων διατμητικής αντοχής, δηλαδή της συνοχής, c , και της γωνίας διατμητικής αντίστασης, ϕ . Βασικές καταστάσεις αστοχίας που αφορούν τα πρανή είναι οι αστοχίες πρώτης ενεργοποίησης.



Japan Association for Earthquake Engineering

**One Year after
the 2011 Great East Japan Earthquake**
- International Symposium on Engineering Lessons
Learned from the Giant Earthquake -
March 1-4, 2012, Kenchiku-kaikan, Tokyo, Japan

Ο συνάδελφος Γιώργος Γκαζέτας, Καθηγητής ΕΜΠ, συμμετείχε στο διεθνές συνέδριο με θέμα τον γιγαντιαίο σεισμό στην Ιαπωνία του 2011 και μας έστειλε το παρακάτω σημείωμα του Προέδρου του Συμποσίου, που παραπέμπει σε ιστοσελίδα με τα πρακτικά του.

Dear International Advisory Committee members,

cc: Professor Akira Wada, Chairman, International Advisory Committee

Thank you for your kind support to the International Symposium on Engineering Lessons Learned from the 2011 Great East Japan Earthquake which was successfully held on March 3 and 4. We had about 190 presentations and over 440 participants with about 140 overseas participants from 16 countries. The Organizing Committee members wish that this Symposium greatly contributed to sharing damage information and lessons learned from the recent earthquakes.

Since we put the Proceedings of the Symposium on the following web page, please visit it. All papers included in the Symposium Proceedings can be downloaded. Since this web site is open only for a couple of months, it is suggested to download necessary papers soon. Instead of downloading papers one by one basis, it is possible to download the whole Proceedings once.

<http://www.jaee.gr.jp/event/seminar2012/eqsympo/proceedings.html>

Once again thank you very much for your kind support to the Symposium.

Kazuhiko Kawashima
Symposium Chair
Professor, Tokyo Institute of Technology



ησης (first – time) και οι επανενεργοποιούμενες (reactivated) αστοχίες.

Η κατάλληλη επιλογή των παραμέτρων διατμητικής αντοχής είναι πολύ σημαντική για την ορθή ερμηνεία και αξιολόγηση των ενεργοποιούμενων κατολισθήσεων. Ειδικότερα, ένας βασικός παράγοντας που επηρεάζει την εξέλιξη της ευστάθειας ή την ενεργοποίηση των ολισθήσεων είναι η ψαθυρή συμπεριφορά των σπιφρών και δομημένων αργίλων. Σημαντική είναι και η συχνά αργή εκτόνωση των πιέσεων πόρων μέχρι την κατάσταση σταθερής ροής.

Οι αστοχίες πρώτης ενεργοποίησης περιλαμβάνουν συνήθως την κινητοποίηση της αντοχής πλήρους χαλάρωσης, μέσω του μηχανισμού προοδευτικής αστοχίας. Έγινε αναφορά στην κατόπιν θραύσης αντοχή (post – rupture strength), η οποία για το σύνηθες εύρος των τάσεων φαίνεται να προσεγγίζει την αντοχή πλήρους χαλάρωσης.

Οι επανενεργοποιούμενες αστοχίες περιλαμβάνουν συνήθως την κινητοποίηση της παραμένουσας αντοχής. Έγινε αναφορά στην παραμένουσα διατμητική αντοχή σε Ελληνικά εδαφικά υλικά και σύγκριση με τη διεθνή βιβλιογραφία.

Η παρουσίαση ολοκληρώθηκε με μια αναφορά στους συντελεστές σχεδιασμού βάσει Ευρωκώδικα και στις προσεγγίσεις από εθνικά πρότυπα για τις περιπτώσεις προοδευτικής αστοχίας και επανενεργοποιούμενων κατολισθήσεων.

Η παρουσίαση θα αναρτηθεί στην ιστοσελίδα της ΕΕΕΕΓΜ.



International Symposium "Practices and trends for financing tunnels and underground works"

Το διήμερο Πέμπτη 22 και Παρασκευή 23 Μαρτίου διοργανώθηκε από την Ελληνική Επιτροπή Σηράγγων και Υπογείων Έργων (ΕΕΣΥΕ), υπό την αιγίδα της International Tunnelling Association, διεθνές συμπόσιο με θέμα "Practices and trends for financing tunnels and underground works".

The recent financial crisis has affected the construction industry and of course tunnelling projects to varying degrees. Confrontation of the crisis and its consequences requires new tools, but especially an overstepping of the prevailing thinking from all involved parties. The Symposium on Financing and Contracting is of particular interest to us and we believe to the rest of the world, as more and more pressure is applied to the financing of tunnelling projects. Many countries are searching for better ways to finance new tunnels and for effective tools to contract these projects.

The Symposium provided an international forum for all involved parties and stakeholders, for exchanging views, experiences, skills, ideas and achievements on the critical issues of Financing and Contracting of Tunnels and Underground Works.

- 1st Session: Procurement Strategies
- 2nd Session: Experiences in Financing and Contracting from Tunnelling Contracts
- 3rd Session: Financing Underground Works
- 4th Session: Contracting Issues I

- 5th Session: Experiences in Financing and Contracting from Tunnelling Contracts II
- 6th Session: Round Table - Discussion
- 7th Session: Contracting Issues II
- 8th Session: Experiences in Financing and Contracting from Tunnelling Contracts II



52nd Rankine Lecture 21 March 2012, Imperial College, London, UK Performance-based design in geotechnical engineering

Professor Malcolm Bolton
Cambridge University

Engineering design consists of a sequence of decisions which should satisfy the client's objective performance requirements. Prof. Bolton argued that an assessment of geotechnical performance must involve ground displacements, and that the traditional approach of specifying safety factors is potentially wasteful. In particular, the Limit State Design (LSD) approach adopted in the Eurocodes lacks objectivity and therefore is inadequate to the needs of clients and society at large. He proposed improvements through the adoption of Mobilizable Strength Design (MSD) principles in which the designer explicitly considers the stress-strain behaviour of the ground.

Central to the MSD approach is an assessment of the possible deformability and strength of the soil that lies within the anticipated deformation mechanism of the proposed geo-structure. Displacements are then calculated by applying the principle of conservation of energy to the deformation mechanism. This leaves the designer with an implicit assessment of deformations before any other checks which might later be made by Finite Element Analysis, and ensures that the intended design performance can always be checked by monitoring during construction.

Finally, he presented examples of the application of MSD in earth retaining structures, slopes and foundations and he demonstrated how MSD provides a better view of the actual deformations and strength of the soil than LSD.

In his conclusions, Bolton said that design to EC7 is too formulaic and ultimately wasteful. "EC7 relies on safety factors rooted in the 1960s," he said. "This creates a built in Rumsfeldian factor, rather than using insurance against risk. We need to rethink LSD and base decisions on deformation."

According to Bolton, deformation based decisions will result in better performance and more sustainable solutions.

"I am not advocating reducing safety factors - I am advocating replacing arbitrary safety factors," he said.

The lecture can now be watched in streaming at the following links:

- Part1: <http://www.cpdlectures.com/Lecture.aspx?id=113>
- Part2: <http://www.cpdlectures.com/Lecture.aspx?id=115>



Rockfall Protection – Design of Mitigation Measures Tembi Valley Case Study

Την Τετάρτη 26 Μαρτίου, στην Αθήνα, και την Πέμπτη 27 Μαρτίου, στη Θεσσαλονίκη, παρουσιάστηκε διάλεξη από τον Hannes Salzmann, Γεωτεχνικό και Μηχανολόγο Μηχανικό, Περιφερειακό Διευθυντή της Geobrugg Geohazard Solutions για την Ασία, Ειρηνικό και Νοτιοανατολική Ευρώπη, με θέμα «Rockfall Protection – Design of Mitigation Measures Tembi Valley Case Study».

Flexible rockfall barriers have been continuously developed and improved in performance over the past 4 decades. Systems available now, allow the mitigation of extremely powerful and hazardous rockfall events. Due to the relatively light components and simple system setup such barriers are especially suitable for installation on steep difficult access slopes.

Part one of the presentation dealt with the special requirements regarding the design and implementation of flexible barriers. Emphasis was put on how to evaluate the necessary design parameters such as outcrop zone, design boulder and catchment area as well as on the 2 and 3-D simulation of rockfall events and related risk assessment tools. For the design and positioning of the barriers special focus was put on the aspect of constructability since the terrain is often extremely steep and unfavorable for standard construction equipment

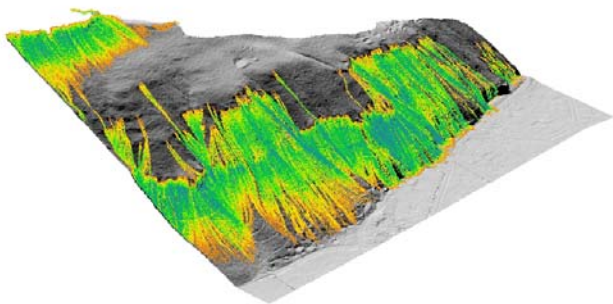


Figure 1. Energy distribution 3-D rockfall model



Figure 1. Tembi Valley rope access drilling works

Part two provided comprehensive insight into the Tembi Valley rockfall protection works carried out in 2009, 2010 and 2011, ranging from rope access scaling over rock bolt-

ing and barrier construction to the installation of monitoring devices and maintenance works. Detailed information on the sequencing of works, the applied construction techniques and special equipment used were displayed as well as the constraints leading to some innovative solutions.

The presentation further provided a short outlook on barrier performance and maintenance as well as the latest developments in flexible rockfall barriers.

Η παρουσίαση θα αναρτηθεί στην ιστοσελίδα της ΕΕΕΕΓΜ.



Μη κορεσμένα εδάφη Γενική παρουσίαση - Η μύζηση και η μέτρησή της

Την Δευτέρα 2 Απριλίου παρουσιάστηκε από τον συνάδελφο Μιχάλη Μπαρδάνη, Πολιτικό Μηχανικό, MSc, Υποψήφιο Διδάκτορα Ε.Μ.Π. και γεωτεχνικό μελετητή στην ΕΔΑΦΟΣ Α.Ε. στην Θεσσαλονίκη διάλεξη με θέμα «Μη κορεσμένα εδάφη Γενική παρουσίαση - Η μύζηση και η μέτρησή της».

Περίγραμμα της παρουσίασης:

- Η φύση των μη κορεσμένων εδαφών
- Αρνητική πίεση πόρων και μύζηση (suction)
- Η χαρακτηριστική καμπύλη εδαφους – νερού
- Μέτρηση της μύζησης και της χαρακτηριστικής καμπύλης εδαφους – νερού
- Συμπίεστικότητα
- Διατμητική αντοχή
- Διαπερατότητα ως προς την υγρή φάση
- Μερικές σκέψεις για την διάδοση του αντικειμένου των μη κορεσμένων εδαφών

Η παρουσίαση θα αναρτηθεί στην ιστοσελίδα της ΕΕΕΕΓΜ.



Harding Memorial Lecture Underground Infrastructure – Meeting the Future Needs of Society

Στις 19 Απριλίου 2012 παρουσιάστηκε η ετήσια διάλεξη της British Tunnelling Society Harding Memorial Lecture από τον Bill Grose, εταίρο της εταιρείας συμβούλων Arup, με θέμα «Underground Infrastructure – Meeting the Future Needs of Society». Στη συνέχεια δίνεται σύντομη περίληψη της διάλεξης, ενώ οι ενδιαφερόμενοι μπορούν να την παρακολουθήσουν μέσω της ιστοσελίδας <http://ice.adobeconnect.com/p8nm6moud74/>

The UK is at a tipping point in economic infrastructure. We led the world in industrial development but now we have some of the oldest and most complex infrastructure in the world as a result. It has served us very well, but is wearing out and increasingly needs repair and replacement. At the same time further infrastructure is needed to help provide growth, jobs and exports. The benefits of putting infrastructure underground are starting to be more universally recognised – it is no coincidence that very significant proportions of our proposed new infrastructure projects are in tunnel.

The importance of infrastructure and the benefits of tunnelling are being recognised by our government. We need to rise to the challenge and get engaged!

The lecture looked at the drivers of change in our industry, and some of the success stories of recent times. What is the shape of our industry in the future, and how do we need to change in response? What technological advances and directions of research should the country take?

αντοχή για το γεωτεχνικό σχεδιασμό και συγκεκριμένα για τη συμπεριφορά πρανών και τις θεμελιώσεις με πασσάλους.

Η παρουσίαση θα αναρτηθεί στην ιστοσελίδα της ΕΕΕΕΓΜ.



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Η παραμένουσα αντοχή συνεκτικών εδαφών

Την Τετάρτη 25 Απριλίου παρουσιάστηκε από την συνάδελφο Θεοδώρα Τίκα, Δρ. Πολιτικό Μηχανικό, Καθηγήτρια Τομέα Γεωτεχνικής Μηχανικής Τμήματος Πολιτικών Μηχανικών Πολυτεχνικής Σχολής Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, διάλεξη με θέμα «Η παραμένουσα αντοχή συνεκτικών εδαφών».

Η παραμένουσα αντοχή του εδάφους έχει γίνει αντικείμενο εκτενούς μελέτης κατά τις τελευταίες πέντε δεκαετίες και έχει καθιερωθεί ως μια πολύ σημαντική παράμετρος του εδάφους στη Γεωτεχνική Μηχανική. Τούτο οφείλεται στο γεγονός κυρίως ότι η παραμένουσα αντοχή είναι ανεξάρτητη της αρχικής δομής του εδάφους, της προϊστορίας φόρτισης, καθώς και άλλων παραμέτρων που επηρεάζουν τις από την προϊστορία φόρτισης εξαρτώμενες ιδιότητες του εδάφους.

Η θεώρηση της παραμένουσας αντοχής του εδάφους απαιτείται στη μελέτη πρακτικών προβλημάτων ευστάθειας των εδαφικών μαζών, σε συνεκτικά εδάφη τα οποία είτε παρουσιάζουν προοδευτική θραύση όπως τα υπερστερεοποιημένα αργιλικά εδάφη, είτε έχουν υποστεί διατμητικές παραμορφώσεις (μετατοπίσεις) κατά το παρελθόν λόγω ενεργών κατολισθήσεων ή τεκτονικών μετακινήσεων.

Στο εργαστήριο η παραμένουσα αντοχή προσδιορίζεται με δοκιμές, είτε στη συσκευή άμεσης διάτμησης με αντιστροφή της διεύθυνσης μετατόπισης ή τη χρήση φυσικών επιφανειών ολίσθησης ή προδιατεταγμένων δοκιμίων, είτε στη συσκευή διάτμησης εδαφικού δακτυλίου.

Η παρουσίαση αποσκοπούσε καταρχήν στην ανασκόπηση της τρέχουσας γνώσης, όσο αφορά στις κυριότερες παραμέτρους που επηρεάζουν την παραμένουσα αντοχή συνεκτικών εδαφών, όπως είναι: η κοκκομετρική διαβάθμιση και η ορυκτολογική σύσταση, η ορθή τάση, η χημική σύσταση του ύδατος των πόρων, η ταχύτητα διάτμησης, η μύζηση και η γήρανση και στη συνέχεια στη συζήτηση των συνεπειών της επίδρασης των παραπάνω παραμέτρων στην παραμένουσα

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

Για τις παλαιότερες καταχωρήσεις περισσότερες πληροφορίες μπορούν να αναζητηθούν στα προηγούμενα τεύχη του «περιοδικού» και στις παρατιθέμενες ιστοσελίδες.

GEOAMERICAS 2012 II Pan-American Congress on Geosynthetics, Lima, Perú, 1 - 4 May 2012
www.igsperu.org

16th Nordik Geotechnical Meeting, 9-12 May, 2012, Copenhagen, Denmark www.ngm2012.dk

Second Southern Hemisphere International Rock Mechanics Symposium SHIRMS 2012, 14-17 May 2012, Sun City, South Africa, www.saimm.co.za



International conference on earthquake engineering research challenges in the 21st century

18-21 May 2012, Harbin, China

<http://mceer.buffalo.edu/meetings/default.asp>

During the second half of the 20th century earthquake engineering has advanced rapidly throughout the world, resulting in significant reductions of societal losses due to seismic events. However, since the turn of the century, catastrophic earthquakes such as the 2008 M8.0 Wenchuan Earthquake in China and the more recent 2011 M9.0 Japan earthquake have wreaked havoc on the lives of millions of people. The Japan earthquake not only produced strong ground motions, but also included a huge tsunami and a subsequent nuclear disaster that affected global economies. These events bring numerous new earthquake engineering challenges to the sustainable development of our societies.

To commemorate the 100th anniversary of the birth of Professor LIU Huixian, the founder of Earthquake Engineering in China, the Institute of Engineering Mechanics (IEM) of the China Earthquake Administration will host an International Conference in Harbin, China on May 18-21, 2012.

The goal of this conference is to summarize the impact and lessons learned from the recent earthquakes, and discuss how to address the new challenges facing earthquake engineering researchers.

Topics

- Lessons Learned from Recent Earthquakes
- Strong Motion Observation and Analysis
- Geotechnical Engineering
- Structural Engineering
- Lifeline Engineering
- Codes and Standards for Both New and Existing Construction

- Post-earthquake Rehabilitation and Reconstruction
- Disaster Planning and Social and Economic Impact Studies
- Others

Contact Person: Ms. BAI Bmg
Institute of Engineering Mechanics (IEM), China Earthquake Administration
29 Xuefu Road, Harbin 150080, China
Phone +86 451 86652900
Email iceer2012@iem.cn; iem1954@qq.com



ITA-AITES WTC 2012 "Tunnelling and Underground Space for a global Society", Bangkok, Thailand, 18 to 23 May, 2012, www.wtc2012.com

Fifth International Symposium on Contaminated Sediments: Restoration of Aquatic Environment, May 23 - 25 2012, Montreal, QC, Canada, www.astm.org/SYMPOSIA/filtrexx40.cgi?+P+EVENT_ID+1857+/usr6/htdocs/astm.org/SYMPOSIA/callforpapers.frm

EUROCK 2012 - ISRM European Regional Symposium - Rock Engineering and Technology, 27 - 30 May 2012, Stockholm, Sweden, www.eurock2012.com.

Second International Conference on Performance-Based Design in Earthquake Geotechnical Engineering, May 28-30, 2012, Taormina, Italy, www.2pbd-taormina.org

International Symposium & Short Courses TC 211 IS-GI Brussels 2012 Recent Research, Advances & Execution Aspects of GROUND IMPROVEMENT WORKS, 30 May - 1 June 2012, Brussels, Belgium, www.bbri.be/go/IS-GI-2012

12th Baltic Sea Geotechnical Conference "Infrastructure in the Baltic Sea Region", Rostock, Germany, 31 May - 2 June, 2012, www.12bsgc.de

80th Annual Meeting - 24th ICOLD Congress, June, 2nd to 5th, 2012 - June, 6th to 8th, 2012, Kyoto, Japan, <http://icold2012kyoto.org/>

ISL 2012 NASL 11th International Symposium on Landslides, 3 - 8 June 2012, Banff, Alta, Canada, corey.froese@ercb.ca, www.ISL-NASL2012.ca

4th Traditional International Colloquium on Geomechanics and Geophysics, 7-8 June 2012, Ostravice, Czech Republic, www.ugn.cas.cz/events/2012/qeko/?l=en&p=general.php

2nd Annual Underground Infrastructure & Deep Foundations Qatar, 10 - 13 June, 2012, Doha, Qatar www.undergroundfoundations.com



Third International Geo-Hazards Research Symposium (IGRS-2012)

June 10-14, 2012, Uttarakhand, India
<http://igrs.webs.com/igrs2012.htm>

Geo-Hazards are the events caused by geological features and processes that present severe threats to humans, property and the natural environment. Earthquakes, floods, landslides, volcanoes, avalanches and tsunamis are the most common geohazards on the land. In terms of number of fatalities, earthquakes and floods are often considered the worst devastating geo-hazards. Tsunami is another type of geo-hazard that is relatively rare, but the recent tragic events in the Indian Ocean and Japan showed the devastating nature. There is an urgent need to improve our basic understanding of the technical, financial and social risks posed by these geohazards, the relationships between those risks, and our ability to cope with them.

International Geo-Hazards Research Society (IGRS) is dedicated to the dissemination of scientific information on all aspects of natural hazards; namely earthquakes, volcanoes, landslides, floods, radiation hazards, and all related topics. IGRS has been holding biannual symposium on Geo-Hazards Research at different cities of the world with no geographic limit, to provide a forum for meaningful interaction among scientists working on Geo-Hazards research. The Third International Symposium of this series will be organized by the Department of Physics, H.N.B. Garhwal University at Badshahi Thaul Campus, Tehri Garhwal, India during June 10-14, 2012. The symposium would cover the following themes:

1. Earthquake
2. Landslides
3. Volcanoes
4. Tsunami
5. Anthropogenic activities
6. Dam instability
7. Man-induced geohazards (induced seismicity etc.)
8. Disaster management
9. Gas and hydro geochemistry
10. Nuclear accidents
11. Radiation hazards

Correspondence

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Web page: <http://igrs.webs.com>, www.hnbqu.ac.in



Vth International Geomechanics Conference, 18 – 21 June 2012, Varna, Bulgaria, www.mdgm.org, www.confgeomech.info/icg

International Symposium on Sustainable Geosynthetics and Green Technology for Climate Change (SGCC2011), which also serves as the Retirement Symposium of Prof. Dennes T. Bergado, 20 and 21 June 2012, Bangkok, Thailand, www.set.ait.ac.th/acsig/sgcc2011



2nd European Conference on Unsaturated Soils E-UNSAT2012

Unsaturated soils: Research and Applications
20-22 June 2012, Napoli, Italy

<http://eunsat2012.mgmcongress.org/index.php>

E-UNSAT 2012 follows the first successful conference held in Durham, UK (2008), and is a favourite chance to get together researchers and practitioners from Europe and overseas for discussing advances in unsaturated soils mechanics and related engineering applications.

The Conference will address several areas such as laboratory and in-situ testing, engineering behaviour, modelling, monitoring, design methods and case histories. The areas of application include slope stability, foundations dams, contaminated land, landfill and nuclear waste repositories. It is therefore expected to provide a comprehensive contribution which has the potential to become reference material for geo-engineers.

The Conference will last three days and will focus on the following main themes:

1. Experimental soil behaviour, including laboratory and site advances in the experimental techniques for the analysis of the hydro-thermo-chemo-mechanical behaviour of unsaturated soils;
2. Theoretical, constitutive, numerical and physical modelling.
3. Engineering applications and case histories, including soil-environment interaction, soil-structure interaction in service conditions, monitoring on site and case histories.

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46th U.S. Rock Mechanics Geomechanics Symposium, Chicago, USA, 24 – 27 June 2010, www.armasymposium.org

XII International Symposium on Environmental Geotechnology. Energy and Global Sustainable Development "Unveiling the Pathways to Global Sustainability", Los Angeles, USA, June 27 – 29, 2012, www.iseqnet.org/2012/



**International Forum
Integrated Development of City's Underground
Space
June 27-29, 2012, Saint Petersburg, Russia
www.undergroundcity-forum.com**

Today development of the Russian cities is accelerating. Public policy, foreign investment, modern technologies aim at the creating of comfortable living conditions for citizens. After more than twenty years of interruption, construction industry attracts again attention to itself, which gives hope to resolve long-standing issues in metropolitan areas: transport, environmental and social.

Unfortunately, under the circumstances, small-scale projects and partial modifications are unattainable luxury. If we do not take urgent action now, life in major cities will stop after several years, on a physical point of view. Today the traffic average speed in St. Petersburg is just 16 km/h! If we choose this way of development, one of the most beautiful cities in the world will become absolutely empty open-air museum, where residents have no place.

The scale of the problem requires radical measures, fundamentally changing principles of the solution of urgent issues. Urban underground space development programs operate to combat the shortage of land areas in many developed countries. These programs constitute a necessary condition for balanced growth of modern cities, and they supported by the state level and attractive for investments.

The purpose of the International Forum, which will be held on 27th -29th June, 2012 in St. Petersburg, is a radical change of an integrated development of underground space in Russian cities, the transition from the practice of indiscriminate construction of underground structures to elaborate models of using underground space.

Professionals, defining urban development policy of world cities, will be expected to participate, they will tell about experience of integrated development of underground space and principles of urban planning in their cities. Speakers will reflect achievements in the field of underground construction, principles of urban planning and persuasive arguments in favor of underground space development: economic, environmental, energy in their presentations.

Global Underground Construction projects, which presented at the Forum, were implemented by our foreign counterparts, will be attracted the attention of public authorities at all levels and potential investors to the creation of modern underground infrastructure of Russian cities. We intend to prove, using the best examples of foreign underground construction, that without the development of underground space is impossible to solve the most acute problems of urban infrastructure such as traffic congestion in the historic center and ecological problems. And understanding the real value of land area gives rise to a favorable prognosis in terms of development of underground construction and increase its attractiveness in the near future.

Participation in the Forum will give to potential investors prospects of achieving on the untapped market of underground space in Russia. Statesmen will solve problems of modern Russian cities. Specialists in civil constructing will be able to claim uncontested need for a comprehensive development of underground space, without which it is impossible to create a favorable environment for life and sustainable development of megacities, particularly in the historical part of it.

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ASTM Symposium on Dynamic Testing of Soil and Rock: Field and Laboratory, June 28 - 29 2012, San Diego, CA, USA, www.astm.org/D18symp0612.htm

Protection and Restoration of the Environment XI July 3-6, 2012, Thessaloniki, Greece, www.pre11.org

Shaking the Foundations of Geo-engineering Education, International Conference on Geotechnical Engineering Education, 4-6 July 2012, NUI Galway, Galway, Ireland, bryan.mccabe@nuigalway.ie



09 - 11 July, 2012, Milan, Italy
www.pilingfoundationeurope.com

Increased globalisation and a drying up of public funding have left many engineering companies in a difficult position. To compete in the geotechnical space, consultants and contractors need to be able to deliver excellent and innovative solutions and services at a competitive rate. Despite the downturn, despite cut-throat competition – Europe still holds amazing deep foundation and underground infrastructure projects, and we offer you the opportunity to meet the people behind them.

With this in mind, Construction IQ is delighted to announce the [Second Annual Deep Foundations and Underground Infrastructure Europe Summit](http://www.pilingfoundationeurope.com) which will be taking place in Milan from the 9-11 July (For more information please download the draft agenda [here](#)).

Building on the success of our Deep Foundation and Underground Infrastructure titles globally, this European summit will bring together key regional and international stakeholders from the geo-technical, piling and foundations sector to:

- Discover Europe's most exciting projects from north to south in depth case studies and project updates by the people behind the builds themselves – from the London Array to the Ceneri Base Tunnel – take part in some of the most exciting foundation projects out there.
- Keep ahead of the curve on Eurocodes 7 and it's impact on geotechnical engineering practitioners by listening to the technical committee members directly.
- Learn about innovations and new thinking in the fields of instrumentation and geohazards, directly from leading experts in technical detail.

With key case studies and experiences from contractors, consultants and government clients from across the world, Deep Foundations and Underground Infrastructure is the must-attend technically oriented deep foundations event that keeps you up to date on upcoming opportunities and prepares you for the challenges of major builds.

Despite austerity and financial turmoil, many large scale engineering projects are still going ahead. In the current economic climate, can you afford to pass them by?

Building on the success of our Deep Foundation and Underground Infrastructure titles globally, this European summit will bring together key regional and international stakeholders from the geo-technical, piling and foundations sector.

Construction IQ's Deep Foundations and Underground Infrastructure Europe will be bringing together project owners, consultants, and contractors to learn about:

- Europe's most exciting projects from north to south in depth case studies and project updates by the people behind the builds themselves – from the London Array to the Ceneri Base Tunnel – take part in some of the most exciting foundation projects out there.
- Keep ahead of the curve on Eurocodes 7 and it's impact on geotechnical engineering practitioners by listening to the technical committee members directly.
- Learn about innovations and new thinking in the fields of instrumentation and geohazards, directly from leading experts in technical detail

With key case studies and experiences from contractors, consultants and government clients from across the world, Deep Foundations and Underground Infrastructure is the must-attend technically oriented deep foundations event that keeps you up to date on upcoming opportunities and prepares you for the challenges of major builds right



ANZ 2012 "Ground Engineering in a Changing World" 11th Australia-New Zealand Conference on Geomechanics, Melbourne, Australia, 15-18 July 2012, www.anz2012.com.au

A Symposium on EXPERIMENTAL STUDIES WITH GEOSYNTHETICS In Conjunction with 15th INTERNATIONAL CONFERENCE ON EXPERIMENTAL MECHANICS (ICEM15), Porto, Portugal, July 22-27, 2012, <http://paginas.fe.up.pt/clme/icem15>

Geotechnique Themed Issue 2012 "Offshore Geotechnics", www.geotechnique-ice.com

34th International Geological Congress 5 ÷ 15 August 2012, Brisbane, Australia, <http://www.ga.gov.au/igc2012>

2nd SASPRE South American Symposim on Rock Excavation, 7 – 9 August 2012, San Jose, Costa Rica, www.civiles.org/acg/simposio

EYGEC 2012 Gothenburg 22nd European Young Geotechnical Engineers Conference, Gothenburg, Sweden, August 26th to 29th, 2012, www.sgf.net



http://acem12.cti3.com/icge_email.htm

"The 2012 Int'l Conference on Geomechanics and Engineering (ICGE12)" will be held during 26-30 August 2012 at COEX (Convention & Exhibitions) in Seoul, Korea. The Conference will be held in association with the "Geomechanics and Engineering, An International Journal" and under the umbrella of "The World Congress on Advances in Civil, Environmental, and Materials Research (ACEM'12)". The main objective of the Conference is to exchange the scientific information on engineering problems in the area of Geomechanics and Engineering among the interested scientists and engineers from all over the world.

The Conference will focus on the "Emerging Technologies in Multiple Systems". Topics will include (but not limited to):

- Computational Geomechanics
- Energy Geotechnology
- Foundation Engineering
- Geo-Mechanics from Micro to Macro
- Ground Improvement
- Laboratory Testing
- Offshore Geotechnics
- Physical Modeling
- Seismic Geotechnics
- Site Characterization
- Slope Stability
- Soil-structure Interaction
- Tunneling & Underground Spaces
- Unsaturated Soils

Secretariat, ACEM'12,
c/o TP Congress Consultants,
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ICSE-6, 6th International Conference on Scour and Erosion, 27-31 August 2012, Paris, France, www.icse-6.com

Advances in Multiphysical Testing of Soils and Shales, ISS-MGE Workshop, 3-5 September 2012, Lausanne, Switzerland, <http://amtss.epfl.ch>

Baltic Piling Days 2012, Tallinn, Estonia, 3-5th September 2012, www.balticpiling.com

2nd International Conference on Transportation Geotechnics, 10 - 12 September 2012, Sapporo, Hokkaido, Japan, <http://congress.coop.hokudai.ac.jp/tc3conference/index.html>

7th International Conference in Offshore Site Investigation and Geotechnics: Integrated Geotechnologies, Present and Future, 12-14 September 2012, London, United Kingdom, peter.allan@geomarine.co.uk; zenon@tamu.edu

CRETE2012 3rd International Conference on Hazardous and Industrial Waste Management September 12 - 14, 2012, Chania, Greece, www.hwm-conferences.tuc.gr

EUROGEO5 - 5th European Geosynthetics Conference, 16 - 19 September 2012, Valencia, Spain, www.eurogeo5.org

IS-Kanazawa 2012 The 9th International Conference on Testing and Design Methods for Deep Foundations 18-20 September 2012, Kanazawa, Japan, <http://is-kanazawa2012.jp>

ISC' 4 4th International Conference on Geotechnical and Geophysical Site Characterization, September 18-21, 2012, Porto de Galinhas, Pernambuco - Brazil, www.isc-4.com

1st Eastern European Tunneling Conference, September 18-21, 2012, Budapest, Hungary, www.eetc2012budapest.com

IS-Shanghai 2012- International Symposium on Coastal Engineering Geology, September 20-21, 2012, Shanghai, China, www.is-shanghai2012.org

The 4th International Conference on PROBLEMATIC SOILS, 21-23 September 2012, Wuhan, China, www.cipremier.com/page.php?487



**The 4th Central Asian Geotechnical Symposium:
Geo-Engineering for Construction and Conservation
of Cultural Heritage and Historical Sites
- Challenges and Solutions -
21-23 September 2012, Samarkand, Uzbekistan
<http://conference.geotechnics.uz>**

We are pleased to announce the 4th Central Asian Geotechnical Symposium to be held in Samarkand, Uzbekistan from September 21-23, 2012. The previous Central Asian Geotechnical Symposiums was in Astana, Kazakhstan, 2000; Samarkand, Uzbekistan, 2003; Dushanbe, Tajikistan, 2006.

The 4th Central Asian Geotechnical Symposium intends to discuss and exchange ideas on general characteristics of soils in the region, geotechnical problems as well as conservation of heritage and historical sites.

Samarkand ("Stone Fort" or "Rock Town") is the second-largest city in Uzbekistan and the capital of Samarqand

Province. The city is most noted for its central position on the Silk Road between China and the West, and for being an Islamic center for scholarly study. In the 14th century it became the capital of the empire of Timur and is the site of his mausoleum. The Bibi-Khanym Mosque remains one of the city's most notable landmarks. The Registan was the ancient center of the city. In 2001, UNESCO added the city to its World Heritage List as Samarkand Crossroads of Cultures.

The topics in the theme area include:

1. Regional Characterization of Soils and Foundation, and Geo-Construction
2. Adobe, Tomb and Earthen Structures, Historical Sites, and Conservation of Cultural Heritage
3. Regional and Traditional Characteristics of Foundation and Structures
4. Mosque, Minaret, Towers, Citadel, Castles, Stone Masonry, and Heritage Structures
5. Ancient Caves, Underground Construction, Tunneling, Transportation, and Infrastructures
6. Ancient and Historical Dam, Embankment, and Ancient Highways
7. Soil Dynamics and Geotechnical Earthquake Engineering
8. Ancient, Traditional, and Present Soil Improvements
9. Damages from Salting and Frost including Geoenvironmental Engineering
10. Traditional and Innovative Technologies for Geotechnical Applications

SECRETARIAT

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**24-28 September 2012, Lisbon, Portugal
<http://15wcee.org/>**

The 15th World Conference on Earthquake Engineering will be held from September 24 to September 28, 2012, in Lisbon, Portugal.

Being an engineering conference, the 15th WCEE provides a unique opportunity to establish synergies between participants from different engineering areas and from such varied fields as earth sciences, economics and social sciences.

The Scientific Committee of the Conference urges all participants to contribute to this global effort of the scientific and technical community towards a safer world in what regards the earthquake risk.

Topics

The 15th WCEE 2012 covers a broad spectrum of topics, namely:

- Engineering seismology;
 - Source characterization and simulation
 - Hazard assessment
 - Ground motion studies
 - Seismic networks and monitoring
 - Site effects
- Tsunamis;
 - Hazard assessment
 - Earthquake sources
 - Wave propagation
 - Impact
 - Early warning
- Geotechnical earthquake engineering;
 - Ground failure and liquefaction
 - Soil-structure interaction
 - Seismic design of foundations
 - Experimental work (physical modeling)
- Design of new structures;
 - Buildings
 - Bridges and special structures
 - Experimental work (physical modeling)
 - Architectural aspects
- Assessment and retrofitting of existing structures;
 - Built cultural heritage
 - Buildings
 - Bridges and special structures
 - Experimental work (physical modeling)
 - Non-structural components
- Infrastructures and lifeline systems;
 - Risk Assessment
 - Early Warning
- Social and economic aspects;
 - Impact and indirect consequences
 - Awareness and preparedness
 - Public policy
 - Recovery and resilience
 - Financial and insurance policies
 - Ethical and legal issues
 - Education and outreach
- Preparedness and emergency management of large earthquakes;
 - Rapid structural assessment
 - Immediate safety ("shore-up")
 - Short-term logistics
 - Management policies
- Urban risk assessment.

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Geotechnics 2012 - Constructions, Technologies and Risk,
26-28 September 2012, Ostrava, Slovakia,
www.ingeokring.nl/media/download_gallery/Prelimina.pdf

The 4th Central Asian Geotechnical Symposium: Geo-Engineering for Construction and Conservation of Cultural Heritage and Historical Sites. Challenges and Solutions, September 2012 Samarkand, Uzbekistan, Zokhir Hasanov uzssmge@gmail.com,

2nd International Symposium on Constitutive Modeling of Geomaterials: Advances and New Applications (IS-Model 2012), October 15 and 16, 2012 Beijing, China, www.csrme.com/ISMODEL/index.html

SAHC 2011, 8th International Conference on Structural Analysis of Historical Constructions, October 15 – 17, 2012, Wroclaw, Poland, www.sahc2012.org

7th Asian Rock Mechanics Symposium, 15-19 October 2012, Seoul, Korea, www.arms7.com

37th Annual Conference on Deep Foundations, October 16-19, 2012, Houston, TX, USA, www.dfi.org/conferencedetail.asp?id=193



17-19 October, Ankara, Turkey
www.ace2012.metu.edu.tr

The 10th International Congress on Advances in Civil Engineering (ACE 2012) will be held in Ankara, 17-19 October, 2012.

The goal of the congress is to bring together researchers and practitioners from around the world in various fields of civil engineering to exchange new ideas, share knowledge and explore recent developments in the world of civil engineering.

The traditional ACE congresses have been hosted every two years by one of the organizing universities: *Bogaziçi University, Eastern Mediterranean University, Istanbul Technical University, Karadeniz Technical University, Middle East Technical University and Yıldız Technical University.*

Starting with this year, *Turkish Chamber of Civil Engineers (TCCE)* has also joined the list of organizers to strengthen the existing academic and professional links. Middle East Technical University and the TCCE welcome participants of the 2012 congress to Ankara.

ACTIVITIES

Stimulating events have been organized to achieve the goals of the congress and to expose the mysteries of local culture in Central Anatolia.

- Panel Discussions
- Tutorials / Workshops
- Keynote Speakers
- Student Competitions
- Young Researcher / Best Paper Awards
- Technical Trips / Exhibitions
- Social and Cultural Events

TOPICS

Topics of the conference include but are not limited to the areas listed below:

- Coastal and Harbor Engineering
- Computational Methods in Civil Engineering
- Construction Engineering and Management
- Engineering Materials
- Geotechnical Engineering
- Hydraulic Engineering
- Structural Engineering
- Earthquake Engineering
- Engineering Seismology
- Transportation Engineering
- Geomatics Engineering

This year's highlighted topics are:

- Energy
- Natural Hazards
- New Trends and Challenges in Civil Engineering

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HYDRO 2012 Innovative Approaches to Global Challenges,
29 to 31 October 2012, Bilbao, Spain, www.hydropower-dams.com

International Conference on Ground Improvement and
Ground Control: Transport Infrastructure Development and
Natural Hazards Mitigation, 30 Oct - 2 Nov 2012, Wollon-
gong, Australia www.icgiwollongong.com



Tangible Risks, Intangible Opportunities: Long-Term Risk Preparedness and Responses for Threats to Cultural Heritage

2012 Theme: Reducing Risks to Cultural Heritage from Natural and Human-Caused Disasters
31 October 2012, Beijing, China

At the recent ICOMOS General Assembly in Paris, the interdisciplinary theme for the Scientific Council Triennial Action Plan for 2012-14 was discussed. Taking into consideration increasing risks to tangible and intangible cultural heritage due to various natural and human-caused factors, the themes for scientific symposia for the next three Advisory Committee meetings will focus on risks resulting from natural and human caused disasters (2012), globalization and uncontrolled development (2013), and loss of traditions and collective memory (2015). Consideration of risks also marks a shift from reactive to a preventive approach for conservation that seeks to put emphasis on risk reduction and preparedness.

The three themes will bring forward the underlying causes for risks to cultural heritage; tools and methodologies for their assessment; and policies, strategies and techniques for reducing potential threats to the future of cultural heritage aimed at protecting and managing our irreplaceable cultural resources for present and future generations.

Context

Cultural heritage is exposed to numerous disasters resulting from natural hazards such as earthquakes, floods, cyclones, as increasingly human-induced hazards, such as arson, armed conflict and civil unrest. The great East Japan Tohoku Earthquake and Tsunami (2011); Thailand Floods (2011); Haiti, Chile and Christchurch earthquakes (2010); and recent civil unrests in Libya, Egypt, Yemen and Syria have caused serious damage to tangible and intangible attributes of cultural-heritage sites ranging from historic buildings, museums, historic settlements, as well as cultural landscapes.

Undoubtedly the frequency and intensity of some disasters has increased recently due to impact of Global Climate Change, as well as social, economic and political changes. Considering these challenges, The ICOMOS Symposium, Reducing Risks to Cultural Heritage from Natural and Human-Caused Disasters, aims to assess these risks and formulate policies, strategies and techniques for reducing risks to disasters, responding to emergencies and recovering from disasters. During the one-day symposium, position papers and case studies will be presented on the following themes:

1. Techniques and Strategies for Mitigating Risks to Cultural Heritage from Natural and Human-Caused Disasters
 - How can we develop appropriate techniques for mitigating risks to cultural heritage from earthquakes and floods, cyclones/hurricanes and fires by considering factors of safety, as well as values?
 - What are traditional materials, skills and knowledge systems for disaster mitigation of cultural heritage, and how can we utilize them in present context?
 - Which maintenance and monitoring strategies can be adopted for reducing risks to cultural heritage due to disasters?
 - How can we enhance security of cultural-heritage sites to prevent risks of terrorism and theft?
2. Methodology and Tools for Undertaking Risk Assessment of Cultural Heritage
 - What are various approaches and tools for assessing risks to cultural-heritage sites from natural and human-caused disasters?
 - What are good practices in documentation, inventorying and mapping for recording and analysing risks due to natural and human-caused factors?
 - How can we communicate these risks to decision makers?
3. Protecting Cultural Heritage in Times of Conflict and Other Emergencies
 - What kind of policies, techniques and strategies can be adopted for protecting cultural-heritage sites in the times of conflicts and other emergencies?
 - How can we effectively use international legal instruments and coordinate with organizations such as Blue Shield?
4. Planning for Post-Disaster Recovery of Cultural Heritage
 - How do we avoid hasty destruction of vulnerable materials and structures (earth, stone and wood) of architectural heritage located in disaster-prone areas?

- How do we undertake post-disaster damage assessment of cultural heritage?
 - How can we develop monitoring and evaluation strategies for post-disaster interventions and reconstruction?
 - How do we evaluate costs of post-disaster recovery and rehabilitation of cultural heritage?
 - How do we engage various international and national stakeholders for post disaster recovery of cultural heritage?
 - How can intangible heritage be utilized effectively for post-disaster recovery and rehabilitation?
5. Awareness-Raising and Capacity-Building for Managing Disaster Risks to Cultural Heritage.
- How do we engage communities for disaster-risk management of cultural heritage sites?
 - How do we build the capacity of craftsmen, professionals and decision makers for managing risks to cultural heritage from natural and human-caused factors?

SC Officer: Pamela Jerome, ISCEAH Earthen Architectural Heritage), ISC20C (20th Century Heritage), pamela.jerome@icomos.org)



6th Congress on Forensic Engineering, October 31 – November 3, 2012, San Francisco, USA
<http://content.asce.org/conferences/forensics2012/index.html>

ACUUS 2012 13th World Conference of the Associated Research Centers for the Urban Underground Space Underground Space Development – Opportunities and Challenges, 7 – 9 November 2012, Singapore, www.acuus2012.com



International Symposium on Earthquake-induced Landslides November 7-9, 2012, Kiryu, Japan

<http://geotech.ce.gunma-u.ac.jp/~isel/index.html>

The International Symposium on Earthquake-induced Landslides will be held in Kiryu, Japan, on November 7-9, 2012. This symposium is being organized by the Japan Landslide Society (JLS).

The symposium proceedings will be published by Springer, and indexed by the Ei Compendex, ISTP, and/or other indexing services.

The 2011 disaster of the Great East Japan Earthquake was at the greatest scale that we have ever experienced. We have to learn about the experiences and adopt them to our future disaster managements. During the symposium, the scientific reports on the recent activities by the Earthquake-induced Landslides Research Project in the JLS will also be

made, and it will provide us fruitful information on the related topics.

The current symposium offers an opportunity for information exchange on earthquake-induced landslides. Topics of interest included, but are not limited to:

1. Investigation of recent and historical earthquake-triggered landslides and their impacts
2. Characteristics, processes and mechanisms of earthquake-triggered landslides
3. Physical and numerical modeling of earthquake-triggered landslides
4. Instrumentation and monitoring technologies for earthquake-related landslides
5. Risk assessment and management of earthquake-related landslides
6. Stabilization and disaster mitigation of earthquake-related landslides
7. Earthquake-related landslide dams and their risk assessment and management
8. Monitoring, prediction and early warning systems for post-earthquake landslides and debris flows
9. Other relevant topics concerning earthquake-related landslides

The symposium covers all aspects of earthquake-induced landslides including the phenomena occurred in manmade embankments as well as in natural slopes in mountainous areas.

CONFERENCE SECRETARIAT

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<http://geotech.ce.gunma-u.ac.jp/~isel/>



GEOMAT2012-KL, MALAYSIA Second International Conference on Geotechnique, Construction Materials and Environment, November 14-16, 2012, Kuala Lumpur, Malaysia, <http://geomat2012.webs.com>

32. Baugrundtagung with exhibition "Geotechnik", Mainz, Germany, 26 – 29 November 2012, www.baugrundtagung.com

GEOSYNTHETICS ASIA 2012 (GA2012) 5th Asian Regional Conference on Geosynthetics, Bangkok, Thailand, 10 - 14 December 2012, www.set.ait.ac.th/acsig/igs-thailand

First International Congress FedIGS, 12 – 15 November 2012, Hong Kong – China, www.fedigs.org/HongKong2012

GA2012 - Geosynthetics Asia 2012 5th Asian Regional Conference on Geosynthetics, 10 - 14 December 2012, Bangkok, Thailand, www.set.ait.ac.th/acsig/GA2012

Fourth International Seminar on FORENSIC GEOTECHNICAL ENGINEERING, January, 10-12, 2013, Bengaluru, India, Prof. G L Sivakumar Babu, isfge2013@gmail.com

Geotechnical Special Publication, ASCE "Foundation Engineering in the Face of Uncertainty". Abstracts to Mohamad H. Hussein at: MHussein@pile.com.

Geotechnical Special Publication, ASCE "SOUND GEOTECHNICAL RESEARCH TO PRACTICE", http://web.engr.oregonstate.edu/~armin/index_files/Holtz_GSP

Themed Issue on Geotechnical Challenges for Renewable Energy Developments, Geotechnical Engineering 2013, ben.ramster@icepublishing.com

Pam-Am UNSAT 2013 First Pan-American Conference on Unsaturated Soils, 20-22 February 2013, Cartagena de Indias, Colombia, panamunsat2013.uniandes.edu.co



3rd International Conference on Geotechnical Engineering New Developments in Analysis, Modeling, and Design
21-23 February 2013, Hammamet, Tunisia
www.icge13.com

The Geotechnical Engineering Research Team (Unité de Recherche Ingénierie Géotechnique- URIG) has the pleasure to invite you for the participation in the third International Conference on Geotechnical Engineering (ICGE'13) to be held at Hammamet (Tunisia) February 21-23, 2013.

The ICGE'13 provides a forum for exchange ideas and discussions on topics related to Geotechnical Engineering. Senior and young researchers, scientists and engineers from overseas are invited to attend this conference, to share and to exchange their knowledge.

ICGE'13, also, includes three workshops:

1. Workshop on "Sustainable Construction",
2. Workshop on "Geosynthetics",
3. Workshop on "micromechanical Experimentation and Modeling of Granular Soils".

The objectives of the ICGE'13 are to promote good relationship and cooperation between geotechnical researchers and engineers. Such an international event also provides an opportunity for the exchange of experiences and information about theoretical, practical and technical aspects related to Geotechnical Engineering. The conference is also an occasion to look at the developments, advances and innovation achievements in soil mechanics, rock mechanics and applied geophysics. ICGE'13 represents a world forum for the presentation and the publication of theoretical contributions, numerical computations and experimental investigations in the field of Geotechnical Engineering.

Main Topics

- Soil Behavior
- Soil Improvement
- Foundations and Underground Constructions
- Analysis and Management of Seismic Risk
- Rock Mechanics and Slope Stability
- Environmental Geotechnics
- Unsaturated Soils
- Hydraulic Works

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TU-SEOUL 2013 International Symposium on Tunnelling and Underground Space Construction for Sustainable Development, March 18-20, 2013, Seoul, Korea
www.tu-seoul2013.org

GEOSYNTHETICS 2012, April 1 – 4, 2013, Long Beach, California, USA www.geosynthetics2013.com



9-11 Avril 2013, Dijon, France
www.rencontresgeosynthetiques.org

Les Rencontres Géosynthétiques 2013 sont le neuvième colloque francophone sur les géotextiles, les géomembranes et les produits apparentés organisé par le Comité Français des Géosynthétiques (CFG).

Ces rencontres techniques réservées à la présentation de cas réels d'ouvrages feront le point sur l'état de l'art, les pratiques recommandées et les normes en vigueur. Elles comporteront des exposés de synthèse, des communications, des présentations de posters, une exposition technique et des séances de formation.

Les communications présenteront des cas concrets d'applications des géosynthétiques en Génie Civil et Environnement illustrant les fonctions essentielles de ces matériaux de construction.

SECRÉTARIAT
Rencontres Géosynthétiques 2013
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Fifth International Conference on Forensic Engineering
Informing the Future with Lessons from the Past, 15-17
April 2013, London, United Kingdom, <http://ice-forensicingineering.com>



**Second International Symposium on
Geotechnical Engineering for the Preservation
of Monuments and Historic Sites**
30 -31 May 2013, Napoli, Italy
www.tc301-napoli.org

The conservation of monuments and historic sites is one of the most challenging problems facing modern civilization. It involves a number of factors belonging to different fields (cultural, humanistic, social, technical, economical, administrative), intertwining in inextricable patterns. In particular, the requirements of safety and use appear (and often actually are) in conflict with the respect of the integrity of the monuments. In almost all countries of the world the conservation is looked after by an official trained in Art History or Archaeology. He has generally the control of any action to be undertaken, and imposes constraints and limitations that sometimes appear unreasonable to the engineer. The engineer, in turn, tends to achieve safety by means of solutions which appear unacceptable to the official in charge of conservation, sometimes mechanically applying procedures and regulations conceived for new structures. It is evident that some equilibrium has to be found between the safe fruition of a monument and the respect of its integrity. The former task belongs to the know-how of any well trained and experienced engineer, while the latter one is more difficult, being the same concept of integrity rather elusive.

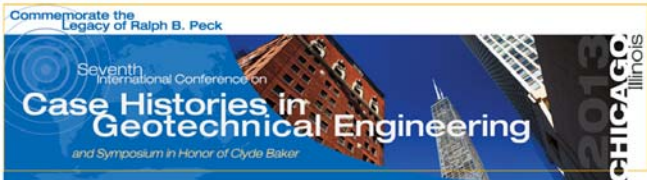
The difficulty of the problem is increased by the lack of a general theory, universally accepted and guiding the behaviour of the actors involved as the Mechanics does with the structural engineer. The possibility of finding in practice an acceptable equilibrium is linked to the development of a shared culture. The International Society of Soil Mechanics and Geotechnical Engineering contributed to this development by an ad hoc Committee (TC 19 – Conservation of Monuments and Historic Sites), that has been promoted over 25 years ago by French and Italian engineers (Jean Kerisel, Arrigo Croce). A number of international and regional symposia have been organised, always with large audience and lively discussions. A Lecture dedicated to Jean Kerisel will be given for the first time at the next International Conference on Soil Mechanics and Geotechnical Engineering to be held in 2013 in Paris. In this framework, the Technical Committee (now TC301) is organising the 2nd International Symposium on Geotechnical Engineering for the Preservation of Monuments and Historic Sites, which will be held in Napoli on May 2013. Its aim is that of comparing experiences, presenting important achievements and new ideas, establishing fruitful links.

The contributions to the Conference should focus on the following main themes:

1. Geotechnical aspects of historic sites, monuments and cities;
2. Past design criteria and traditional construction methods;
3. Techniques to preserve ancient sites and constructions;
4. Rehabilitation of heritage;
5. Role of geotechnical engineering in preservation of cultural and historical integrity.

Scientific secretariat

For general queries please contact:
info@tc301-napoli.org



Conference to Commemorate the Legacy of Ralph B. Peck,
7th International Conference on Case Histories in Geotechnical Engineering & Soil Dynamics and Symposium in Honor of Clyde Baker, Chicago, USA, 29 April – 4 May, 2013,
<http://7icchg.mst.edu>



ITA-AITES WTC 2013 "Underground – the way to the future", Geneva, Switzerland, 10 to 17 May 2013,
www.wtc2013.ch/congress



**5th International Symposium on
Geotechnical Engineering,
Disaster Prevention and Reduction,
and Environmentally Sustainable Development**
May 15-17 May 2013, Incheon, South Korea

Contact person : Prof. Eun Chul Shin, University of Incheon,
Korea, E-mail : ecshin@incheon.ac.kr



HF2013 Effective and Sustainable Hydraulic Fracturing - an
ISRM Specialized Conference, 20-22 May 2013, Brisbane,
Queensland, Australia, <http://www.csiro.au/events/HF2013>



For queries about paper submission please contact:

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STREMAH 2013 13th International Conference on Studies, Repairs and Maintenance of Heritage Architecture, 25 – 27 June 2013, New Forest, UK, carlos@wessex.ac.uk

The 6th International Symposium on Rock Stress, 20-22 August 2013, Sendai, Japan, <http://www2.kankyo.tohoku.ac.jp/rs2013>

18th International Conference on Soil Mechanics and Geotechnical Engineering "Challenges and Innovations in Geotechnics", 1 – 5 September 2013, Paris, France www.paris2013-icsmqe.org

Géotechnique Symposium in Print on Bio- and Chemo-Mechanical Processes in Geotechnical Engineering, www.elabs10.com/content/2010001471/SIP%202013.pdf



EUROCK 2013
ISRM European Regional Symposium
Rock Mechanics for
Resources, Energy and Environment
21-26 September 2013, Wrocław, Poland
www.eurock2013.pwr.wroc.pl

The Polish Society for Rock Mechanics, the ISRM national group POLAND and the Institute of Geotechnics and Hydrogeotechnics of Wrocław University of Technology are proud to announce the organization of the ISRM International Symposium EUROCK 2013 "Rock Mechanics for Resources, Energy and Environment", which is to be held in Wrocław, Poland, September 21-26, 2013.

The main objective of the Symposium is to:

- provide a forum for engineers, researchers and students
- integrate industry professionals and scientific research communities
- create opportunities to update and improve knowledge
- present the most recent contributions in the area of rock mechanics and geotechnics

Topics

- rock mass characterization

- laboratory and in-situ testing
- constitutive models and numerical modeling
- mathematical modeling of T-H-M processes in rocks
- mine design and ground control
- petroleum rock mechanics
- geological CO₂ sequestration
- underground storage and waste disposal
- slope and open pit stability
- dynamic phenomena in rock masses
- new materials and technologies in geoengineering
- design methodology in rock engineering
- mechanical breakage of rocks
- rock tunnel excavation and support

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International Symposium on Design and Practice of Geosynthetic-Reinforced Soil Structures, 14-16 October, 2013, Bologna, Italy, www.civil.columbia.edu/bologna2013

ANDORRA 2014 14th International Winter Road Congress 2014, 4-7 February 2014, Andorra la Vella (Andorra), www.aipcrandorra2014.org



EUROCK 2014
ISRM European Regional Symposium
Rock Engineering and Rock Mechanics:
Structures in and on Rock Masses
26-28 May 2014, Vigo, Spain

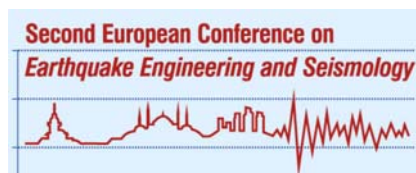
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8th European Conference "Numerical Methods in Geotechnical Engineering", Delft, The Netherlands, 18-20 juni 2014, www.numge2014.org



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24-29 August 2014, Istanbul, Turkey
www.2ceesistanbul.org

Turkish Earthquake Foundation - Earthquake Engineering Committee and Prime Ministry, Disaster and Emergency Management Presidency, take great pleasure in expressing the strong motivation and endorsement of the Local Organizing Committee for hosting 2nd European Conference on Earthquake Engineering and Seismology, in 2014 in Istanbul, Turkey.

Istanbul has an enchanting location spreading over two continents. Istanbul also represents the unique feature of Turkey for serving as a bridge between different cultures. This feature will be the major asset of the 2nd European Conference on Earthquake Engineering and Seismology, in 2014 in bringing together the Middle East with Europe, the developing world with the global professionals of people. Istanbul will provide the perfect platform for introducing and discussing Earthquake Engineering and Seismology along with priority issues of global importance. It will also create synergy between all delegates around scheme of the metropolitan area, closely depending on Bosphorus, the most romantic waterway in the world.

Istanbul has also an outstanding reputation for hosting similar major conferences. With the ever improving excellent congress facilities in the congress district, the large spectrum of hotels in world standards, one of the most effective international airport in the world, the unique charm of the culinary art and shopping, the mild climate and sunshine it offers...

2ECEES and Istanbul definitely promises an unforgettable experience for all participants.

We are certain that Istanbul will mobilize the necessary experience, expertise and support for one of the most successful events in EAEE and ESC histories.



10th International Conference on Geosynthetics – 10ICG,
Berlin, Germany, 21 – 25 September 2014 www.10icg-berlin.com



ARMS 8 - ISRM Regional Symposium
8th ISRM Rock Mechanics Symposium
15-17 October 2014, Sapporo, Japan



13th ISRM International Congress on Rock Mechanics
Innovations in Applied and Theoretical
Rock Mechanics
29 April – 6 May 2015, Montreal, Canada

The Congress of the ISRM "Innovations in Applied and Theoretical Rock Mechanics" will take place on 29 April to 6 May 2015 and will be chaired by Prof. Ferri Hassani.

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ΝΕΑ ΑΠΟ ΤΙΣ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ



International Society for Soil Mechanics and Geotechnical Engineering
Société Internationale de Mécanique des Sols et de la Géotechnique

ISSMGE Awards

Terzaghi Oration Award: This is the most prestigious of all the ISSMGE awards for technical contributions. The Terzaghi Orator is selected by the President after input from the Member Societies and the Board. The Oration is presented at the quadrennial conference.

Kevin Nash Gold Medal: This award is more oriented towards service contributions to ISSMGE. It is decided by a committee made of all Past Presidents and chaired by the Immediate Past President (Pedro Seco e Pinto in this case). Past Presidents are not eligible.

Young Geotechnical Engineer Award (3): There are 3 of those awards for young members. Young is defined here as less than 36 year old on 31 December. This award is for an outstanding paper to be published in the proceedings of the upcoming quadrennial conference. The nomination must come from a member society.

Outstanding Technical Committee Award: This is an award to recognize an outstanding technical committee of ISSMGE. The nomination must come from a member society.

Outstanding Geotechnical Project Award: This award is to recognize an outstanding project worldwide. This project should exemplify the ingenuity of geotechnical engineers and the value they bring to mankind. It is the kind of project that we would wish to propose to the television Discovery channel for example to highlight our achievements and enhance the image of our profession. The nomination must come from a member society.

Outstanding Innovator Award: This award is to recognize a geotechnical engineer or team of geotechnical engineers for their creativity and innovation in solving difficult geotechnical problems and for their impact on our geotechnical life. The nomination must come from a member society.

Outstanding Member Society Award: This award is to recognize an outstanding member society and to reward young and smaller Member Societies who are active. Self nomination is requested in this case.

Outstanding Paper in the International Journal of Geo-Engineering Case Histories Award: This award is to recognize the best paper in this ISSMGE Journal. The Editorial Board of the IJGCH will select the paper.

All awards are to be submitted to the Secretary General by the deadline who will relay them to the Awards Committee for consideration. The ISSMGE Board will receive the recommendations from the Awards Committee and make the final decision. All awards will be presented at the International Conference for Soil Mechanics and Geotechnical Engineering.

Request for Monitoring of Soils and Foundations Journal

Sign up today to receive free online access through Volume 52, Numbers 1-2 to Soils and Foundations.

Soils and Foundations will be published online in partnership with Elsevier via ScienceDirect. The first issue to be published online will be the February 2012 issue. To commemorate the launch of online availability, Soils and Foundations is pleased to offer those who are not subscribing Soils and Foundations yet the chance to register for a free online trial of the first two issues, Numbers 1 and 2 of the 2012 Volume. This offer is only valid until the end of May, 2012.

To sign up, send e-mail to: monitor_sandf@jiban.or.jp.

Please note that the 5th issue in October 2012 will be a Special Issue on 'The 2011 Great East Japan Earthquake'. This issue will have completely open public access; that is, access to this issue online will be free and will not require any registration.

We sincerely hope that you will make the decision to subscribe to Soils and Foundations after participating in the free trial. Subscription details can be found at our journal web site: <http://www.jiban.or.jp/e/subscription-rates/>

Akira Murakami
Professor of Kyoto University
Editor, Soils and Foundations

ISSMGE Council Meeting Minutes of the Meeting held in Toronto, October 2011

Dear Colleagues,

This is to let you know that the complete Minutes of the Toronto Council Meeting (October 2011) are now available from the ISSMGE website at:
<http://www.issmge.org/web/page.aspx?refid=780>

If you would like a bound copy of the Minutes, please let me know as soon as possible; I have a limited number of hard copies.

It has taken us longer than we would have liked to prepare and distribute these Minutes, and we can only apologise for the delay.

Best wishes,

Paloma Peers
Administrative Officer, ISSMGE
City University London
Northampton Square
London EC1V 0HB
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Invitation for submission of article to ISSMGE Bulletin

ISSMGE Bulletin always welcomes contribution from readers who are interested in submitting technical and event articles. The number of subscribers in the world is more or less 19,000.

Examples of desired type of articles in recent issues have addressed "Soil Improvement under New Levees in New Orleans" and "Development of New Cone Penetrometer" as well as "Harbour Construction in Australia." For more idea, you can freely download past issues of the bulletin from the website of ISSMGE; <http://www.issmge.org/web/page.aspx?refid=430>

Because the Bulletin is an electronic publication, there is no page limitation. Colour photographs and illustrations are highly welcome. Moreover, you can submit draft by a WORD file and there is no fixed format; the editing team will take care of formatting.

There is no fixed due date of submission. Submission is certainly free of charge. There is no peer review because the bulletin is not an academic journal but a newsletter. Only one request to authors is that the article has to be clear and easily understandable for practitioners. It is very advisable to use nice photographs and illustrations.

I would like to express my sincere thanks for you to consider this invitation in a positive manner and send me a reply at your earliest convenience. Please take this good opportunity to demonstrate to the world **HOW GOOD YOU ARE.**

Yours sincerely

Ikuo Towhata



International Society for Rock Mechanics

ISRM

Infomail

Annual ISRM News Journal

Dear ISRM Member

In the last meeting of the Council of the ISRM held in Beijing, last October, it was decided to stop the distribution of a hard copy of the annual ISRM News Journal to the members. The cost of printing and posting 6,500 copies of the News Journal represented a very large proportion of the ISRM annual budget, and this was considered no longer necessary, since electronic distribution is now easily available and even preferred by most ISRM members.

You can now read the electronic version of the latest issue of the News Journal directly on our website, or you can download it, using the following link: <http://www.isrm.net/qca/?id=206>.

Best regards

Luís Lamas
ISRM Secretary General

News from the Europe region

The Eurock conference is going to be held from May 28th to May 31st in Stockholm, Sweden. During this conference, the Eurock award will be given to the young author having written the best paper.

15 young people were appointed to sit on the Young Members' Presidential Group. They come from Austria, Belgium, Croatia, Czech Republic, Finland, France, Germany, Greece, Poland, Portugal, Russia, Serbia, Slovenia, Switzerland and the UK (σ.σ. την ΕΕΕΕΓΜ εκπροσωπεί ο συνάδελφος Πέτρος Φορτσάκης).

Bosnia and Herzegovina is joining the ISRM as a National Group. This brings us up to 24 European countries belonging to the ISRM.

The school of Mines ParisTech is going to hold the 7th conference on salt mechanics from April 16th to April 19th 2012.



Συστάσεις για τη χρήση των γεωσυνθετικών: Εκθέσεις Ομάδων Εργασίας του Γαλλικού Τμήματος της International Geosynthetics Society

Η Comité Français des Géosynthétiques (CFG) εξέδωσε, κατά την διάρκεια των τελευταίων ετών, οδηγούς και συστάσεις για τη χρήση των γεωσυνθετικών σε διάφορες εφαρμογές. Οι πιο πρόσφατες οδηγίες, που εξακολουθούν να είναι επίκαιροι μέχρι σήμερα, είναι διαθέσιμα δωρεάν στην ιστοσελίδα <http://www.cfg.asso.fr/>:

- N° 9 - Recommandations pour l'emploi des géotextiles dans le renforcement des ouvrages en terre
- N° 10 - Recommandations générales pour la réalisation d'étanchéité par géomembranes
- N° 11 - Recommandations générales pour l'utilisation des géosynthétiques dans les centres de stockage de déchets
- N°12 - Recommandations générales pour la réalisation d'étanchéité par géosynthétiques bentonitiques
- N° 13 - Recommandations pour l'utilisation des géosynthétiques bentonitiques en installations de stockage de déchets
- Lutte contre l'érosion
- Détection de fuites dans les dispositifs d'étanchéité par géosynthétiques
- Guide pour la réalisation de planches d'essais d'endommagement

Επίσης είναι διαθέσιμα δωρεάν από την ίδια ιστοσελίδα τα Πρακτικά των Συνεδρίων της CFG των τελευταίων ετών.

Reality sinks in for wind project Turbine shut down for foundation fix

The MWRA is scrambling to strengthen the soil holding up its brand-new power turbine — a green project paid for with federal stimulus money — after shutting down the Charlestown windmill when engineers found it sank about twice as much as they'd anticipated.

Massachusetts Water Resources Authority honchos and engineers met yesterday to figure out a fix for the \$4.7 million wind turbine, which started turning in October, only to power down last month when crews discovered it had settled about 2 inches, agency officials said. Possible causes, they said, include soil conditions and vibrations from a sudden shutdown triggered by high winds.

"There's no risk of it leaning over or falling," MWRA Executive Director Fred Laskey told the Herald between meetings yesterday. "It's one of those things that happens in a project. It's manageable, it's safe, and the remedy will come quickly under the warranty."

"The urgency is to get the turbine working again," Laskey said. "We were making electricity like gangbusters through the fall. It was magnificent."

Shoring up of the soil will start within the next couple of weeks and most likely will require injecting grout into the ground, Laskey said.

"Basically, they're looking to put steroids into the foundation," he said.

The foundation runs about 60 feet deep, he said, including about 20 feet of filled-in land.

The 364-foot-tall, 231-ton turbine stands next to the DeLauri Sewer Pump Station off Route 99. The MWRA sells the electricity it generates, and the proceeds are deducted from the power bill for the Deer Island sewage treatment plant.

Wilmington firm Lumus Construction built the turbine through its green-energy arm, Solaya Energy — the same company that built a pair of turbines on Deer Island and another on the Driftway in Scituate.

Only one other firm submitted a competing bid for the Charlestown turbine, MWRA officials said; that proposal was thrown out, they said, because the company did not want to front the money for the giant structure.

Officials at that company, Bond Brothers Construction of Everett, declined to comment, saying the firm bids on many projects and did not have an immediate recollection of the Charlestown turbine proposal.

Boston City Councilor Salvatore LaMattina, whose district encompasses the turbine site, said neighborhood opposition to the windmill was minimal because the site is set back from nearby homes.

"Me, personally, I support the project," he said, citing the cost savings to MWRA customers.

(John Zaremba / Boston Herald, February 25, 2012, http://bostonherald.com/news/regional/view/20220225reality_sinks_in_for_project_turbine_shut_down_for_foundation_fix)

Structural Design Ingenuity A Critical Component for a Sophisticated Science Building University of Scranton – Loyola Science Center



In fall 2011, Phase 1 of the Loyola Science Center (LSC) at The University of Scranton in Scranton, Pennsylvania, opened its doors, transforming the university's science, technology, engineering, and mathematics (STEM) learning environment. The new 150,000-gross-square-foot facility is equipped with the latest technologies to support STEM pedagogy, and provides distinctive spaces for teaching, learning, and research within and across disciplines. Given the high level of environmental control required by sophisticated scientific equipment, structural and foundation designs have become increasingly complicated, while the characteristics of the supporting soil have only limited scope for manipulation. Providing a safe and efficient interface between science facilities and the soil media therefore requires structural engineering ingenuity. For the LSC, these design complexities were exacerbated by existing site conditions, where abandoned coal mines below the site and nearby railroad traffic presented extraordinary challenges.

Abandoned Coal Mines

The City of Scranton, known today as the home of the fictional Dunder-Mifflin paper company in the NBC sitcom, *The Office*, was once the center of Pennsylvania's anthracite coal mining industry. When oil and natural gas replaced anthracite coal as a preferred energy source, the downfall of the mining industry in Northern Pennsylvania left a city scarred by abandoned coal mines. As soon as buildings started rising above and around these abandoned mines, ground subsidence became a widespread problem as the pillar supports for the roofs and overlying surfaces of abandoned mines began to fail. While such failures are no longer a common occurrence - thanks to the state and federal flushing projects or backfilling efforts that stabilized the ground surface in the late 1970s - underground voids are still present in some areas. Site soil exploration performed by the geotechnical engineering consultant revealed deep underground voids within 100 feet below ground of the proposed LSC, and determined that a potentially 20-foot wide sink hole could develop anywhere beneath the new structure. During early design phases, engineers considered three viable foundation systems to mitigate possible structural failure due to mine subsidence:

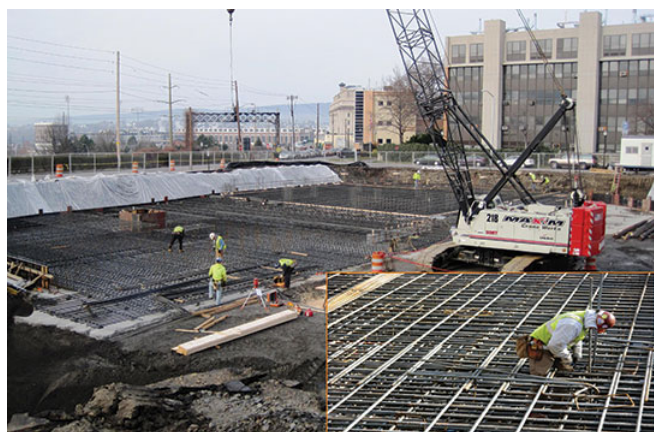
- Caissons or conventional spread footings with interconnected grade beams.
- Conventional spread footings after site modifications through grouting of underground voids.
- Mat slab foundation system.

For the LSC, mat slab proved to be most appropriate alternative because of its simplicity, more rapid pace of construction, and the relatively inexpensive cost estimated to be fifty percent less than that of the caisson option.

Mat Slab Foundation System

Every structural problem has a solution, but sometimes the solution to one problem creates its own challenges. Such was the case with the mat slab foundation system for the LSC Project. Mat slab is relatively simple to design using the finite element method (FEM) adopted in most structural concrete design programs like SAFE by Computers & Structures, Inc., which is utilized in the design or RAM Concept by Bentley and a number of other commercially available structural analysis and design software. For a complicated site such as that of the LSC Project, the challenge is in manipulating the supporting natural soil media to achieve the desired engineering properties for a safe and efficient building support. This solution requires a high degree of ingenuity and "engineering judgment" or instinct on the part of the structural engineer.

For the LSC Project, the mat slab foundation mitigated the potential for structural failure due to ground subsidence by acting as a transfer slab bearing on the stable ground left behind around the depression. At the same time, however, it takes up space for under-slab ducts, plumbing, and other services that in conventional foundation construction could otherwise have been easily located between spread footings or pile caps. To make room for these elements, the top of mat slab needed to be dropped three feet below the ground-floor slab. The shallow top of bedrock at this site required rock excavation in some areas, which increased the risk of weakening the roof of the abandoned mines.



Mat Slab Foundation Construction.

Another concern was the subsequent irregularity in the substrata due to the variability of the topography of the top bedrock found in the site, which caused some portions of the mat slab to sit on bedrock and the rest on native soil. Resolving this challenge required a more complex structural analysis, necessitating the use of multiple flexibility coefficients or modulus of sub-grade reactions. To maintain a homogeneous subsoil layer throughout the entire mat slab, modification to the existing site soil condition was required. One option was removing the natural soil portion of the site and infilling cavities with lean mass concrete. This option can provide additional stiffness to the overlying surfaces of the abandoned mines, reducing the risk of ground subsidence, but it requires significant amounts of concrete and the associated cost is considerably high. The alternative was to further undercut the existing substrata, including the bedrock, and backfilling with select structural fill materials up to the desired founding level. While the latter option further increases the required rock excavation and could weaken the roof of the abandoned mines, increasing the risk of ground subsidence, the structural fill layer separate-

ing the mat slab from the bedrock serves a double purpose. It not only creates a homogeneous subsoil layer for the mat slab to bear on, it can also produce foundation coupling loss or partial reflection of vibration energy at the interface between the bedrock and the layer of fill materials due to impedance mismatch (different material properties). Foundation coupling loss is essential to mitigating the effect of the other structural issue in the project, "ground-borne train vibration" from nearby railroad traffic. Adopting the latter site modification option in the LSC project contributed to reducing construction cost by avoiding otherwise costly special vertical vibration mitigation.

Ground-Borne Train-Induced Vibration

Along with the coal mining industry in Scranton came the railroad business that transported coal to ports in larger cities for eventual distribution around the country. While the last mine in Scranton closed down in the mid 1960s, the railroad track that lies less than 100 feet from the new Loyola Science Center is still in use. Today it transports not coal but tourists from the nearby Steamtown National Historic Site, as well as carloads of goods transported throughout the Delaware-Lackawanna Line. These historic steam trains and freight trains were potential sources of ground-borne vibration disturbances to the new science building. There is yet no generally accepted, comprehensive model for predicting train-induced structural vibrations inside a building. Structural engineers must therefore rely on partially empirical techniques for predicting the transmission and propagation of vibration from a railroad traffic source as it enters into the building base or foundation, as it proliferates through the building structure, and as it is finally transmitted into the receivers (i.e. vibration-sensitive equipments and occupants).

Normally, the level of vibration in the foundations is lower than that in the surrounding ground due to the foundation coupling loss that occurs as vibration is transmitted from the ground into a building. For mat slab bearing on bedrock, the coupling loss may only be very minor or nil. Since concrete is just as dense as rock, the concrete and bedrock therefore have the same mechanical impedance properties (no material mismatch). The foundation design for the new LSC therefore ensures that the mat slab bears on a different intermediate soil media and not directly on the bedrock, since the separation created by the layer of structural fill materials between the mat slab and the bedrock produces impedance mismatch and would result in foundation coupling loss. The physical size and mass of the building, and the characteristics of its foundation, also contribute to the level of attenuation of ground-borne vibration inside a building.

A mid-value of -6 VdB coupling loss was assumed in the prediction process for the LSC Project. Vibration can be expressed in linear (μ in/sec) or logarithmic amplitude scales. Ground-borne vibration is normally expressed in a logarithmic scale VdB (vibration velocity level in decibel). In this scaling, any increase in level of 6 VdB represents a doubling of amplitude regardless of the initial level. Therefore, the aforementioned value -6 VdB due to assumed coupling loss basically implies that ground-borne vibration is reduced by half as it enters into the foundation of the new LSC. Vibration amplification due to excitation by the floor's own natural frequency was also considered in the predictions and assumed to be +12 VdB. In like manner, this change represents an amplification factor of 4. Losses also occur with the transfer of vibration from floor to floor due to structural damping and geometrical spreading. In the predictions, -2 VdB floor-to-floor attenuation was assumed. All in all, a net change in ground-borne vibration level of +4 VdB was assumed in the predictions due to foundation coupling loss, resonance of floors, and floor-to-floor attenuations. Pre-construction measurements of on-site ground-borne vibrations were taken over an approxi-

mately 24-hour period in two spots, at both ground level and bedrock, that border vibration-sensitive areas in the building. As expected, vibrations nearer to railroad traffic were higher than those farther away, since ground naturally attenuates vibration as it moves further away from the source. The maximum measured train-induced vibrations on the bedrock were 1,050 μ in/s (65.4 VdB) and 460 μ in/s (58.3 VdB) at the nearest and farthest locations respectively. With the predicted net change in vibration level of +4VdB, the anticipated most severe train-induced vibrations at the above-grade floors would be 69.4 VdB, equivalent to approximately 1660 μ in/s. At the ground level, the measured vibrations were 1,500 μ in/s at the nearest location and 500 μ in/s at the farthest location. These would be the expected train-induced vibrations at the underside of the slab on grade for buildings with conventional foundations. In the mat slab-supported LSC, whose mat slab foundation encompasses the entire building footprint, ground-borne vibration transmission into the ground-floor slabs are minimized, making the ground floor ideal for program spaces with highly sensitive equipments or occupants.

Conclusion

The use of a mat slab foundation system mitigates the risk of the structural failure of the new LSC due to potential ground subsidence. Project structural engineers predicted that mat slab bearing on a different intermediate soil media that separated the foundation from bedrock could result in foundation coupling loss and improve the vertical vibration mitigation. Observed train-induced vibration levels inside the completed building support predictions and confirmed compliance to the design goal: moderately sensitive equipments, such as microscopes at magnifications up to 400X and analytical balances, can generally be used without disturbance within the laboratory spaces of the new Loyola Science Center. The laboratory spaces in the building can also accommodate highly sensitive equipment in vibration isolation systems.

(Alvin P. Tabar / STRUCTURE Magazine, March 2012, <http://www.structuremag.org/article.aspx?articleID=1410>)



Καταβύθιση σε Κορινθία και Αχαΐα Η θάλασσα διαβρώνει τις παραλίες, κατατρώγοντας κτίρια και δρόμους

Σαν «λάβα» εισχωρεί στις παραλίες της Κορινθίας και της Αιγιάλειας το νερό της θάλασσας κατατρώγοντας ακτές, κτίρια, δρόμους και έργα υποδομής. Αν και το φαινόμενο της διάβρωσης των ακτών δεν είναι νέο, σύμφωνα με τους επιστήμονες, η επέκταση της ανθρώπινης δραστηριότητας στις παραλιακές περιοχές καθιστά εμφανείς τις επιπτώσεις.



Πλέον πρόσφατο γεγονός η καταβύθιση στο Δερβένι, με αποτέλεσμα η θάλασσα να εισχωρήσει κάτω από σπίτια στην παραλία. Οπως ανέφερε στην «Κ» ο αντιπεριφερειάρχης Κορινθίας κ. Γιώργος Δέδες, η διάβρωση των ακτών εκτείνεται από τα Μαύρα Λιθάρια μέχρι τις παρυφές της πόλης της Κορίνθου. Μάλιστα στην περιοχή της Λυγιάς, ανάμεσα στο Δερβένι και το Ξυλόκαστρο, τα τελευταία 50 χρόνια η θάλασσα έχει εισχωρήσει στην ακτή σε βάθος 80 μ.

Στην παλαιά εθνική οδό

Σύμφωνα με τον κ. Δέδε, έντονα είναι τα προβλήματα που δημιουργούνται στην παλαιά εθνική οδό Κορίνθου – Πατρών. Το νερό εισχωρεί στην υπόβαση του δρόμου, προκαλώντας καθιζήσεις. Επίσης σημαντικά προβλήματα έχουν καταγραφεί στο κτίριο του ειρηνοδικείου στο Δερβένι και στο αποχετευτικό δίκτυο στο Λέχαιο.



Στην περιοχή της Αχαΐας τα εντονότερα προβλήματα από τη διάβρωση των ακτών καταγράφονται στις παραλιακές περιοχές που βρέχονται από τον Κορινθιακό Κόλπο, στις περιοχές Βαλιμήτικων, Διγελιώτικων, Τέμενης, Ροδιάς - Ελαιώνα, Πλατανιού, Διακοπού, Νικολέικων και Αιγείρας. Σύμφωνα με τα στοιχεία, το 46% των ακτών της Αιγιάλειας, από το Δερβένι μέχρι και το Αίγιο, έχουν υποστεί διάβρωση, δηλαδή έχουν χαθεί 2.500 στρέμματα. Από την άλλη πλευρά, το 40% των ακτών παραμένει αναλλοίωτο και μόνο στο 14% έχει γίνει πρόσθεση εδαφικού υλικού.



Ως αιτία του φαινομένου ο κ. Δέδες αναφέρει την ανθρώπινη δραστηριότητα, την αστικοποίηση των παραλιακών περιοχών, με αποτέλεσμα να μπαζωθούν χείμαρροι που μετέφεραν υλικά στις παραλίες, καθώς και την εκτέλεση τεχνικών έργων χωρίς προγραμματισμό. Πάντως η αντιμετώπιση του φαινομένου εκτιμάται ότι δεν είναι εύκολη υπόθεση, λόγω του υψηλού κόστους των εργασιών αποκατάστασης. «Αντιμετωπίζουμε το φαινόμενο αποσπασματικά, όπου δημιουργούνται σοβαρά προβλήματα», λέει ο κ. Δέδες και προσθέτει ότι απαιτείται μελέτη για το σύνολο της διάβρωσης, ώστε να δοθεί λύση. Όμως τα χρήματα που χρειάζονται είναι πολλά. Σύμφωνα με μελέτη, η αποκατάσταση ακτής μήκους έξι χλμ.

απαιτεί έργα 22 εκατ. ευρώ. Έτσι, ελπίδες εναποτίθενται σε προκήρυξη μελέτης από το υπ. Περιβάλλοντος και χρηματοδότηση μέσω ΥΠΕΡΑ.

Από την πλευρά του ο καθηγητής του Πανεπιστημίου Πατρών κ. Γιώργος Φερεντίνος (Εργαστήριο Θαλάσσιας Γεωλογίας και Φυσικής Ωκεανογραφίας, μέλος του δικτύου Εργαστηρίων «Ωκεανός» του Παν. Πατρών) μιλώντας στην «Κ» τονίζει ότι όλη η ακτογραμμή του Κορινθιακού επηρεάζεται από τις κατολισθήσεις και ανάλογα φαινόμενα έχουν καταγραφεί τα τελευταία 50 χρόνια. Μετά τον μεγάλο σεισμό στο Αίγιο το 1995, η θάλασσα είχε εισχωρήσει στην παραλία των Νικολέικων έως και 60 μ., ενώ καταγράφηκαν δύο παρόμοια περιστατικά στην απέναντι πλευρά, στην Ερατεινή και τον Τοιοφώνα. Φαινόμενο κατολισθήσεως έχει καταγραφεί πάλι στην περιοχή της Ερατεινής το 1965, ενώ δύο χρόνια νωρίτερα, το 1963, κατολίσθηση είχε σημειωθεί στις Καμάρες Αιγιαλείας, όπου η ακτή οπισθοχώρησε μέχρι και 200 μ. Μάλιστα στην περίπτωση των Καμαρών είχε προκληθεί και τσουνάμι ύψους 5 μ.

Γρήγορη η εξέλιξη τα τελευταία 60 χρόνια

Ο κ. Φερεντίνος περιγράφει στην «Κ» περιστατικό που είχε συμβεί κατά τη διάρκεια που κατασκευαζόταν η μαρίνα στο Ξυλόκαστρο. Την ώρα που το σκαπτικό μηχάνημα εκτελούσε εργασίες, ο χειριστής του άκουσε έντονους θορύβους και έσπευσε να το εγκαταλείψει. Αμέσως μετά το σκαπτικό μηχάνημα το ρούφηξε η θάλασσα και παρά τις εκτεταμένες έρευνες από δύτες δεν βρέθηκε ποτέ. Κατά τον κ. Φερεντίνο το φαινόμενο δεν είναι νέο, όμως τις προηγούμενες δεκαετίες δεν υπήρχαν στις παραλιακές περιοχές κατοικίες και οι άνθρωποι έχαναν μερικά μέτρα από τις καλλιέργειές τους. Τώρα χάνουν οικόπεδα και κτίρια που έχουν μεγαλύτερη οικονομική αξία. Το φαινόμενο επιταχύνθηκε τα τελευταία 60 χρόνια. Ο κ. Φερεντίνος θεωρεί ότι στον Κορινθιακό έπαιξαν επιβαρυντικό ρόλο και οι εργασίες για την κατασκευή της εθνικής οδού Πατρών - Κορίνθου στα μέσα της δεκαετίας του 1960. Όπως αναφέρει, πήραν από ποτάμια αδρανή υλικά για να κατασκευαστεί το έργο, με αποτέλεσμα την αποψίλωση, ενώ ταυτόχρονα μειώθηκε η ποσότητα των φερτών υλικών που έφταναν στις παραλίες. Επίσης ρόλο έπαιξαν κατασκευές όπως μαρίνες και λιμάνια.

Όσον αφορά τις λύσεις, σύμφωνα με τον κ. Φερεντίνο, υπάρχουν σκληρά μέτρα, όπως λιμενοβραχίονες και υποθαλάσσιοι κυματοθραύστες, αλλά και ήπια, δηλαδή εμπλουτισμός της ακτής με υλικό. «Πρέπει να αναλάβουμε όλοι τις ευθύνες μας, πολιτεία, επιστήμονες, μηχανικοί και πολίτες» λέει. Όπως τονίζει, η περιφέρεια θα πρέπει να πάρει αποφάσεις, να τις γνωστοποιήσει στους δήμους και όλοι μαζί να προχωρήσουν.

(Ηλίας Κάνιστρας / Η ΜΑΘΗΜΕΡΙΝΗ, 7 Απριλίου 2012, http://news.kathimerini.gr/4dcgi/_w_articles_ell_1_07/04/2012_478273)

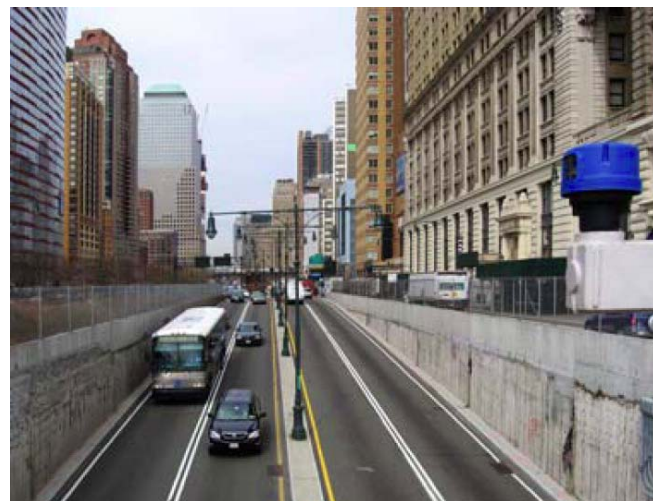


Research Examines Tunnels, Towers in Earthquakes

As the underground environment in large cities grows increasingly complex and developers build taller buildings to maximize floor space in desirable locations, little is known about how these elements will interact in an earthquake. A three-year research project to examine these interactions and develop design parameters is being conducted by researchers at the University of Colorado at Boulder and the University of Illinois at Urbana-Champaign, with collabora-

tion from engineers in the San Francisco office of Arup, headquartered in London.

"Recently there has been excavation work in seismic areas, such as San Francisco, and one of the emerging problems and questions is what happens when we have a tall building next to an excavation, or a cut and cover tunnel? How will they interact?" says Youssef Hashash, P.E., Ph.D., F.ASCE, one of the principal investigators on the project.



"Through interactions with a number of engineers in different cities, this ended up being an issue," says Hashash, a professor of civil engineering at the University of Illinois. "We found that we don't have a ready answer for it in our design literature, so we proposed to do a study on this topic."

During an earthquake, forces from within a building are transferred to the foundation and the surrounding soil. Currently, most models assume the surrounding soil is a "green field," with no underground developments. When there is a tunnel in the soil, loads will be transferred to that structure.

"Building designers have not always given too much consideration as to how it will affect an underground structure next to it, from a seismic perspective," Hashash says. "And the designers of the underground structures have not had to give much consideration to these tall buildings, because they were not an issue before. This is an emerging issue."

Hashash developed an interest in the effects of seismic activity on underground structures while working with the engineering firm Parsons Brinckerhoff, headquartered in New York City, on the seismic analysis and retrofit designs for the historical Posey Tube and Webster Street Tube beneath the Alameda-Oakland Estuary. The 1989 Loma Prieta earthquake revealed liquefaction concerns in the backfill materials.

For this research project, supported by the National Science Foundation's Network for Earthquake Engineering Simulation, Hashash and his research assistants will develop numerical simulations. Shideh Dashti, Ph.D., A.M.ASCE, the other principal investigator on the project, and her research assistants will conduct a series of physical tests using representative models. Dashti, an assistant professor of engineering at the University of Colorado at Boulder, developed an interest in the seismic response of underground structures while working for Bechtel in San Francisco. She will conduct tests that subject the models to centrifugal acceleration of 50g in research facilities at the University of California, Davis and the University of Colorado. The models will be shaken to replicate an earthquake. This will enable small-scale models to experience the same stresses as full-scale prototypes.

Dashti's team will begin with a tunnel in a sandbox to develop a baseline. A model that represents a 10- to 15-story building will then be added. The small-building model will then be replaced by a model that represents a building of more than 50 stories. The data from actual earthquakes will be applied to the centrifuge model to achieve similar effects on the structures.

In the study involving tunnels, Arup provides the experience of engineers in the trenches, Hashash says. Nick O'Riordan, Ph.D., P.E., M.ASCE, and Ramin Motamed, Ph.D., A.M.ASCE, are the lead collaborators from Arup, contributing guidance in developing models that capture the key elements of seismic response for tall buildings.

"They have significant experience with underground structures, with above-ground structures, and they are dealing with these types of problems in their engineering practice, so they provide us with significant inputs," Hashash says.

The results of the centrifuge test program will be used to calibrate the numerical models until they reproduce what was observed in physical experiments.

"Then, with these calibrated numerical models, we can run many more different simulations and try to understand the behavior of the tunnels," Hashash says. "Because of budget and time constraints, you can only do a limited number of physical experiments.

But we are interested in many different configurations that we will not be able to build physical experiments for."

"[The numerical models] will help us in developing design parameters, and also the tools themselves, the numerical tools that we develop and calibrate, then become more useful to design engineers," Hashash says. "They can use them having confidence that they are able to simulate physical experiments."

Hashash says he hopes the project not only increases understanding of the interactions between tall buildings and nearby underground tunnels during seismic events, but also leads to guidelines for engineers in the field.

"What we are hoping to have, first, is a better understanding of how these two systems interact through the soil medium," Hashash says. "Then [we want to] understand, what forces do these tall buildings end up transmitting into these tunnels? Also we are hoping we would be developing numerical simulation tools that are reliable and engineers can use. The engineers can then apply them when they encounter these situations in their projects."

(Kevin Wilcox / ASCE's Civil Engineering Magazine, April 3, 2012)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Recent Geodetic Unrest at Santorini Caldera, Greece

A. V. V Newman, S. Stiros, L. Feng, P. Psimoulis, F. Mo-schas, V. Saltogianni, Y. Jiang, C. Papazachos, D. G. Panagiotopoulos, E. Karagianni, D. Vamvakaris

After approximately 60 years of seismic quiescence within Santorini caldera, in January 2011 the volcano reawakened with a significant seismic swarm and rapidly expanding radial deformation. The deformation is imaged by a dense network of 19 survey and 5 continuous GPS stations, showing that as of 21 January 2012, the volcano has extended laterally from a point inside the northern segment of the caldera by about 140 mm and is expanding at 180 mm/yr. A series of spherical source models show the source is not migrating significantly, but remains about 4 km depth and has expanded by 14 million m³ since inflation began. A distributed sill model is also tested, which shows a possible N-S elongation of the volumetric source. While observations of the current deformation sequence is unprecedented at Santorini, it is not certain that an eruption is imminent as other similar calderas have experienced comparable activity without eruption.

(GEOPHYSICAL RESEARCH LETTERS, <http://www.agu.org/pubs/crossref/pip/2012GL051286.shtm> l)

Σεισμοί και κατολισθήσεις από την παραμόρφωση της Καλντέρας

Μετά από σχεδόν 60 χρόνια σεισμικής αδράνειας στην καλντέρα της Σαντορίνης, το ηφαίστειο ξύπνησε και πάλι τον Ιανουάριο του 2011 και παραμορφώνεται με γρήγορο ρυθμό.

Αυτό αναφέρει μελέτη που δημοσιεύεται στο περιοδικό της Αμερικανικής Γεωφυσικής Ένωσης "Geophysical Research Letters", υπό τον καθηγητή Αντρίου Νιούμαν της Σχολής Γεωεπιστημών του Ινστιτούτου Τεχνολογίας της Τζόρτζια (Georgia Tech), ο οποίος από το 2006 έχει εγκαταστήσει πάνω από 20 σταθμούς (αισθητήρες) GPS στη Σαντορίνη.

Στην εν λόγω μελέτη συμμετέχουν συνολικά 11 επιστήμονες μαζί με τον κ. Νιούμαν, ανάμεσά τους και Έλληνες όπως ο Στάθης Στείρος του Εργαστηρίου Γεωδαισίας του Τμήματος Πολιτικών Μηχανικών του πανεπιστημίου Πατρών.

Η παραμόρφωση του ηφαιστείου απεικονίζεται σε μια σειρά 19 ερευνών ενώ φαίνεται και από τους σταθμούς που έχουν εγκαταστήσει εκεί.

"Ηδη έχει "ξεράσει" μάγμα 14 εκατομμυρίων κυβικών, ικανό να γεμίσει μια σφαίρα διαμέτρου όσο τρία ποδοσφαιρικά γήπεδα", αναφέρεται στην μελέτη υπό τον τίτλο [Recent Geodetic Unrest at Santorini Caldera](http://www.agu.org/pubs/crossref/pip/2012GL051286.shtm).

Σύμφωνα με τον κ. Νιούμαν η ηφαιστειακή καλντέρα στη Σαντορίνη δείχνει σημάδια έντονης κινητικότητας και οι μετρήσεις, που έγιναν σε συνεργασία με τον Στάθη Στείρο, δείχνουν ότι το έδαφος γύρω από την καλντέρα επεκτείνεται αργά προς τα έξω.

"Από τότε (Ιανουάριος 2011), τα όργανά μας στο βόρειο τμήμα του νησιού έχουν μετακινηθεί πλαγίως κατά πέντε έως εννέα εκατοστά. Ο θάλαμος μάγματος του ηφαιστείου γεμίζει και παρατηρούμε στενά αυτήν τη δραστηριότητα",

δήλωσε ο Νιούμαν, σύμφωνα με σχετική ανακοίνωση του πανεπιστημίου του και με το "Live Science".

Ο Αμερικανός επιστήμονας εκφράζει την αβεβαιότητα του κατά πόσον κάτι τέτοιο θα μπορούσε να σημαίνει ότι επίκειται έκρηξη, καθώς, όπως επισημαίνει, είναι περιορισμένες διεθνώς οι παρατηρήσεις τέτοιας δραστηριότητας σε αυτά τα είδη ηφαιστείου. Στην πραγματικότητα, πάντως, όπως υπογραμμίζει, παρόμοιες καλντέρες σε άλλα μέρη της Γης έχουν στο παρελθόν δείξει ανάλογη δραστηριότητα, χωρίς να εκραγούν.

Σύμφωνα με παλαιότερες έρευνες, σχεδόν στο 90% των περιπτώσεων τέτοιων υπόγειων κινήσεων του μάγματος δεν καταλήγουν σε έκρηξη του ηφαιστείου, γι' αυτό κατά τον Νιούμαν δεν είναι πιθανό να συμβεί έκρηξη στη Σαντορίνη. Όπως αναφέρει, σε μια παρεμφερή περίπτωση, η καλντέρα Λονγκ Βάλεϊ στην Καλιφόρνια άρχισε να παραμορφώνεται το 1980, μετά ησυχάσε έως το 1989, ενώ επανέλαβε τον κύκλο ενεργοποίησης- ηρεμίας το 1997 και το 2002, χωρίς να έχει υπάρξει καμία έκρηξη μέχρι σήμερα.

Σύμφωνα με τους υπολογισμούς του Αμερικανού γεωφυσικού, ο θάλαμος του μάγματος του ηφαιστείου της Σαντορίνης έχει διογκωθεί κατά περίπου 14 εκατομμύρια κυβικά μέτρα από πέρυσι τον Ιανουάριο. Αυτό σημαίνει, όπως εκτιμά, ότι αρκετό μάγμα έχει πλέον συσσωρευτεί στον υποθαλάσσιο θάλαμο, το οποίο θα μπορούσε να γεμίσει μια σφαίρα διαμέτρου μήκους τριών ποδοσφαιρικών γηπέδων.

Μη πιθανή μια έκρηξη

Αν πάντως συνέβαινε το ηφαίστειο να εκραγεί κάποια στιγμή, κατά τον Άντριο Νιούμαν, το φαινόμενο θα ήταν συγκρίσιμο με ό,τι έχει συμβεί κατά τα τελευταία 450 χρόνια και όχι με την τρομακτική έκρηξη, η οποία εκτιμάται ότι έλαβε το χώρο το 1650 πΧ. Η έκρηξη εκείνη, αφού νέκρωσε την πόλη του Ακρωτηρίου, θάβοντάς την κάτω από 20 μέτρα στάχτης, πιθανώς προκάλεσε στη συνέχεια και την πτώση του μινωικού πολιτισμού, ενώ μερικοί έφθασαν να ταυτίσουν το συμβάν με την εξαφάνιση της αρχαίας Ατλαντίδος.

Κατά τον Αμερικανό καθηγητή, μια παρόμοια κολοσσιαία έκρηξη δεν αναμένεται να επαναληφθεί σύντομα, καθώς αφενός συμβαίνει μία φορά κάθε 100.000 χρόνια και αφετέρου γιατί σήμερα το "φούσκωμα" του μαγματικού θαλάμου είναι λιγότερο από το 1% αυτού που εκτιμάται ότι είχε υπάρξει τότε.

"Θα μπορούσε πάντως (μια πιθανή έκρηξη) να είναι επικίνδυνη. Αν η καλντέρα εκραγεί υποθαλάσσια, ίσως προκαλέσει τοπικά κύματα τσουνάμι και επηρεάσει την κίνηση των σκαφών και των κρουαζιερόπλοιων μέσα στην καλντέρα. Οι σεισμοί θα μπορούσαν να προξενήσουν ζημιές σε σπίτια και να προκαλέσουν κατολισθήσεις στις πλαγιές (της καλντέρας)", σύμφωνα με τον Άντριο Νιούμαν, ο οποίος επίσης σημείωσε όμως ότι ακόμα κι αν η καλντέρα δεν εκραγεί, **η αργή μετακίνηση (παραμόρφωσή της) μπορεί να αυξήσει τον κίνδυνο για σεισμούς και κατολισθήσεις**. "Δεν χρειάζεται μια έκρηξη ηφαιστείου για να προκληθούν κατολισθήσεις λόγω σεισμών", ανέφερε.

Όσον αφορά το πόσο χρόνο μπορεί να συνεχιστεί αυτή η παραμόρφωση του εδάφους γύρω από την καλντέρα, ανέφερε ότι αυτό είναι άγνωστο, αλλά θα μπορούσε το φαινόμενο να κρατήσει ακόμα και για χρόνια ή δεκαετίες, πιθανώς με εναλλασσόμενες μεταξύ φάσεων δραστηριότητας και ηρεμίας. Αν και δεν συντρέχει λόγος για ανησυχία, όπως τόνισε, η ανήσυχη καλντέρα είναι σημαντικό να παρακολουθείται στενά από τους επιστήμονες.

Η καλντέρα της Σαντορίνης "είναι μια από τις πολύ λίγες πραγματικά μεγάλες ηφαιστειακές καλντέρες. Έτσι, οποιαδήποτε πληροφορία συλλέγουμε από τη συνεχιζόμενη δραστηριότητα σε αυτήν, αυξάνει σημαντικά τις γνώσεις μας σχετικά με το πώς αυτά τα συστήματα εξελίσσονται", σημείωσε ο Άντριο Νιούμαν



Υποπτες δονήσεις Μικροσεισμοί στις ΗΠΑ αποδίδονται στην εξόρυξη υδρογονανθράκων

Η αύξηση των δονήσεων στις μεσοδυτικές ΗΠΑ συνέπεσε με το άνοιγμα νέων γεωτρήσεων

Η απότομη αύξηση που καταγράφεται στη συχνότητα των σεισμών στις μεσοδυτικές πολιτείες των ΗΠΑ οφείλεται πιθανότατα στις γεωτρήσεις πετρελαίου και φυσικού αερίου, εκτιμούν ερευνητές της αμερικανικής γεωλογικής υπηρεσίας USGS.

Η συχνότητα δονήσεων με ένταση άνω των 3,0 βαθμών αυξήθηκε κατά 20 φορές από τα τέλη του 20ού αιώνα μέχρι σήμερα, και η μεταβολή αυτή «είναι σχεδόν σίγουρα ανθρωπογενής» αναφέρει η ερευνητική ομάδα.

Ανεξάρτητοι ειδικοί που κλήθηκαν να σχολιάσουν την έρευνα ήταν μοιρασμένοι όσον αφορά τη γνώμη τους για τα αποτελέσματα, τα οποία δεν έχουν ακόμα δημοσιευτεί αλλά πρόκειται να παρουσιαστούν σε συνέδριο εντός του Απριλίου. Η περίπτωση της μελέτης είναι διαθέσιμη στην ιστοσελίδα http://www2.seismosoc.org/FMPro?-db=Abstract_Submission_12&-sortfield=PresDay&-sortorder=ascending&-sortfield=Special+Session+Name+Calc&-sortorder=ascending&-sortfield=PresTimeSort&-sortorder=ascending&-op=qt&PresStatus=0&-lop=and&-token.1=ShowSession&-token.2=ShowHeading&-recid=224&-format=/meetings/2012/abstracts/sessionabstractdetail.html&-lay=MtgList&-find.

Η έρευνα καταγράφει μια μικρή αρχικά αύξηση των σεισμών που εμφανίστηκε το 2001 κατά μήκος των συνόρων του Κολοράντο και του Νιού Μέξικο, μια περιοχή στην οποία άρχισαν τότε να εξορύσσονται και να παράγονται μεγάλες ποσότητες μεθανίου.

Μια δεύτερη, πιο απότομη αύξηση καταγράφηκε το 2009 σε όλη τη μεσοδυτική χώρα και δείχνει να συνδέεται με τις γεωτρήσεις πετρελαίου και αερίου, από τις οποίες αρκετές βρίσκονται στο Άρκανσο και την Οκλαχόμα.

Η αύξηση στη συχνότητα των μικροσεισμών ήταν γνωστή από προηγούμενες έρευνες. Μάλιστα, ορισμένοι επιστήμονες είχαν αποδώσει σεισμούς στο Άρκανσο, την Οκλαχόμα και το Οχάιο στις λεγόμενες **γεωτρήσεις ρωγμάτωσης**, στις οποίες τεράστιες ποσότητες νερού, χημικών και άμμου διοχετεύονται υπό πίεση μέσα σε σχιστολιθικά πετρώματα, τα οποία θρυματίζονται απότομα και απελευθερώνουν έτσι το πετρέλαιο ή το φυσικό αέριο που περιέχουν στο εσωτερικό τους.

Πάντως, ο επικεφαλής της νέας μελέτης στο USGS, Ουίλιαμ Έλσγουορθ, δήλωσε ότι ο ίδιος δεν πιστεύει πως η τεχνική της ρωγμάτωσης προκαλεί το πρόβλημα, αλλά το φαινόμενο πρέπει να οφείλεται σε άλλο μηχανισμό.

Η μελέτη του Έλσγουορθ κάλυψε ένα μεγάλο τμήμα των ΗΠΑ δυτικά του Οχάιο και ανατολικά της Γιούτα. Οι ερευνητές αναφέρουν ότι από το 1970 έως το 2000 καταγράφηκαν σε αυτή την περιοχή 21 σεισμοί το χρόνο κατά μέσο όρο. Από το 2001 μέχρι το 2008 ο αριθμός είχε αυξηθεί

στους 29 σεισμούς, ενώ τα τρία επόμενα έτη έδωσαν 50, 87 και 134 σεισμούς.

Οι ερευνητές επισημαίνουν ότι η αύξηση της συχνότητας συμπίπτει χρονικά και χωρικά με την αύξηση των γεωτρήσεων, ένδειξη ότι οι σεισμοί είναι ανθρωπογενείς.

Με την εκτίμηση αυτή συμφώνησε εξάλλου ο Ρ. Λόμαν, γεωφυσικός του Πανεπιστημίου Κορνέλ, ο οποίος πάντως επισήμανε ότι ο μηχανισμός του φαινομένου παραμένει ασαφής.

Διαφορετική γνώμη είχε πάντως ο Όστιν Χόλαντ, σεισμολόγος της πολιτείας της Οκλαχόμα, ο οποίος πιστεύει ότι η αύξηση των σεισμών έχει φυσικά αίτια και πιθανώς σχετίζεται τους φυσικούς κύκλους σεισμικής δραστηριότητας στην περιοχή, οι οποίοι δεν είναι γνωστοί.

(Newsroom ΔΟΛ / 08 Απρ. 2012)



Η Ελλάδα είναι μια χώρα που κινδυνεύει από τσουνάμι

Γερμανική έρευνα του Πολυτεχνείου του Άαχεν εκτιμά πως οι ακτές του βορείου Αιγαίου είναι ευάλωτες σε ενδεχόμενο τσουνάμι ιδιαίτερα μετά από ισχυρές σεισμικές δονήσεις.

Ο καθηγητής γεωλογίας Κλάους Ράιχερτερ του Πολυτεχνείου του Άαχεν εκτιμά, βάσει στοιχείων που συνέλεξε τα τελευταία χρόνια στις ακτές του βορείου Αιγαίου, πως ο κίνδυνος εμφάνισης τσουνάμι δεν είναι αμελητέος. Ο Ράιχερτερ δημοσιεύει την έρευνά του στην ετήσια σεισμολογική έκθεση της «Seismological Society of America», στην οποία μελετά τις περιπτώσεις εμφάνισης φαινομένων τσουνάμι στον ελλαδικό χρόνο τα τελευταία 5.000 χρόνια.

Μελέτες πάνω στη γεωλογική ιστορία του Αιγαίου

Σύμφωνα με τα στοιχεία του γερμανού καθηγητή, τα οποία προκύπτουν από γεωλογικές μετρήσεις στην περιοχή του βορείου Αιγαίου τα τελευταία χρόνια, η εν λόγω περιοχή εμφανίζεται ευάλωτη σε ενδεχόμενες καταστροφές από την απότομη μετατόπιση θαλάσσιων μαζών προς τις ακτές ιδιαίτερα μετά από ισχυρούς σεισμούς. Μάλιστα τα θαλάσσια κύματα εκτιμάται ότι μπορεί να έχουν ύψος 3-5 μέτρα ύψος και να προκαλέσουν σημαντικές καταστροφές στις ακτές.

Έχοντας μελετήσει τη γεωλογική ιστορία της περιοχής κατά τις 5 τελευταίες χιλιετίδες, ο Ράιχερτερ δηλώνει πως «με βάση τα ερευνητικά αποτελέσματα, το γεγονός τα ότι φαινόμενα τσουνάμι που έχουν παρατηρηθεί στο Αιγαίο δεν αποτέλεσαν μεμονωμένα περιστατικά αλλά παρατηρήθηκαν περισσότερες φορές, μας οδηγεί στην εκτίμηση πως ενδέχεται να επαναληφθούν».

Οι ιστορικές αφηγήσεις του Ηροδότου

Ενδιαφέρον προκαλεί μάλιστα η επίκληση του αρχαίου Έλληνα ιστοριογράφου, Ηροδότου ως «ιστορική πηγή» που φαίνεται να καταγράφει ένα τσουνάμι στην Ποτιδαία της Χαλκιδικής κατά τη διάρκεια των περσικών πολέμων (479 π.Χ.). Σύμφωνα με τις περιγραφές του Ηροδότου, τεράστια θαλάσσια κύματα κατέκλυσαν τις ακτές της αρχαίας Ποτιδαίας στη σημερινή Χαλκιδική, μετά από σεισμό, συμπαρασύροντας μαζί του εκατοντάδες Πέρσες στρατιώτες.

«Οι έρευνες μας έδειξαν πως η περιοχή του βορείου Αιγαίου γνώρισε περισσότερα από ένα ιστορικά τσουνάμι. Τα γεωλογικά ευρήματα μαρτυρούν την ύπαρξη κινδύνου τεράστιων παλινροιακών ή σεισμικών κυμάτων στην περιοχή», αναφέ-

ρει ο Ράιχερτερ. Σύμφωνα με τα στοιχεία του, το τελευταίο τσουνάμι που παρατηρήθηκε στην περιοχή ήταν το 1893. Ωστόσο, η συχνότητα εμφάνισης αντίστοιχων περιστατικών στην περιοχή είναι τέτοια που θα μπορούσε να δικαιολογήσει την αναφορά του βορείου Αιγαίου στη λίστα των περιοχών με παρουσιάζουν κίνδυνο για την εμφάνιση σεισμογενών κυρίων τσουνάμι.

(ΣΚΑΪ.gr / Δήμητρα Κυρανούδη, 20/04/2012

Πηγή: Deutsche Welle,

<http://www.skai.gr/news/greece/article/200863/welt-online-i-ellada-enai-mia-hora-pou-kinduneuei-apo-tσουνami>)

Τσουνάμι στον Θερμαϊκό «έσωσε την Ποτίδαια από τους Πέρσες»

Η αρχαία Ποτίδαια στη Χαλκιδική θα μπορούσε να είχε πέσει στα χέρια των Περσών, αν ένα τεράστιο τσουνάμι δεν σάρωνε τα στρατεύματα του σατράπη Αρτάβαζου, υποστηρίζουν Γερμανοί ερευνητές, οι οποίοι μάλιστα εκτιμούν ότι ο Θερμαϊκός Κόλπος δεν έχει διαφύγει τον κίνδυνο.

«Ο Έλληνας ιστορικός Ηρόδοτος περιέγραψε την παράξενη υποχώρηση της παλίρροιας και τα τεράστια κύματα στην Ποτίδαια, καθιστώντας τη μαρτυρία του την πρώτη περιγραφή ενός ιστορικού τσουνάμι» αναφέρει η ομάδα του Κλάους Ράιχερτερ στο Πανεπιστήμιο του Άαρχαους.

Η αρχαία Ποτίδαια βρισκόταν στη θέση της σημερινής Νέας Ποτίδαιας στις ανατολικές ακτές του Θερμαϊκού, λίγο βόρεια της χερσονήσου Κασσάνδρας, η οποία ονομαζόταν τότε Παλλήνη.

Το 479 π.Χ. πολιορκήθηκε χωρίς να ηττηθεί από τη μεγάλη στρατιά του Αρτάβαζου, σατράπη της Περσικής Αυτοκρατορίας.

Προκειμένου να επιβεβαιώσει ότι η πόλη σώθηκε από τσουνάμι, η ομάδα του Δρ Ράιχερτερ πραγματοποίησε δειγματοληψίες ιζημάτων στις βόρειες και ανατολικές ακτές του Θερμαϊκού.



Τα κόκκινα αστέρια αντιστοιχούν στα σημεία δειγματοληψίας

Οι πυρήνες που ανασύρθηκαν από τις ερευνητικές γεωτρήσεις αποκάλυψαν ενδείξεις «θαλάσσιων συμβάντων υψηλής ενέργειας», τα οποία χρονολογήθηκαν στον 5ο π.Χ. αιώνα. Τις ενδείξεις αυτές ενισχύουν τα ευρήματα στην αρχαία πόλη της Μένδης, λίγο νότια της Ποτίδαιας: πολύ αρχαιότερα θαλάσσια όστρακα που μεταφέρθηκαν από τον πυθμένα του κόλπου βαθιά μέσα στις ακτές.

Σύμφωνα με τους ερευνητές, η μοντελοποίηση της σεισμικής δραστηριότητας στη λεκάνη του Βορείου Αιγαίου υποδεικνύει ότι η περιοχή θα μπορούσε να πληγεί και στο μέλλον από μεγάλα τσουνάμι.

Ο Θερμαϊκός Κόλπος, επισημαίνει ο Ράιχερτερ, δεν περιλαμβάνεται σήμερα στις δέκα ελληνικές περιοχές που απειλού-

νται περισσότερο από τσουνάμι. Σύμφωνα με τον ίδιο, οι Αρχές θα έπρεπε να εξετάσουν το ενδεχόμενο προσθήκης του Θερμαϊκού στην εν λόγω λίστα, δεδομένου μάλιστα ότι οι ακτές του είναι πυκνοκατοικημένες.

Η μελέτη παρουσιάστηκε στο ετήσιο συνέδριο της Σεισμολογικής Εταιρείας Αμερικής (SSA), το οποίο πραγματοποιείται στο Σαν Ντιέγκο.

(Newsroom ΔΟΛ / 20 Απρ. 2012, <http://news.in.gr/science-technology/article/?aid=1231192295>)

Ένα τσουνάμι έσωσε την Ποτίδαια από τους Πέρσες



Η Ποτίδαια, στη χερσόνησο της Κασσάνδρας, σώθηκε από τους Πέρσες εισβολείς το χειμώνα του 479 π.Χ. χάρη σε ένα... τσουνάμι, υποστηρίζεται σε μελέτη που παρουσιάστηκε σήμερα στις ΗΠΑ και η οποία προειδοποιεί για το σεισμικό κίνδυνο που υπάρχει στην περιοχή αυτή και για την πιθανότητα να επαναληφθεί το φαινόμενο.

Οι νέες γεωλογικές μελέτες αφήνουν να εννοηθεί ότι η περιοχή μπορεί να είναι ευάλωτη σε κάποιο παλιρροϊκό κύμα, εξήγησε ο Κλάους Ράιχερτερ, του Πανεπιστημίου του Άαχεν, ο κυριότερος συγγραφέας της μελέτης. Ο Ηρόδοτος είχε περιγράψει τότε το παράξενο φαινόμενο, την «απόσυρση» της θάλασσας από την Ποτίδαια και τα τεράστια κύματα που ακολούθησαν.

Ο Ράιχερτερ και οι συνάδελφοί του επαλήθευσαν την αφήγηση αυτή αναλύοντας δείγματα που έλαβαν από τη χερσόνησο της Κασσάνδρας και τα οποία αποκάλυψαν ενδείξεις ενός θαλάσσιου φαινομένου «μεγάλης ισχύος», όπως τεράστια κύματα.

Από τις ανασκαφές που έγιναν επίσης κοντά στην γειτονική, αρχαία πόλη της Μένδης διαπιστώθηκε ότι την εποχή εκείνη σημειώθηκαν πολύ έντονα φυσικά φαινόμενα στην περιοχή. Το ιζηματογενές στρώμα της Μένδης περιέχει όστρακα πολύ παλαιότερης εποχής που πιθανότατα μεταφέρθηκαν εκεί από τα βάθη της θάλασσας, μέσω των τεράστιων παλιρροϊκών κυμάτων.

Η ζώνη αυτή δεν περιλαμβάνεται στις δέκα περιοχές της Ελλάδας όπου θεωρείται ότι υπάρχει κίνδυνος για δημιουργία τσουνάμι. Ο Ράιχερτερ και η ομάδα του πιστεύουν όμως ότι οι ανακαλύψεις τους δείχνουν πως ο Θερμαϊκός Κόλπος θα πρέπει να ενταχθεί στον κατάλογο των περιοχών αυτών, δεδομένου ότι πρόκειται για μια πυκνοκατοικημένη ζώνη, με πολλές μόνιμες κατοικίες, ξενοδοχεία και εξοχικά σπίτια.

Ο ερευνητής θα παρουσιάσει τη μελέτη του στο ετήσιο συνέδριο της Αμερικανικής Εταιρείας Σεισμολογίας (SSA) στο Σαν Ντιέγκο της Καλιφόρνιας.

The first description of a tsunami in 479 BC by Herodotus: sedimentary evidence in the Thermaikos Gulf (Greece)

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The Herodotus Histories (Urania, Book 8, 129) report on a series of large waves and sea withdrawals occurring in winter 479 BC during the Persian-Greek war. Large portions of the Persian troops perished by drowning near Potidaea, western Chalkidiki peninsula (Greece), while sieging the Greek village. Therefore, Herodotus's report is regarded and interpreted as the first description of a historical tsunami. The ancient Mende situated on the Possidi peninsula of Kassandra was a quite important city in the classic Hellenistic period, already founded in the 13th cent. BC. However, the youngest parts of the city are situated close to the sea-side (proasteion of the 6-5th cent. BC). Within the excavation of the proasteion, a high-energy layer has been encountered. Besides a vast amount of ceramics, the layer also contains shells of *Acanthocardia* sp. These have been dated as c. 2500 a BP (14C, taking into account a reservoir effect of 400 a). More evidence has been found on the Possidi peninsula where we drilled shallow cores (up to 10 m). In the cores we found sedimentary evidence for high-energy events. Also, the last cult building of the Poseidon sanctuary has an age of mid-5th cent. BC. Modelling of the tsunami potential along the western tip of the North Anatolian Fault Zone in the North Aegean Basin revealed the possibility of high waves induced by seismicity (Reicherter et al., 2010). This area was not included in the ten "tsunami" regions of Greece, data presented in this paper clearly show that the Thermaikos Gulf should be included in the areas of tsunami hazards. This is a densely populated area, where the second biggest city of Greece and several holiday resorts do exist.

Reicherter, K., Papanikolaou, I., Roger, J., Mathes-Schmidt, M., Papanikolaou, D., Rössler, S., Grützner, C., Stamatis, G., 2010. Holocene tsunamigenic sediments and tsunami modeling in the Thermaikos Gulf area (northern Greece). *Zeitschrift für Geomorphologie N.F. Suppl.* 54/3: 99-126.

(<http://www2.seismosoc.org/FMPPro>)

Το άρθρο αυτό αποτελεί προϊόν του ερευνητικού προγράμματος «Tracing tsunami deposits in the Thermaikos Gulf, Northern Greece. Implications for seismic and tsunami hazard and archaeology» στο οποίο συμμετέχουν οι Καθ. Δημήτριος Παπανικολάου, Πανεπιστήμιο Αθηνών (Εργαστήριο Φυσικών Καταστροφών), Καθ. Γεώργιος Σταμάτης, Γεωπονικό Πανεπιστήμιο Αθηνών (Εργαστήριο Ορυκτολογίας – Γεωλογίας) και Δρ. Ιωάννης Παπανικολάου, Γεωπονικό Πανεπιστήμιο Αθηνών και UCL London, από την ελληνική πλευρά και Prof. Dr. Klaus Reicherter, Dr. Margret Mathes-Schmidt και Dipl. Geophys. Christoph Grützner, από την γερμανική πλευρά.

This project aims to the extraction and study of sediment cores from coastal deposits of the Thermaikos Gulf in Northern Greece, in order to identify tsunami deposits and correlate them to the activity of faults from the North Aegean Basin. Based on the Herodotus reports in 479 B.C. during the Greek-Persian war, a series of large sea waves

and water sea withdrawals occurred that could represent a tsunami generation, partly destroyed the Persian Fleet in Potidaea, western Chalkidiki peninsula. We, hence, try to contribute to the seismic and tsunami hazard assessment in coastal areas of Northern Greece.



Evaluating the Impact of Earthquakes on Minoan Coastal Settlements: an Example from the Archaeological Site of Sissi, North-Eastern Crete (Greece)

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According to the traditional view, seismic events played an important role in the history of Bronze Age (Minoan) Crete (ca. 3000-1200 BC): catastrophic earthquakes repeatedly destroyed settlements, shaped religious beliefs and influenced the political geography of the island. The lack of strong, supportive archaeological evidence for such effects has, however, progressively led archaeologists to disregard the Bronze Age seismicity of Crete. Moreover, the vision of Minoan society as a passive victim of ancient earthquakes is clearly at odds with current efforts to reconsider such conventional versions of Minoan history. It is suggested that any attempt to reach a more elaborate understanding of the relationship between earthquakes and Minoan society will necessitate a better grasp of the effects of seismic events on archaeological stratigraphical records. This is particularly true for coastal archaeological sites where destructive agents such as tsunamis, storms, and seaborne attacks can obscure earthquake damage patterns. A territorial approach testing the existence of synchronous and regional damage is brought forward as a way to identify ancient earthquake effects. In this perspective, and in contexts where radiocarbon chronology is not available, ceramic analyses provide an invaluable tool for assessing the temporal relationship between damage events. They also allow shedding light on the processes having led to the formation of archaeological destruction layers. These perspectives are discussed in the Late Minoan IIIB (ca.1300-1200 BC) context at the archaeological site of Sissi, an ancient harbour excavated in 2007-2011 by the Belgian School at Athens and located on the north-eastern coast of the island.

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Wastewater could generate electricity while cleaning itself

Wastewater could become a source of energy by combining two technologies -- one that relies on bacteria and the other on salty and fresh water -- that clean the wastewater itself during the process of generating electricity. "We're seeing this technology evolve very quickly," said Bruce Logan, an environmental engineer. The process could provide energy needed for wastewater treatment in the U.S. and "[that] is a problem that we can solve."

In Bruce Logan's lab, scientists are using sewage to create electricity. They can use wastewater from households, companies, or farms—virtually any stream with organic material in it. Better yet, the process of harvesting energy from wastewater also cleans it. Logan has been working on this process for years, and the systems he's developed are getting better at doing this work. One day soon, they could stand alone, with wastewater providing all the power needed for its own sanitation.

An environmental engineer, Logan began with the idea that bacteria can generate electricity. Wastewater has plenty of bacteria, which helps process the organic materials dirtying the water. But when Logan first examined the technology to capture bacteria-generated electricity, the amount of power he could produce from a given volume of wastewater was "very, very, very, very low," he says.

The bacteria seemed the obvious culprit—perhaps they could be altered to produce more electrical power, he thought. But soon Logan and his colleagues realized that the bacteria were producing much more power than they given it credit for. Instead of fixing the bacteria, the engineers began tweaking the chemistry and physics of the system in which the bacteria were working.

These systems are called microbial fuel cells. To understand how they work, think about *The Matrix*, Logan suggests. "The premise of the movie was that humans were in these pods, and they were supplying electricity to the machines," he says. "You and I eat food and generate energy," and bacteria do the same thing. In aerobic conditions, the electrons they generate latch onto oxygen. But in a microbial fuel cell, the wastewater-dwelling bacteria are deprived of oxygen. Those electrons have to go somewhere, and in the fuel cell, they travel to an electrode. From there, they flow to the other side of the cell, creating an electrical current. On the other side, those electrons find oxygen and protons, with which they can combine. The end results: electricity and water.

Over time, Logan says, he and his colleagues improved the materials, their strategies for building the cells, and their understanding of the underlying microbiology and electrochemistry. Their results improved, but not enough. They kept trying out ideas to improve the cells. And every once in a while, Logan says, "You come up with a really good idea."

The results of one such idea—to combine this technology with another in an effort to boost power—were published last week in *Science*. In this particular setup, Logan's lab combined a microbial fuel cell with reverse electrodialysis, a technique to capture the energy between gradients of salty and fresh water. On their own, neither of these technologies could produce energy efficiently enough. Together, they worked much better, Logan found.

"One of the criticisms we received has been: 'You're taking two technologies that haven't made it on their own and putting them together. Isn't that a formula for disaster?'" he says. "But if you have a wooden stick and try to chop wood, nothing's going to happen. If someone gives you a piece of heavy metal and you try that, nothing's going to happen. But if you put that stick and heavy metal together, you can split the wood. Sometimes things by themselves aren't as good as they are together."

In this case, the energy the microbial fuel cell harnesses boosts the reverse electrodialysis system, which channels the power of ions as they move through a series of membranes from salty water to fresh water. The boost from the cell means that the system needs fewer membranes to be effective. That makes it cheaper. It's also a closed system, so it doesn't require new inputs. It just means that the amount of power generated by any particular volume of wastewater increases.

Logan's goal is to eliminate the need to burn coal, oil or gas in order to process. He's close: the amount of energy he can generate from a unit of wastewater almost matches the amount needed to process it. "We're seeing this technology evolve very quickly," he says. "If in 10 years, I'm telling you the same thing, it's a problem. But we know a lot more than we did 10 years ago." To find the energy needed to process wastewater in the United States — "that looked easily within our grasp," he says. "This is a problem that we can solve."

(Sarah Laskow / GOOD ENVIRONMENT, 8th March 2012, <http://www.good.is/post/where-bacteria-meets-the-matrix-wastewater-could-provide-electricity-to-clean-itself-up>)



ΥΠΟΓΕΙΕΣ ΠΟΛΕΙΣ

Μία πόλη κάτω από τη γη (pics)

Η πόλη Coober Pedy βρίσκεται στο βόρειο τμήμα της Νοτίου Αυστραλίας και είναι γνωστή ως "η πρωτεύουσα του οπαλιού", καθώς σχεδόν το 95% από το ορυκτό οπάλιο της παγκόσμιας παραγωγής προέρχεται από τα τοπικά ορυχεία. Αυτή η μικρή πόλη, με πληθυσμό περίπου 3.000 άτομα, βρίσκεται κάτω από τη γη.



Πάνω από 1900 άνθρωποι ζουν υπογείως. Τα πάντα είναι υπόγεια: τα σπίτια, τα καταστήματα και τα ορυχεία, τα νεκροταφεία, τα μπαρ, τα μουσεία κ.ά.

Οι τρομερά υψηλές θερμοκρασίες της περιοχής οδήγησαν τους κατοίκους κάτω από τη γη! Εκεί εργάζονται, περνούν

τη μέρα τους, έχουν τα σπίτια τους, πηγαίνουν βόλτες. Είναι απίστευτο, κι όμως οι κάτοικοι της πόλης Coober Pedy περνούν τον περισσότερο χρόνο τους με αυτόν τον τρόπο.

(15 Απριλίου 2012,
<http://www.akous.gr/post.asp?uid=3192>)

Απίστευτο σπίτι μέσα στη γη, στην Ελβετία

Έχετε σκεφτεί ποτέ, πως θα ήταν να ζείτε μέσα σε ένα τουνελ; Σήμερα, σας δείχνουμε μια βελτιωμένη έκδοση αυτού, το οποίο είναι ένα πλήρως εξοπλισμένο σπίτι. Χτισμένο στο Ελβετικό χωριό Βαλς, χτισμένο μέσα στα βουνά. Το ασυνήθιστο αρχιτεκτονικό σχέδιο έγινε από τις εταιρείες SeARCH και Christian Muller Architects, και περιλαμβάνει όλες τις εγκαταστάσεις ενός κοινού σπιτιού καθώς και ειδικούς εσωτερικούς χώρους που θυμίζουν υπόγεια μονοπάτια. Η είσοδος είναι οβάλ και οδηγεί σε μερικά σκαλοπάτια, φτιαγμένα από ... πέτρα. Τέλος, υπάρχουν μεγάλα παράθυρα που φέρνουν το φως μέσα στους εσωτερικούς χώρους.



ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

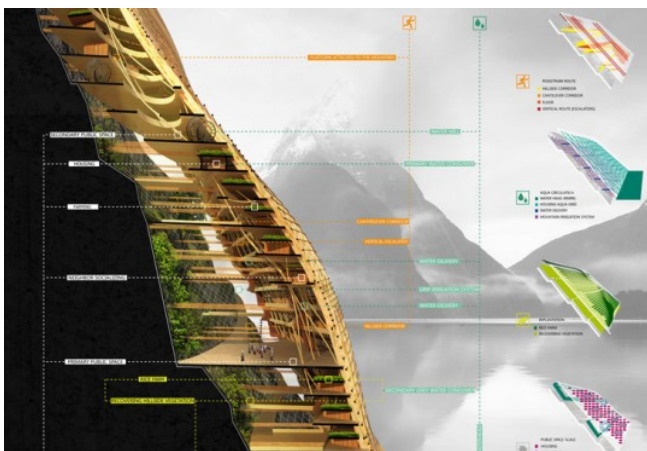
Skyscraper on a mountainside: A sustainable village in China

A proposed skyscraper structure built into the side of a mountain in southern China won second place in eVolo's 2012 SkyScraper Competition. The project, called Mountain Band-Aid, seeks to simultaneously restore the displaced mountain inhabitants and reclaim over-mined mountains. The two-layered structure would create a village complete with vertical rice paddies and an irrigation system based on greywater reclamation and rainwater catchment.

'Mountain Band-Aid' Transforms Strip-Mined Mountainside Into a Vertical Eco Village



Mountain Band-Aid is a plan for a sustainable city designed to help mitigate mining damage in southern China while providing a place for local inhabitants to repopulate the countryside. From a distance, the vertical village looks like a graft of humanity onto the countryside – it reclaims the industrial scars created by past generations so that future generations can return to a lifestyle integrated with their surroundings. The project was recently awarded second place in eVolo's 2012 Skyscraper Competition.



Designers Yiting Shen, Nanjue Wang, Ji Xia, Zihan Wang show great sensitivity to place with their Mountain proposal. The industrialization of southern China has displaced many of the region's original inhabitants, and adding to the devastating change is a landscape which has been torn up for mineral wealth.

The team's proposal takes the "traditional Chinese Southern building style known as *Chuan Dou*" and applies it vertically to the stripped face of the mountain. Large beams sunk into the mountainside support a lattice and platforms which hold the residences and workspaces, creating an 'inner layer' and an 'outer layer'. The unique spaces created by the mountain-straddling skyscraper emulate a traditional Hmong mountain village, giving residents an opportunity to return to a life they have lived for centuries.

The traditionally-sized living and working arrangements are set on the 'outer layer', creating a village complete with vertical rice paddies. The 'inner layer' holds community spaces and interfaces with the mountain. An irrigation system based on rainwater catchment and grey water reclamation feeds plants re-established on the mountainside. We are not sure how the plants receive sunlight, but bear with us. Vertical escalators move residents quickly up and down the face of the skyscraper village, and an inner path links all the levels for a more relaxed stroll through the 21st-century neighborhood.

(Andrew Michler / Inhabitat, March 06, 2012, <http://inhabitat.com/mountain-band-aid-transforms-strip-mined-land-into-a-vertical-eco-village/>)



Σκηνή κυνηγιού Ιουράσιο ψάρι τρώει πτερόσαυρο που έφαγε ψάρι



Ο ασιδόρυγχος διαπέρασε με το ρύγχος του το φτερό του πτερόσαυρου. Το τελευταίο γεύμα του ερπετού μόλις που διακρίνεται στον οισοφάγο του (E.Frey et al./PLOS ONE)

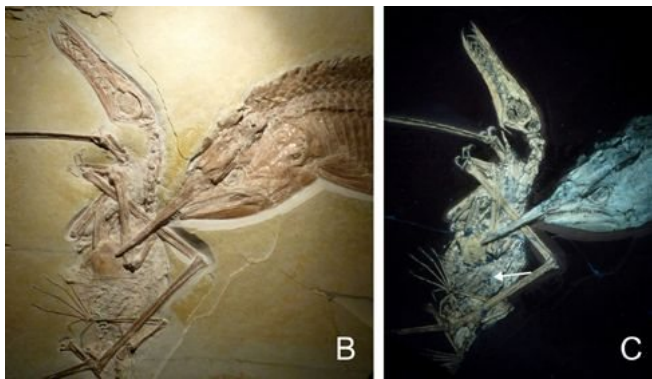
Ένα εκπληκτικό εύρημα ανακάλυψαν ερευνητές στη Γερμανία. Σε μια περιοχή της Βαυαρίας εντόπισαν ένα απολιθωμα στο οποίο αποτυπώνεται μια σκηνή ηλικίας 120 εκατομμυρίων ετών. Πρωταγωνιστές είναι ο ασιδόρυγχος (*aspidorhynchus*), ένα ψάρι με μήκος περίπου 60 εκατοστά που διέθετε ένα μακρύ ρύγχος που το χρησιμοποιούσε ως όπλο και ένα μικρό είδος πτεροσαύρου.

Το απολιθωμα δείχνει το ψάρι να έχει πραγματοποιήσει ένα μακροβούτι καταφέρνοντας να αρπάξει τον πτερόσαυρο ο οποίος την ώρα της επίθεσης έτρωγε ένα μικρό ψάρι. Όπως φαίνεται ο πτερόσαυρος ήταν απασχολημένος με την επίθεση στο μικρό ψάρι (το ψάρι ανήκε στο γένος των λεπτολεπιδών) και έμεινε εκτεθειμένος στον ασιδόρυγχο που παραμόνευε και πετάχτηκε από το νερό αρπάζοντας τον πτερόσαυρο.

Τυχαία και μοιραία επίθεση

Οι ειδικοί έχουν εντυπωσιαστεί από το εύρημα αφού, εκτός από το γεγονός ότι πρόκειται για ένα εξαιρετικά σπάνιο είδος απολιθώματος, η ίδια η επίθεση δεν είναι συμβατή με όσα γνωρίζουν οι επιστήμονες. Δεν πιστεύουν ότι ο ασιδόρυγ-

χος είχε στο διατολόγιο του πτεροσαύρου και συμπεραίνουν ότι μάλλον του επιτέθηκε κατά λάθος.



«Συνήθως αυτά τα δύο ζώα δεν έχουν καμία επαφή και σχέση μεταξύ τους. Τα ψάρια δεν είναι πολύ έξυπνα και έτσι κάποιες φορές κάνουν επιθέσεις που αποδεικνύονται μοιραίες για αυτά. Παραδείγματος χάριν, ορισμένες φορές τα ψάρια επιτίθενται σε κάποιο άλλο ψάρι που είναι τόσο μεγάλο ώστε δεν μπορούν να το καταπιούν και τελικά χάνουν τη ζωή τους αφού πνίγονται στην προσπάθειά τους να το φάνε. Κάτι ανάλογο συνέβη και στην προκειμένη περίπτωση» αναφέρει ο Ερμπερχαρντ Φρέι, παλαιοζωολόγος στο Μουσείο Φυσικής Ιστορίας της Καρλσρούης που ήταν μέλος της ερευνητικής ομάδας.

Οι ερευνητές πιστεύουν ότι το ψάρι κατάφερε να πιάσει τον πτερόσαυρο αλλά δεν μπορούσε να τον εξοντώσει και πολύ περισσότερο να τον καταναλώσει. Έτσι τα δύο ζώα πάλεψαν για λίγη ώρα έξω από νερό και στη συνέχεια το ψάρι κατάφερε να τραβήξει μέσα στο νερό τον πτερόσαυρο αλλά τελικά κανένα από τα δύο ζώα δεν κατέφερε να επιβιώσει.

(Βήμα Science / Newsroom ΔΟΛ, 12 Μαρ. 2012)



Tunnel design investigated in Swiss bus crash that killed 28

A coach crashed in a tunnel in Switzerland last month killing 28 people. The vehicle impacted a wall head on, killing both drivers. No other vehicles were involved.

Peter Bishop, chairman of the Road Tunnel Operator Association said, "I've examined the photos carefully. The crash definitely occurred in a lay-by. It was not clear at first as it looked like a built-out structure. The tunnel is 2.5km-long with twin tubes very close together.

"The European Tunnel Register requires tunnels of this length to have lay-bys and safety niches. It seems that the driver lost control of the vehicle and mounted the kerb before hitting the wall."

Swiss prosecutor Olivier Elsig said that there were a few possible causes of the crash. An autopsy would conclude if the driver was ill, though there was no evidence and that driver error was another possibility.

UK paper The Telegraph reported that the Swiss Federal Office for Roads was examining whether the angle of the wall increased the severity of the crash.

Bishop said, "The problem with permanently changing the angle of the wall, or introducing crash barriers is the deflection factor. The vehicle will deflect. This can be into the

traffic of the tunnel and you can have a far worse accident involving many vehicles.

"It also comes to likelihood, the aperture of this lay-by measured against the entire length of the tunnel is very small. Crash cushions have been proposed in the past, but the angle of impact required is awkward in a tunnel."

Belgian Transport Minister Melchior Wathelet said both drivers were well rested. They were hired to conduct tourists away from a ski resort and had arrived the night before, resting during the day before departure as per the law. No alcohol was found in the active driver's blood and Elsig said there was no evidence of illness.

Elsig said the bus was new, and added that initial investigations suggested the coach was not exceeding the 100kph speed limit.

Swiss journalist Ruth Seeholzer told UK national media company BBC that driving conditions were normal and the two-lane tunnel was not busy with traffic when the accident happened.

A police spokesman said reports that the driver was changing a DVD at the time of the crash were "pure speculation". Swiss newspaper 'Le Matin Dimanche' ('Sunday Morning') quoted the father of an injured victim saying the last thing his daughter remembered was a teacher approaching the driver with a DVD.

Investigations were ongoing as T&TI went to press. Bishop concluded, "Speed is the vital factor in tunnel crashes. It would have made an awful difference in this case as the smallest error of judgement is needed for a disaster. I don't think a catastrophe of this magnitude could have been prevented, but we are pushing for speed reductions with the Highways Agency.

"All tunnel designers will now be looking at their structures. There is a forum in April near Farnborough, UK that did not have this accident on the agenda, but I think now it will be a serious topic."

(Tunnels & Tunnelling International Newsletter, 23.03.2012 <http://www.tunnelonline.info/story.asp?sectioncode=1&storycode=70079&c=3>)



Αυτός ο μυστήριος δορυφόρος μας Νέα στοιχεία θέτουν σε αμφισβήτηση την «πα- ραδοσιακή» θεωρία δημιουργίας της Σελήνης

Οι επιστήμονες, εδώ και χρόνια, πιστεύουν ότι η Σελήνη δημιουργήθηκε μετά από μία σφοδρή σύγκρουση ενός μεγάλου ουράνιου σώματος όσο ο 'Αρης πάνω στη Γη, πριν από περίπου 4,5 δισ. χρόνια. Όμως αυτή η επικρατούσα θεωρία τίθεται τώρα σε αμφισβήτηση, καθώς μία νέα χημική ανάλυση των σεληνιακών πετρωμάτων, όσον αφορά την ποσότητα του τιτανίου, διαπίστωσε ότι είναι υπερβολικά όμοια με την αντίστοιχη των γήινων πετρωμάτων, κάτι που δεν δικαιολογείται αν το φεγγάρι είχε σχηματιστεί από δύο διαφορετικά σώματα, τη Γη και το άλλο που έπεσε πάνω της.

Σύμφωνα με το Science και το Nature, οι ερευνητές του πανεπιστημίου του Σικάγο, με επικεφαλής την γεωχημικό Τζουντζούν Ντρανγκ (δημοσίευσαν τη σχετική μελέτη στο περιοδικό γεωεπιστήμης «Nature Geoscience») χρησιμοποίησαν ένα φασματογράφο μάζας για να κάνουν την πιο ακριβή μέτρηση που έχει γίνει μέχρι σήμερα, της αναλογίας των

ισοτόπων τιτανίου-50 και τιτανίου-47, τα οποία περιέχονται στα δείγματα σεληνιακών βράχων που έφεραν για μελέτη στη Γη οι αποστολές «Απόλλων» τη δεκαετία του 1970 (τα άτομα των περισσότερων χημικών στοιχείων, όπως το τιτά-νιο, υπάρχουν στη φύση σε ελαφρώς διαφορετικές μορφές, που λέγονται ισότοπα και έχουν διαφορετικές μάζες ανάλογα με τον αριθμό των νετρονίων στον πυρήνα τους).

Οι επιστήμονες διαπίστωσαν ότι η αναλογία των δύο ισοτό-πων στη Σελήνη είναι ουσιαστικά ίδια με αυτή που υπάρχει στον μανδύα της Γης (το στρώμα μεταξύ του φλοιού και του πυρήνα), δηλαδή περίπου 4 μέρη ανά εκατομμύριο. Όμως αυτή η ομοιότητα δεν δικαιολογείται, αν η Σελήνη, από γε-ωλογική άποψη, αποτελεί όχι κομμάτι μόνο της Γης, αλλά μίγμα δύο ουρανίων σωμάτων.

Κανονικά, η χημική «υπογραφή» της Σελήνης θα έπρεπε να αντανakά και τους δύο «γονείς» της, τόσο τη Γη, όσο και το άλλο άγνωστο σώμα που συγκρούστηκε με τον πλανήτη μας. Το σώμα αυτό πρέπει να είχε διαφορετική γεωχημική σύσταση από τη γήινη, αφού οι μελέτες μετεωριτών που έχουν πέσει στη Γη από το διάστημα, δείχνουν ότι έχουν αφθονία ισοτόπων τιτανίου (έως 600 μέρη ανά εκατομμύρι-ο).

Οι επιστήμονες έχουν υπολογίσει ότι, μετά την τρομακτική πρόσκρουση και τα υλικά που εκτινάχτηκαν στο διάστημα για να σχηματίσουν τελικά το δορυφόρο μας, η Γη συνεισέ-φερε κατά προσέγγιση έως το 60% της Σελήνης και το άλλο σώμα τουλάχιστον το 40%. Έτσι, η Σελήνη δεν θα έπρεπε σήμερα να έχει ακριβώς ίδια με τη Γη αναλογία των ισοτό-πων τιτανίου στο έδαφός της.

Η νέα ανάλυση δεν είναι η μόνη που ρίχνει σοβαρή σκιά αμφιβολίας στην προέλευση της Σελήνης. Οι επιστήμονες ήδη γνωρίζουν ότι η αναλογία των ισοτόπων οξυγόνου στα σεληνιακά πετρώματα είναι επίσης ίδια με αυτή στον μανδύα της Γης. Η ανακάλυψη ότι κάτι ανάλογο συμβαίνει με το τιτά-νιο, ενισχύει την άποψη ότι κάτι πάει λάθος με την κυρί-αρχη θεωρία δημιουργίας της Σελήνης.

Μία εναλλακτική θεωρία, που θα εξηγούσε καλύτερα τα νέα στοιχεία, είναι ότι η Σελήνη δημιουργήθηκε αποκλειστικά από τη Γη, όταν ένα τμήμα της τελευταίας αποκόπηκε, όσο ακόμα η φυγόκεντρη δύναμη του πλανήτη μας ήταν ισχυρό-τερη από την κεντρομόλο δύναμη της βαρύτητας. Όμως και αυτό το σενάριο έχει διάφορες αδυναμίες. Από την άλλη, οι επιστήμονες προσπαθούν να φανταστούν μία κατάλληλη τροποποίηση του κυρίαρχου μοντέλου της δημιουργίας της Σελήνης μετά από πρόσκρουση, έτσι ώστε να εξηγούνται και τα νέα στοιχεία. Σε κάθε περίπτωση πάντως, δεν υπάρχει ακόμα οριστική απάντηση για τον τρόπο που δημιουργήθηκε το φεγγάρι.

(Newsroom ΔΟΛ, 26 Μαρ. 2012)



Aizhai suspension bridge in Hunan opens to traffic **China opens record-breaking bridge over canyon**

The world's highest and longest tunnel-to-tunnel bridge has been completed in China.

The bridge, named the Aizhai Extra Large Suspension Bridge, will link together two tunnels 1,176 metres apart, and 355 metres above Hunan's Dehang Canyon.

A key section of the 64-kilometre-long Jishou-Chadong Ex-pressway, the bridge features a standard two-way, four-

lane motorway. The expressway runs through 18 tunnels in total, which cover about half of its length.



Construction of the bridge started in October 2007, with its main sections being completed at the end of 2011. The bridge was temporarily opened to pedestrians during the 2012 Spring Festival holiday season in February.

The structure is designed to help ease traffic in the moun-tainous region, where tailbacks are a common occurrence due to its narrow, steep and winding roads.

It has been dotted with 1,888 lights to increase visibility at night.

Construction of Aizhai Bridge started in Xiangxi Tujia and Miao Autonomous Prefecture in Hunan Province in October 2007.

(People's Daily Online, April 1, 2012, <http://english.peopledaily.com.cn/90882/7776263.html> και The Telegraph (London), March 30, 2012, <http://www.telegraph.co.uk/news/worldnews/asia/china/9175337/China-opens-record-breaking-bridge-over-canyon.html> - Ενδιαφέρον video)



China: Luxury hotel 'groundscraper' planned in abandoned quarry

Would you spend \$300 a night to sleep underground? You might, once you see the jaw-dropping designs for China's latest hotel project



For more than a decade, China has been a front-runner in the world's skyscraper race.

Now the country is taking the pole position in digging "groundscrapers" -- enormous structures built mostly underground.

Most recently, ground has been broken on construction of a high-end hotel at the foot of Shanghai's Tianmashan (Tianma Mountain) in a 100-meter-deep pit.



Developed by Shanghai Shimao Property Group and to be managed by InterContinental Hotels Group, the hotel, named InterContinental Shimao Shanghai Wonderland, is expected to extend 19 stories into the bottom of the pit.

It's due to open in late 2014 or early 2015.

Once completed, the deepest story of the luxury resort will be approximately 700 meters lower than the top floor of the world's-highest-hotel-to-be, the Shanghai Tower J Hotel in Shanghai Tower, set for completion around the same time.

19 stories, 380 rooms, underwater restaurant

The pit now and what it's expected to look like in two years.

Located about 45 kilometers southwest of Shanghai's city center, the pit in Tianmashan is 100 meters deep, 240 meters long and 160 meters wide.

The lowest 20 meters are filled with stagnant rainwater, which the hotel will retain.



"The pit has served as a quarry since the 1950s," said Yao Qi (), senior branding manager of Shanghai Shimao

Property Group. "It has been abandoned since the year 2000."

Shimao purchased the surrounding land in 2006 in order to build Shimao Shanghai Wonderland, a large-scale theme park integrating hospitality, leisure and entertainment elements. The hotel is planned as part of the wonderland complex.

Construction of the 380-room InterContinental Shimao Shanghai Wonderland commenced last month.



The 19-story hotel will have three levels above ground, and 16 underground, including an underwater restaurant.

"A 60-meter glass curtain will be built to mimic a waterfall next to the resort's main structure," said Yao.

Designed by UK-based engineering firm Atkins, the company behind the ostentatious Burj Al Arab hotel in Dubai, the quarry hotel design bagged a Gold Medal at last year's commercial real estate MIPIM Asia Awards.

Extreme sports in plan

Hotel planners are considering taking advantage of the site's surrounding cliffs by hosting activities such as rock climbing and bungee jumping.

Industry experts believe nightly room rates will start from RMB 2,000 (US\$320), twice the price currently charged by nearby five-star hotels.

Shimao is investing a total of RMB 3.5 billion (US\$555 million) in the 428,200-square-meter Shimao Shanghai Wonderland, of which RMB 600 million (US\$95 million) will go toward the subterranean resort.

The Shanghai property group has yet to reveal detailed plans for the rest of the wonderland complex.

(Raemin Zhang / CNNGo.com (Asia). 2 April, 2012, <http://www.cnn.go.com/shanghai/life/five-star-hotel-planned-in-abandoned-underground-quarry-991761>)



Μαλαισία: Μια γέφυρα στα... σύννεφα που δεν τολμάτε να διασχίσετε!



Δεν είναι λίγες οι φορές που τα ανθρώπινα δημιουργήματα μας αφήνουν με το στόμα ανοιχτό!



Μάλιστα όταν πρόκειται για την κατασκευή κάποιας γέφυρας δίνουν τον καλύτερο τους εαυτό! Έτσι έγινε και στην Μαλαισία...



Η Langkawi sky-bridge βρίσκεται στα 700 μέτρα πάνω από την επιφάνεια της θάλασσας και εκτείνεται σε 125 μέτρα πέρα από τα βουνά, προσφέροντας υπέροχη θέα!



Και ΜΟΝΟ κοιτώντας τις φωτογραφίες όμως θα ευχηθείτε να μη χρειαστεί να τη διασχίσετε ποτέ! 'Η μήπως όχι;;

(Πηγή: www.travelstyle.gr)

«Αμαξοστοιχίες από αυτοκίνητα» στη Σουηδία

Οι επιστήμονες και οι τεχνικοί που συμμετέχουν στο ευρωπαϊκό πρόγραμμα Sartre (Safe Road Trains for the Environment) υποστηρίζουν ότι έφεραν ένα βήμα πιο κοντά την εποχή όπου οι οδηγοί των Ι.Χ. θα μετακινούνται με ασφάλεια και ξεκούραστα στις εθνικές οδούς, αναθέτοντας την οδήγηση του αυτοκινήτου σε κάποιο διερχόμενο όχημα δημόσιας χρήσης - ένα λεωφορείο ή ένα φορτηγό. Στόχος του Sartre, στο οποίο συμμετέχει η Volvo, είναι να αναπτύξει τεχνολογίες που θα επιτρέπουν στα Ι.Χ. να σχηματίζουν «αμαξοστοιχίες από αυτοκίνητα» - δηλαδή κονβόι όπου τα Ι.Χ. θα επιταχύνουν, θα φρενάρουν και θα στρίβουν αυτόματα, ακολουθώντας πιστά το όχημα που θα είναι επικεφαλής του κονβόι. Και, πριν από λίγες εβδομάδες, οι επιστήμονες δοκίμασαν με επιτυχία σε πίστα στη Σουηδία μία τέτοια αυτοκινητοπομπή, η οποία αποτελούνταν από τρία αυτοκίνητα κι ένα φορτηγό.

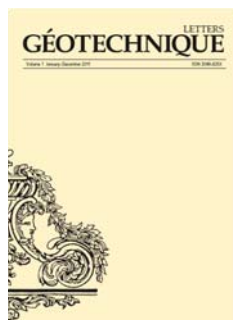
Στο πλαίσιο του Sartre αναπτύσσεται ένα σύστημα αυτόματης οδήγησης για Ι.Χ., αλλά και τηλεπικοινωνιακός εξοπλισμός ώστε τα Ι.Χ. να «συνεννοούνται» με τα οχήματα δημόσιας χρήσεως. Έτσι, όταν ένα αυτοκίνητο κινείται σε οποιονδήποτε αυτοκινητόδρομο ή εθνική οδό, θα «καταλαβαίνει» π.χ. αν κάποιο από τα λεωφορεία που βρίσκεται στον δρόμο του κατευθύνεται προς τον ίδιο προορισμό. Σε αυτή την περίπτωση, το αυτοκίνητο θα ειδοποιεί τον οδηγό ότι έχει την ευκαιρία να θέσει σε λειτουργία το σύστημα αυτόματης οδήγησης: τότε, το σύστημα θα αναλαμβάνει το... τιμόνι, φροντίζοντας ώστε το αυτοκίνητο να παραμένει συνεχώς σε σταθερή (και ασφαλή) απόσταση από το λεωφορείο. Ο οδηγός θα μπορεί πλέον να ασχοληθεί με οτιδήποτε άλλο, διαβάζοντας για παράδειγμα την εφημερίδα του ή σερφάροντας στο Ίντερνετ από το τηλέφωνό του. Και βέβαια, θα έχει τη δυνατότητα ανά πάσα στιγμή να πάρει ξανά υπό τον έλεγχό του το Ι.Χ. - αν, για παράδειγμα, θελήσει να βγει στην επόμενη έξοδο, εγκαταλείποντας το λεωφορείο και τον αυτοκινητόδρομο.

Πίσω από κάθε όχημα δημόσιας χρήσεως θα μπορούν να κινούνται χωρίς ανθρώπινη παρέμβαση έως και 6-8 αυτοκίνητα, συντονίζοντας συνεχώς μαζί του την ταχύτητά τους. Σύμφωνα με τους επιστήμονες, οι «αμαξοστοιχίες από Ι.Χ.» που θα σχηματίζονται με αυτό τον τρόπο θα παρέχουν μεγαλύτερη ασφάλεια, αφού υπεύθυνος για την κίνηση του κονβόι θα είναι ουσιαστικά ο επαγγελματίας οδηγός του φορτηγού, ο οποίος μάλιστα θα περνά από εξετάσεις, για να μπορεί να προσφέρει τέτοιες υπηρεσίες. Ειδικά τις ώρες αιχμής, οι αυτοκινητοπομπές θα εξασφαλίζουν επίσης μικρότερους χρόνους μετακίνησης, αφού έχει αποδειχθεί ότι η οδήγηση με σταθερή ταχύτητα είναι η καλύτερη δυνατή επιλογή για την αποφυγή της κυκλοφοριακής συμφόρησης. Εξίσου σημαντικό είναι ότι συνολικά το κονβόι θα έχει μικρότερη αεροδυναμική αντίσταση απ' ό,τι κάθε αυτοκίνητο ξεχωριστά, μειώνοντας επομένως την κατανάλωση καυσίμου έως και 20%.

Οι υπεύθυνοι του Sartre υποστηρίζουν ότι θα χρειαστούν λιγότερο από μία δεκαετία για να τελειοποιήσουν τις τεχνολογίες του πρότζεκτ, ώστε αυτές να αρχίσουν να ενσωματώνονται σε αυτοκίνητα και φορτηγά μαζικής παραγωγής. Άλλωστε, το φθινόπωρο θα συνεχίσουν τις δοκιμές στην πίστα της Volvo στη Σουηδία προσθέτοντας στην «αμαξοστοιχία» ένα ακόμη Ι.Χ.

(Η ΚΑΘΗΜΕΡΙΝΗ, 03.03.2012)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



GÉOTECHNIQUE LETTERS

**JANUARY–DECEMBER 2011
VOLUME 1**

Géotechnique Letters provides a vehicle for the rapid international dissemination of the latest and most innovative geotechnical research

and practice. As an online journal, it is aimed at publishing short papers within eight weeks of submission, intending to foster the quick exchange of the latest advances and most current ideas without the delays imposed by printed journals, whilst still maintaining rigorous peer-reviewing standards.

The scope of the journal includes the same broad range of geotechnical engineering as *Géotechnique*, while the shorter format and express publication will suit the presentation of novel or emerging ideas and designs, current case studies or the results arising from recently completed research or work in progress that may be of immediate interest to the wider geotechnical community. Papers are limited to 2000 words, they should be able to stand alone, be of high quality and scientifically correct, be placed clearly in the context of the latest research or engineering practice and contain sufficient information to allow readers to review critically the conclusions reached.

Ο 1^{ος} Τόμος είναι διαθέσιμος στην ιστοσελίδα
<http://www.icevirtuallibrary.com/upload/GeoLettersvol1.pdf>



Guide to Pavement Technology Part 2: Pavement Structural Design

Part 2 of the Austroads Guide to Pavement Technology - Pavement Structural Design contains procedures for the design of flexible

pavements consisting of unbound granular materials, flexible pavements that contain one or more bound layers, and rigid pavements, such as concrete.

This is the third revision of this guide and features substantial changes in editorial as well as technical changes in sections.

This guide is ideal for use when designing flexible and rigid pavements for conventional traffic. It is also used to develop design charts for flexible pavements for specific conditions as required by the user (example charts are in-

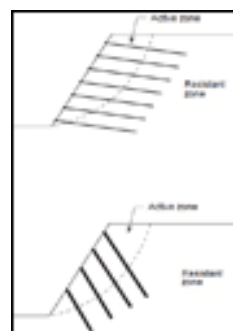
cluded in the Guide for specific design input and performance parameters).

An integral part of the pavement design process is an assessment of how well the outcome of the design – the constructed pavement – will perform. Because of the many factors which must be evaluated to design pavements, there is no absolute certainty that the desired performance will be achieved. This part provides guidance on how to design projects to a desired reliability of outlasting the design traffic. This part covers the assessment of input parameters needed for design, design methods for flexible and rigid pavements and gives guidance to the economic comparisons of alternative pavement designs.

Designers should note the following limitations of the part in terms of its scope:

- The design procedures described apply for pavements subjected to a minimum design traffic loading of 105 ESA which is for moderate-to-heavily trafficked roads. For lightly-trafficked roads environmental distress has a more significant effect on pavement performance.
- Whilst the mechanistic procedures presented in this part can be applied to any pavement type and traffic load, the pavement types addressed relate to public roads subjected to normal highway traffic only – and not to industrial pavements subjected to off road vehicle loads such as fork lifts and straddle carriers.
- The procedures in the guide are applicable to traffic with normal transverse load distribution (wander) within traffic lanes. For example, standard deviation of truck traffic wander of 200 mm to 350 mm has been reported (Jameson, Sharp & Vertessy 1992a). Caution is advised in using the Guide for pavements with truck wander different from normal highway loading.

(Austroads Publications Online,
<https://www.onlinepublications.austroads.com.au/items/AGPT02-12>)



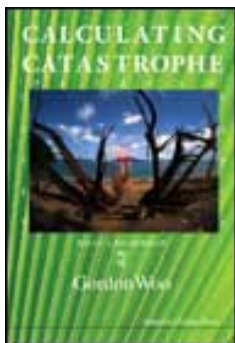
Soil nailing for slopes

TRL Report 537

P E Johnson, G B Card and P Darley

Soil nailing is a useful, economic technique for the construction of new steep cuts or the strengthening of existing slopes. While the technique has much potential it has been adopted more slowly in the UK than in other countries. It can be difficult to achieve the optimum balance between economy and safety and, despite the availability of an Advice Note and a British Standard, design solutions have varied widely. A number of soil nailing schemes were examined (eight of them in some detail) and used to produce a view of current experience and, where possible, current best practice was identified. The eight case histories are included in the appendices. This report should be of value in providing guidance to clients and designers involved with soil nailing works.

(TRL, 01.01.2012, http://www.trl.co.uk/online_store)



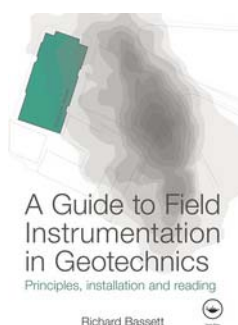
Calculating Catastrophe

Gordon Woo

This book has been written to explain, to a general readership, the underlying philosophical ideas and scientific principles that govern catastrophic events, both natural and man-made. Knowledge of the broad range of catastrophes deepens understanding of individual modes of disaster. This book will be of interest to anyone aspiring to understand catastrophes better, but will be of particular value to those engaged in public and corporate policy, and the financial markets.

Contents: Natural Hazards; Societal Hazards; A Sense of Scale; A Measure of Uncertainty; A Matter of Time; Catastrophe Complexity; Terrorism; Forecasting; Disaster Warning; Disaster Scenarios; Catastrophe Cover; Catastrophe Risk Securitization; Risk Horizons.

(World Scientific Books, June 2011,
<http://www.worldscibooks.com/mathematics/p786.html>)



A Guide to Field Instrumentation in Geotechnics: Principles, Installation and Reading

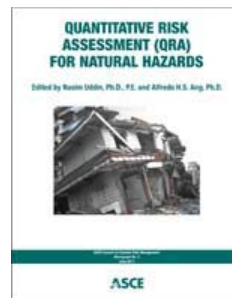
Richard Bassett

Geotechnical instrumentation is used for installation, monitoring and assessment on any sizeable project, particularly in urban areas, and is used for recording, controlled remedial work, and safety.

This unique and up-to-date book deals with the conceptual philosophy behind the use of instruments, and then systematically covers their practical use. It is divided into displacement dominated systems and stress recording systems. The limitations are discussed and the theoretical background for data assessment and presentation are covered in some detail, with some relevant background material in theoretical soil mechanics. Relevant advanced electronic techniques such as laser scanning in surveying and fibre-optics are also included and communication and data recovery systems are discussed.

It is written for senior designers, consulting engineers and major contractors who need a major introduction to the general purpose, availability and analysis of field instruments before details of their own project can be progressed, and serves as a text book to any specialist geotechnical MSc or professional seminar course in which instrumentation forms a major part.

(CRC Press, December 16, 2011)



Quantitative Risk Assessment for Natural Hazards

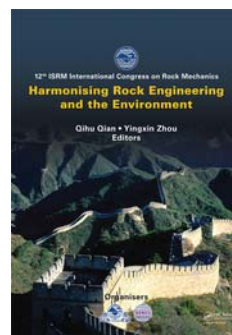
Edited by N. Uddin & A.H.S. Ang

CDRM Monographs 5

Quantitative Risk Assessment for Natural Hazards explains the practical aspects of using quantitative risk assessment (QRA) to develop optimal engineering designs that mitigate the effects of natural hazards, especially on civil infrastructure. Risk analysis of any asset cannot be considered complete without consideration of natural hazards. QRA involves determining the probability of a hazard occurring and estimating the consequences. This monograph demonstrates methods for calculating the vulnerability of infrastructure assets to the common natural hazards-earthquakes, hurricanes, tornadoes, and floods-as well as less frequent events, such as ice storms, extreme cold, wild-fires, avalanches, landslides, mud slides, and tsunamis. Chapters describe QRA for two types of asset (dams and bridges) and three hazards (wind, earthquakes, and hurricanes). Another chapter presents an all-hazards methodology for critical asset and portfolio risk analysis.

This CDRM Monograph is a valuable reference for engineers involved in safeguarding infrastructure from natural hazards, risk assessment, disaster management, engineering mechanics, and structural engineering, as well as for engineers and government officials tasked with homeland security.

(ASCE, 2011,
<http://www.asce.org/Product.aspx?id=2147487208&productid=104456169>)



Harmonising Rock Engineering and the Environment

Qihu Qian & Yingxin Zhou

Harmonising Rock Mechanics and the Environment comprises

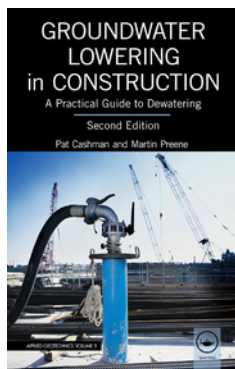
the proceedings (invited and contributed papers) of the 12th ISRM International Congress on Rock Mechanics (Beijing, China, 18-21 October 2011). The contributions cover the entire scope of rock mechanics and rock engineering, with an emphasis on the critical role of both disciplines in sustainable development and environmental preservation. The main topics include (but are not limited to):

- 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.

Harmonising Rock Mechanics and the Environment will appeal to professionals, engineers and academics in rock mechanics, rock engineering, tunnelling, mining, earthquake engineering, rock dynamics and geotechnical engineering.

(CRC Press, September 14, 2011,
<http://www.crcpress.com/product/isbn/9780415804448>)



Groundwater Lowering in Construction: A Practical Guide to Dewatering, Second Edition

Series: Applied Geotechnics

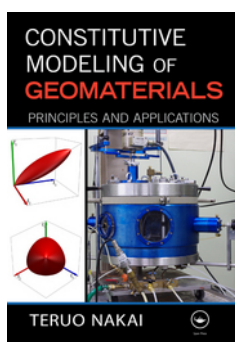
Martin Preene

Construction requires dry, stable and safe soil conditions, which frequently requires the reduction of pore pressures or groundwater levels.

This established professional guide covers the design, construction and environmental management of groundwater control and dewatering works for construction projects. It is practically oriented and written for practising construction professionals, whether engineers, geologists or hydrogeologists, and Masters level students. It is well illustrated with case studies.

Changes have been made to this new edition to reflect the considerable developments in environmental management practice and procedures and in the regulations related to groundwater control. The book contains a brand new chapter on permanent dewatering systems, and heavily revised coverage of other dewatering systems, environmental impacts, and the design of groundwater lowering systems, and coverage of specialist topics such as the management of water from sump pumping and well pointing for deeper excavations.

(CRC Press, August 03, 2012
<http://www.crcpress.com/product/isbn/9780415668378>)



Constitutive Modeling of Geomaterials: Principles and Applications

Teruo Nakai

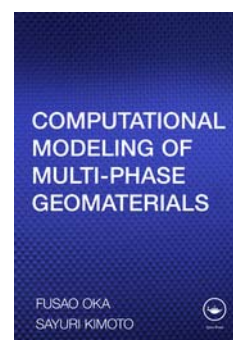
There are many constitutive models for describing the behaviour of soils, but they are invariably either very complex or limited when it comes to describing three-dimensional stress-strain behaviour. The t_{ij} concept allows you to directly extrapolate one-dimensional models into three dimensions.

Beginning with the basics of one-dimensional modelling this

book takes you through the process of modelling both simple and complex behaviour in a variety of geomaterials. These materials, including normally consolidated clay, over consolidated clay, natural deposited clay, loose sand, dense sand and others, are dealt with using simple and unified methods. You will then be introduced to the t_{ij} concept and shown how this can be used to create three dimensional models. In the second part of the book, these three-dimensional models are applied to the analysis of boundary value problems, with the author's own laboratory evidence used to prove the models' reliability.

The simplicity of the t_{ij} concept makes this book accessible for graduate students and researchers, while its reliability and flexibility make it valuable for researchers and professionals.

(CRC Press, July 23, 2012,
<http://www.crcpress.com/product/isbn/9780415557269>)



Computational Modeling of Multi-Phase Geomaterials

Fusao Oka & Sayuri Kimoto

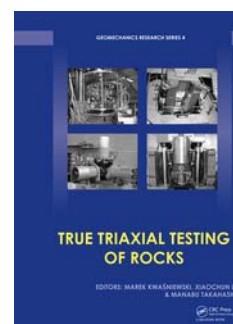
In the last three decades, studies on constitutive models and numerical analysis methods have been well developed. Numerical methods now play a vital role in Geotechnical Engineering and especially in Computational Geotechnics.

Detailing the use of constitutive modelling of multi-phase geomaterials and numerical methods, this book will show you how to predict the behaviour of geomaterials. Along with detailed coverage of viscoplasticity, large deformations and multi-phase analysis, it also includes:

- Recent advances in this area;
- constitutive modelling of soil for rate-dependent behaviour;
- applications for multi-phase theory and analysis;
- water-soil coupling and strain localization.

A valuable reference for masters students studying computational geomechanics and for professionals seeking to apply it in practice.

(CRC Press, July 20, 2012,
<http://www.crcpress.com/product/isbn/9780415809276>)



True Triaxial Testing of Rocks

Geomechanics Research Series

Editors : M. Kwasniewski, X. Li & M. Takahashi

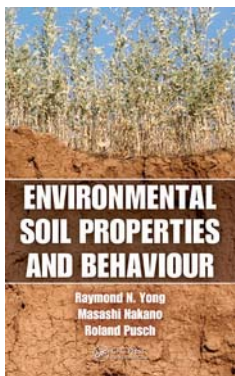
This is the first book ever published on the problems of true triaxial testing of rocks addressing all aspects of true triaxial testing of rocks, including: (i) True triaxial testing techniques and procedures; (ii) Test results:

strength, deformability, failure mode, permeability, acoustic emission, elastic wave velocity; (iii) Constitutive laws and failure criteria; (iv) Applications to geoenvironmental and geosciences.

Recent developments in the field of true triaxial testing of rocks are presented as well as a thorough review of the most important achievements in the whole history of true triaxial testing of rocks.

Almost all of researchers from all over the world, engaged in the true triaxial testing of rocks over the last three decades, have contributed to this work. The authors represent different branches of geoenvironmental and geosciences including civil engineering, engineering geology, geotechnical engineering, mining engineering, petroleum engineering, seismology and tectonophysics.

(CRC Press, May 04, 2012,
<http://www.crcpress.com/product/isbn/9780415687232>)



Environmental Soil Properties and Behaviour

R. N. Yong & M. Nakano

From bridges and tunnels to nuclear waste repositories, structures require that soils maintain their design engineering properties if the structures are to reach their projected life spans. The same is true for earth dams, levees, buffers, barriers for landfills, and other structures that use soils as engineered materials. Yet soil, a natural resource, continues to change as a result of natural and anthropogenic stresses. As the discipline of soil properties and behaviours matures, new tools and techniques are making it possible to study these properties and behaviours in more depth.

What Happens to Soil Under Weathering, Aging, and Chemical Stress?

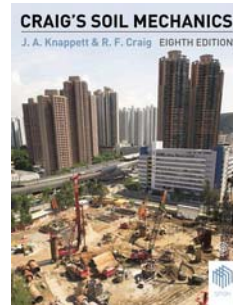
Environmental Soil Properties and Behaviour examines changes in soil properties and behaviour caused by short- and long-term stresses from anthropogenic activities and environmental forces. Introducing new concepts of soil behaviour, soil maturation, and soil functionality, it integrates soil physics, soil chemistry, and soil mechanics as vital factors in soil engineering. The book focuses on environmental soil behaviour, with particular attention to two main inter-related groups of soil-environment issues. The first is the use of soil as an environmental tool for management and containment of toxic and hazardous waste materials. The second is the impact of ageing and weathering processes and soil contamination on the properties and behaviour of soils, especially those used in geotechnical and geoenvironmental engineering projects.

A Transdisciplinary Look at Soil-Changing Processes

To determine short- and long-term soil quality and soil functionality, the authors emphasize the need to be aware of the nature of the stressors involved as well as the kinds of soil-changing processes that are evoked. This book takes a first step toward a much-needed transdisciplinary effort to develop a broader and deeper understanding of what happens to soil and how we can determine and quantify the effect of biogeochemical processes. It offers a timely resource for the study of soil properties and behaviours, ef-

fects of environmental changes, and remediation of contaminated soil.

(CRC Press, March 05, 2012,
<http://www.crcpress.com/product/isbn/9781439845295>)



Craig's Soil Mechanics, Eighth Edition

J. Knappett & R.F. Craig

"Jonathan Knappett is breathing a fresh lease of life into this old favourite with several new slants, including for the first time the design philosophy of Eurocode 7 and much new material... I propose to keep it on our list of 'must consult' textbooks."

—Edward Bromhead, Kingston University, UK

"Buying a copy of Craig as an undergraduate is a lifetime career investment."

—Geoffrey Blight, Witwatersrand University, South Africa

"All the background needed for those engaged in geotechnical engineering practice, foundation engineering and construction can be found in this book."

—Fred Boadu, Duke University, USA

"As a professor and civil engineering professional, I found this 8th edition of Craig's Soil Mechanics to be everything a beginning engineering student is looking for in an introductory textbook on soil mechanics... I would highly recommend this as one of the finest textbooks on the topic of soil mechanics."

—Gregory Ohrn, Northern Arizona University, USA

"This valuable textbook is highly recommended to students, engineers, and educators in the field of geotechnical engineering."

—Mehrdad Razavi, New Mexico Institute of Mining and Technology, USA

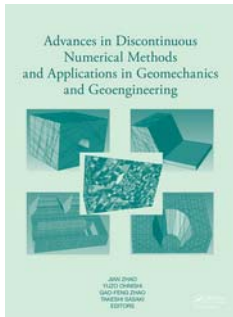
Now in its eighth edition, this bestselling text continues to blend clarity of explanation with depth of coverage to present students with the fundamental principles of soil mechanics. From the foundations of the subject through to its application in practice, Craig's Soil Mechanics provides an indispensable companion to undergraduate courses and beyond.

New to this edition:

- Rewritten throughout in line with Eurocode 7, with reference to other international standards
- Restructured into two major sections dealing with the basic concepts and theories in soil mechanics and the application of these concepts within geotechnical engineering design
- New topics include limit analysis techniques, *in-situ* testing, and foundation systems
- Additional material on seepage, soil stiffness, the critical state concept, and foundation design
- Enhanced pedagogy including a comprehensive glossary, learning outcomes, summaries, and visual examples of real-life engineering equipment

Also new to this edition is an extensive companion web-site comprising innovative spreadsheet tools for tackling complex problems, digital datasets to accompany worked examples and problems, a password-protected solutions manual for lecturers covering the end-of-chapter problems, weblinks, extended case studies, and more.

(CRC Press, February 09, 2012,
<http://www.crcpress.com/product/isbn/9780415561259>)



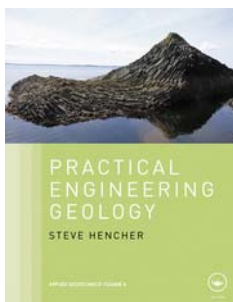
Advances in Discontinuous Numerical Methods and Applications in Geomechanics and Geoengineering

Editors: J. Zhao, Y. Ohnishi, G.-F. Zhao & T. Sasaki

Rocks and soils can behave as discontinuous materials, both physically and mechanically, and for such discontinuous nature and behaviour there remain challenges in numerical modelling methods and techniques. Some of the main discontinuum based numerical methods, for example the distinct element method (DEM) and the discontinuous deformation analysis (DDA), are associated with geomechanics and geoengineering. Discontinuous numerical methods have been widely applied in geoengineering related to civil, mining, hydropower and petroleum engineering. There are many good examples of the use of UDEC/3DEC and DDA in design and forensic of geoengineering projects, in dams, slopes, tunnels, caverns and mines. The discontinuous numerical methods provide good tools to capture the true physical and mechanical behaviours of the geomaterials, and provide the scientific insights enabling for better engineering. Discontinuous numerical methods are indeed very much research and engineering tools of the present, and certainly more in the future.

Advances in Discontinuous Numerical Methods and Applications in Geomechanics and Geoengineering is a collection of 55 technical papers presented at the 10th International Conference on Analysis of Discontinuous Deformation (ICADD-10), held 6-8 December 2011, Honolulu, USA. The papers cover a wide scope of discontinuous numerical methods from algorithms and mechanics, to modelling techniques and applications, including the key block theory, the discontinuous deformation analysis, the numerical manifold method, the distinct element method, coupled discontinuum and continuum methods, multi-scale and multi-physics in modelling, applications and case studies of engineering projects.

(CRC Press, January 27, 2012,
<http://www.crcpress.com/product/isbn/9780415684040>)



Practical Engineering Geology

Series: Applied Geotechnics

Steve Hencher

Steve Hencher presents a broad and fresh view on the importance of

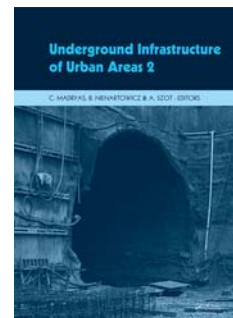
engineering geology to civil engineering projects.

Practical Engineering Geology provides an introduction to the way that projects are managed, designed and constructed and the ways that the engineering geologist can contribute to cost-effective and safe project achievement. The need for a holistic view of geological materials, from soil to rock, and of geological history is emphasised. Chapters address key aspects of

- Geology for engineering and ground modelling
- Site investigation and testing of geological materials
- Geotechnical parameters
- Design of slopes, tunnels, foundations and other engineering structures
- Identifying hazards
- Avoiding unexpected ground conditions

The book is illustrated throughout with case examples and should prove useful to practising engineering geologists and geotechnical engineers and to MSc level students of engineering geology and other geotechnical subjects.

(CRC Press, January 13, 2012,
<http://www.crcpress.com/product/isbn/9780415469081>)



Underground Infrastructure of Urban Areas 2

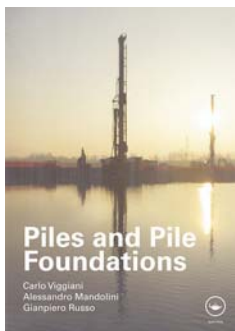
Editors: C. Madryas, B. Nienartowicz & A. Szot

Underground infrastructure undoubtedly constitutes one of the most important engineering equipments of urbanized areas. Such infrastructure includes energy distribution, communications and water, carry away sewage, elements of transportation systems of goods and people, storage facilities of articles, liquids and gases, as well as commercial, recreational and research activities and other functions.

Underground Infrastructure of Urban Areas is dedicated to the research, design, implementation and maintenance of infrastructure systems, as well as communication tunnels and building structures (garages, tanks, etc.) in urbanized areas. The book collects contributions from eight countries, presenting current scientific and technical issues associated with this area of the building industry. Both theoretical issues and cases studies on the design, execution and testing of underground infrastructures at expertise and scientific levels are included in the present work.

Presenting the state-of-the-art in underground infrastructure of urbanized areas, the book aims at academics, designers and builders of structures, producers and suppliers of building materials, equipment, and underground structures, and also to those managing and maintaining these structures.

(CRC Press, October 13, 2011,
<http://www.crcpress.com/product/isbn/9780415683944>)



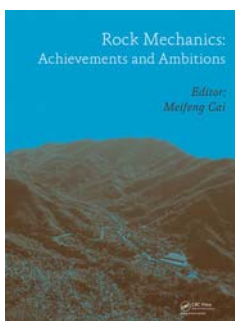
Piles and Pile Foundations

C. Viggiani, A. Mandolini & G. Russo

Piled foundations are generally designed using empirical methods, in particular the traditional capacity based approach on which the majority of codes of practice are based. However in recent years the analysis of pile groups and piled rafts has undergone substantial development in the light of new research and the mechanisms for the interactions between piles, soil and rafts or caps have been largely clarified. Paradoxically, with relatively large piled rafts it has been found that a design based on the criterion of serviceability, with the limitation of absolute and/or differential settlement, not only allows a more rational and economical design, but is also simpler and more reliable than one based on the traditional approach.

This book provides an overview of present design practice of piled foundations, under both vertical and horizontal loads, and then a presentation of recent advances in the analysis and design of piled rafts. Altogether it forms a thorough guide to the design and analysis of efficient and effective piled rafts, and it also serves as a useful design handbook for traditional pile foundations.

(CRC Press, September 29, 2011,
<http://www.crcpress.com/product/isbn/9780415490665>)



Rock Mechanics: Achievements and Ambitions

Meifeng Cai, Editor

Rock Mechanics: Achievements and Ambitions contains the papers accepted for the 2nd ISRM International Young Scholars' Symposium on Rock Mechanics, which was sponsored by the ISRM and held on 14–16 October 2011 in Beijing, China, immediately preceding the 12th ISRM Congress on Rock Mechanics.

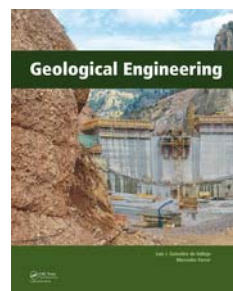
Highlighting the work of young teachers, researchers and practitioners, the present work provides an important stimulus for the next generation of rock engineers, because in the future there will be more emphasis on the use of the Earth's resources and their sustainability. In this context, it is entirely appropriate that the Symposium venue for the young scholars was in China — because of the rock mechanics related work that is anticipated in the future. For example, in the Chinese Academy of Sciences report, "Energy Science and Technology in China: A Roadmap to 2050", it is predicted that China's total energy demand will reach 31, 45, 61 and 66 x 10⁸ tce (tonnes of coal equivalent) in 2010, 2020, 2035, 2050. The associated per capita energy consumption for the same years is estimated at 2.3, 3.1, 4.1 and 4.6 tce. This increasing demand will be met, *inter alia*, by the continued operation and development of new coal mines, hydroelectric plants and nuclear power stations with one or more underground nuclear waste repositories, all of which will be improved by more modern methods of rock engineering design developed by young scholars. In particular, enhanced methods of site

investigation, rock characterisation, rock failure understanding, computer modelling, and rock excavation and support are needed. The topics in the book include contributions on:

- Field investigation and observation
- Rock constitutive relations and property testing
- Numerical and physical modeling for rock engineering
- Information technology, artificial intelligence and other advanced techniques
- Underground and surface excavation and reinforcement techniques
- Dynamic rock mechanics and blasting
- Prediction and prevention of geo-environmental hazard
- Case studies of typical rock engineering

Many of the 200 papers address these topics and demonstrate the skills of the young scholars, indicating that we can be confident in the continuing development of rock mechanics and rock engineering, leading to more efficient, safer and economical structures built on and in rock masses. Rock Mechanics: Achievements and Ambitions will appeal to professionals, engineers and academics in rock mechanics, rock engineering, tunnelling, mining, earthquake engineering, rock dynamics and geotechnical engineering.

(CRC Press, September 22, 2011,
<http://www.crcpress.com/product/isbn/9780415620802>)



Geological Engineering

Luis Gonzalez de Vallejo & Mercedes Ferrer

Interpreting a geological setting for the purposes of engineering design and construction requires knowledge of geological engineering and engineering geology, leading to integrated engineering solutions which take into account both ground conditions and environment. This text-book, extensively illustrated, covers the subject area of geological engineering in four sections:

- Fundamentals: soil mechanics, rock mechanics and hydrogeology
- Methods: site investigations, rock mass characterization and engineering geology mapping
- Applications: foundations, slope stability, tunnelling, dams, reservoirs and earth works
- Geohazards: landslides, earthquake hazards and prevention and mitigation of geological hazards

Geological Engineering can serve as a basic reference work for practising engineering geologists, geological and geotechnical engineers, geologists, civil and mining engineers and those professionals involved in design and construction of foundations, tunneling, earth works and excavations for infrastructures, buildings, mining operations, etc.

As a textbook it develops an extensive teaching program of geological engineering and is designed for undergraduate and postgraduate students and academics. Covering basic concepts up to the newest methodologies and procedures in geological engineering, the book is illustrated with many educational working examples and graphical materials.

(CRC Press, January 10, 2011,
<http://www.crcpress.com/product/isbn/9780415413527>)



BASICS OF RELIABILITY AND RISK ANALYSIS

Worked Out Problems and Solutions

E. Zio, P. Baraldi & F. Cadini

Reliability and safety are fundamental attributes of any modern technological system. To achieve this, diverse types of protection barriers are placed as safeguards from the hazard posed by the operation of the system, within a multiple-barrier design concept. These barriers are intended to protect the system from failures of any of its elements, hardware, software, human and organizational.

Correspondingly, the quantification of the probability of failure of the system and its protective barriers, through reliability and risk analyses, becomes a primary task in both the system design and operation phases.

This exercise book serves as a complementary tool supporting the methodology concepts introduced in the books "An introduction to the basics of reliability and risk analysis" and "Computational methods for reliability and risk analysis" by Enrico Zio, in that it gives an opportunity to familiarize with the applications of classical and advanced techniques of reliability and risk analysis.

This book is also available as a set with [Computational Methods for Reliability and Risk Analysis](#) and [An Introduction to the Basics of Reliability and Risk Analysis](#).

Contents:

- Basic Concepts of Safety and Risk Analysis
- Methods for Hazard Identification
- Basics of Probability Theory for Applications to Reliability and Risk Analysis
- Reliability of Simple Systems
- Availability and Maintainability
- Fault Tree Analysis
- Event Tree Analysis
- Estimation of Reliability Parameters from Experimental Data
- Markov Chains

(World Scientific, April 2011,
<http://www.worldscibooks.com/engineering/8172.html>)



Monitoring and control in tunnel construction

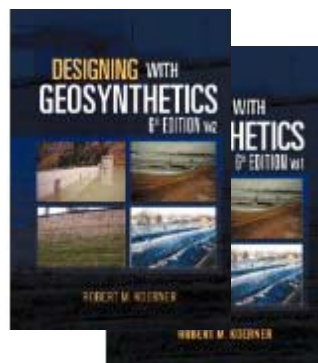
Instrumentation and monitoring are an essential part of current tunnelling practice. For safe and economical tunnelling in sensitive construction environments a continuous ad-

aptation of excavation and support design is required so that input parameters can be revised when the predictions deviate from measured values. In addition, systematic monitoring results can provide valuable information pertaining to imminent collapse, thus, making it possible to control the tunnel stability by providing proper countermeasures.

The recommendation focuses on the contribution of monitoring to the successful completion of a tunnelling project, through real time usage of monitoring information as part of the construction process. It should be read in conjunction with the ITA publication Guidelines for Tunnelling Risk Assessment by Eskesen et al. (2004), as this approach can be viewed as one way of mitigating risks involved in tunnel construction.

A special emphasis is given to the use of absolute displacement measurements by geodetic methods for use in tunnelling control. It should be noted that this recommendation does not address the specific aspects related to monitoring of TBM parameters.

Η έκθεση αυτή της WG2 – Research της ITA είναι διαθέσιμη από την ιστοσελίδα http://www.ita-aite.org/fileadmin/filemounts/general/pdf/ItaAssociation/ProductAndPublication/ItaReports/ITARReport_N9_WG2_P.pdf



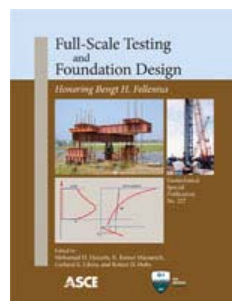
Designing with Geosynthetics Volumes 1 and 2

Robert M. Koerner

Kindle Edition

The book is available digitally. For those who may not be familiar, Dr. Koerner is one of the leading authorities on geosynthetics these books cover most design methodologies and materials in our field (including geotextiles, geogrids, geonets, geomembranes, and geocomposites) all in one place. These are great pieces to add to your reference library.

(<http://amzn.to/GB7NNg>)



Full-Scale Testing and Foundation Design

Honoring Bengt H. Fellenius

Edited by M. H. Hussein, K. R. Massarsch, G. E. Likins & R. D. Holtz

Geotechnical Special Publications (GSP) GSP 227

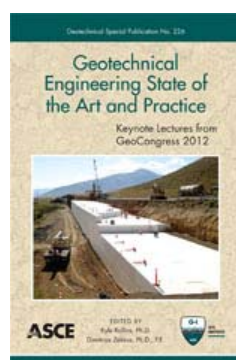
Full-Scale Testing and Foundation Design, GSP 227, honors Bengt H. Fellenius, Dr.Tech., P.Eng., for his noteworthy efforts to advance foundation engineering research, design, construction, and testing practices. From the beginning in Sweden of his 50-year career as a geotechnical engineer through nearly two decades as a professor of civil engineer-

ing at the University of Ottawa, Dr. Fellenius has made outstanding contributions in the international arena to the development and advancement of innovative approaches and practical methods for incorporating full-scale testing in foundation design, especially for deep foundations.

This collection contains 51 papers on the use of full-scale testing to enhance the design of foundations. Eighteen papers are reprints of landmark articles authored or co-authored by Dr. Fellenius. Thirty-three additional peer-reviewed papers written especially for this collection present test methods for various types of foundations and describe useful applications in a diversity of situations. These papers offer findings from interesting projects and document valuable lessons learned by some of the leading experts in the field of foundation engineering from around the world.

Full-Scale Testing and Foundation Design contains technical and practical information that will be valuable to geotechnical engineers, foundation specialists, researchers, and construction engineers

(ASCE, 2012,
http://www.asce.org/Product.aspx?id=2147487208&productid=149296508&utm_campaign=GI%20Apr%202012&utm_medium=email&utm_source=Eloqua)



Geotechnical Engineering State of the Art and Practice

Keynote Lectures from GeoCongress 2012

**Edited by Kyle Rollins, Ph.D.,
and Dimitrios Zekkos, Ph.D., P.E.**

**Geotechnical Special Publications
(GSP) GSP 226**

Keynote lectures presented at GeoCongress 2012, held in Oakland, California, March 25-29, 2012. Sponsored by the Geo-Institute of ASCE.

Geotechnical Engineering State of the Art and Practice: Keynote Lectures from GeoCongress 2012 contains 30 peer-reviewed papers that survey the entire breadth of research and practice in geotechnical engineering. Each paper is contributed by distinguished geotechnical engineers who were invited to create a comprehensive overview of the profession by focusing on a specific technical subject. About half the papers present the state of the art by describing current challenges for geotechnical researchers. The other half demonstrate the state of the practice by reporting on issues tackled by geotechnical engineers in the field. Taken together, these papers showcase the best of the profession and form a basis for integrating geotechnical research with its practice.

Topics include: foundations and earth stability; geotechnical modeling; site characterization, testing, and monitoring; geoenvironmental engineering; embankments and slope stability; soil properties; pavements; tunneling and underground spaces; and earthquake engineering.

This collection is an important touchstone for geotechnical and geoenvironmental engineers, whatever their focus on research and practice.

(ASCE, 2012,
http://www.asce.org/Product.aspx?id=2147487208&productid=149296508&utm_campaign=GI%20Apr%202012&utm_medium=email&utm_source=Eloqua)

http://www.asce.org/Product.aspx?id=2147487208&productid=149296508&utm_campaign=GI%20Apr%202012&utm_medium=email&utm_source=Eloqua)

Deep Excavations Third edition

D. J. Puller & M. J. Puller

Deep Excavations: A Practical Manual assembles the practical rules and details for the efficient and economical execution of deep excavations. The third edition uses international case examples, including the Nicholas highway, Singapore and Silken Hotel, Aldwych, alongside the experience of both design and construction from published work and practical experience to do this. Each chapter is fully updated to current practice, including the latest contractor safety measures, construction regulations (including manslaughter), and causes and avoidance of injury and fatality.

New material has been included: basic reasons behind deep excavations; typical design calculations for basement excavation support and for cofferdams; underpinning and ground freezing in design of soil support; risk of deep cofferdams in soft ground; CTRL cut and cover; and Well formulae. Further details are also included on the computer programs available - FLAC, ABACUS, etc.

(ICE Publishing, December 2012,
<http://www.icevirtuallibrary.com/content/book/101169>)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

- ARMS 7, Seoul, 15 to 19 October 2012 Volume 14 of the ISRM News Journal is now online
- Nick Barton's 2011 Müller Lecture can now be viewed online
- News from the Europe region
- ISRM sponsored meetings



<http://www.issmge.org/web/page.aspx?refid=770>

Κυκλοφόρησε το Τεύχος 1 του 6^{ου} Τόμου του ISSMGE Bulletin (Φεβρουαρίου 2012) με τα παρακάτω περιεχόμενα:

- Message to ISSMGE Members
- President's Report
- Activity Report from the Indian Geotechnical Society
- Technical Article: Landslides in Landfills
- Conference Report : Indian Geotechnical Conference
- Conference Report : Indo-Japan Workshop on Earthquake Geotechnical
- Upcoming Conference : International Symposium on Design and Practice of Geosynthetic-Reinforced Soil Structures
- Upcoming Conference : II PBD Taormina 2012: Second International Conference on Performance Based Design in Earthquake Geotechnical Engineering
- Announcement : 2012 Young Researcher Award of TC 203 ISSMGE
- Announcement : 2012 Shamsher Prakash Research Award
- Call for Journal Paper : Géotechnique Letters Themed Issue
- News : Request for Monitoring of Soils and Foundations Journal
- Obituary : Professor Wilson H. Tang
- New Books : ICE
- Event Diary
- Corporate Associates
- Foundation Donors
- From the Editor - Call for articles



No. 17 - March 2012
http://www.isrm.net/adm/newsletter/ver_html.php?id_newsletter=70&ver=1

Κυκλοφόρησε το Τεύχος 17 / Μάρτιος 2012 του Newsletter της International Society for Rock Mechanics. Περιεχόμενα:

- Welcome to the ISRM International Symposium Eurock 2012
- Commemoration of the 50-year anniversary of the ISRM
- 2nd SASORE, Costa Rica, 7 to 9 August 2012



www.geoengineer.org

Κυκλοφόρησαν τα Τεύχη #86 και #87 του **Newsletter του Geoengineer.org** (Μάρτιος και Απρίλιος 2012) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωτεχνικής μηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).



**INTERNATIONAL TUNNELLING AND
UNDERGROUND SPACE ASSOCIATION**

ita@news n°43

http://ita-aites.org/index.php?id=887&no_cache=1

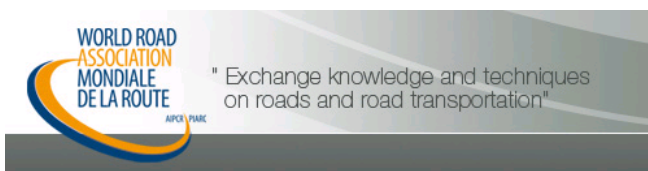
Κυκλοφόρησε το Τεύχος No. 43 – Μάρτιος 2012 των ita@news της International Tunnelling Association με τα παρακάτω περιεχόμενα:

- Message from In Mo LEE, ITA President
- WTC'12 Bangkok (TH)
- ExCo meetings in New York
- Guidelines for good working practice in high pressure compressed air
- Guidance on the safe use of temporary ventilation ducting in tunnels
- Monitoring and control in tunnel construction
- ITA participation at a World Bank training session
- Visit to the Society of Engineers United Arab Emirates
- Visit to South and Central America
- Visit to Skopje (FYRM)
- SELI ITA New Prime Sponsor
- Congratulations to NORMET
- ITA Tunnel Drive in India
- International Symposium
- UNDER CITY 2012
- Pressurized TBM Tunnelling
- Underground City Forum 2012



http://www.itacet.org/Newsletter/01_2012/newsletter_01_2012.php

Κυκλοφόρησε το Τεύχος No. 11 (Φεβρουάριος 2012) του ITACET Foundation.



www.piarc.org



<http://www.piarc.org/ressources/documents/NEWS-LETTER-PIARC-NATIONAL-COMMITTEES-WORLD-ROAD-ASSOCIATION/13639,National-Committees-Newsletter-March-2012-PIARC-World-Road-Association.pdf>

Κυκλοφόρησε το Τεύχος No. 43 (Μάρτιος 2012) του **Newsletter της World Road Association** (PIARC) και το Τεύχος No. 28 (Μάρτιος 2012) του Newsletter των PIARC National Committees.



<http://library.constantcontact.com/download/get/file/1103777414955-147/2012-03-igs-news-a4+Volume+28,+No.1.pdf>

Κυκλοφόρησε το Τεύχος 1, Volume 28 των IGS News. Μεταξύ των θεμάτων περιλαμβάνονται:

- President's Corner
- General Information for IGS Members
- Conference Reports
- Announcements of Conferences of IGS
- Announcements of Regional Conferences of IGS
- Announcements of Conferences under the Auspices of IGS
- News from the IGS Chapters and the Membership
- Calendar of Events



Geosynthetics International
www.thomastelford.com/journals

Κυκλοφόρησαν τα τεύχη αρ. 5 και 6 του 18^{ου} τόμου (Οκτωβρίου και Δεκέμβριος 2011) και το τεύχος 1 του 19^{ου} τόμου (Φεβρουάριος 2012) του περιοδικού Geosynthetics International. Πρόσβαση μέσω των ιστοσελίδων

<http://www.icevirtuallibrary.com/content/issue/gein/18/5>,
<http://www.icevirtuallibrary.com/content/issue/gein/18/6>,
<http://www.icevirtuallibrary.com/content/issue/gein/19/1>.



Geotextiles & Geomembranes
www.geosyntheticssociety.org/journals.htm

Κυκλοφόρησαν οι τόμοι 31 και 32 (Απριλίου και Ιουνίου 2012). Πρόσβαση μέσω της ιστοσελίδας
<http://www.sciencedirect.com/science/journal/02661144>.

ΕΕΕΕΓΜ

Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
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