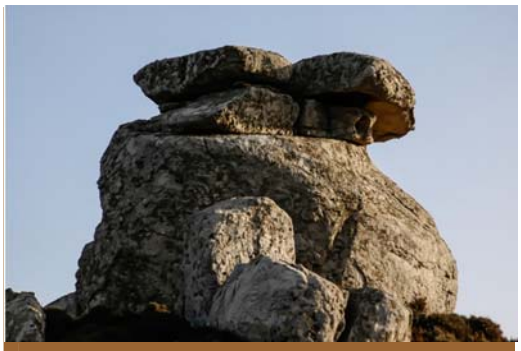

Τήνος, Βώλακας. Η αγκαλιά...
(Γιάννης Τούντας)

Αρ. 61 – ΣΕΠΤΕΜΒΡΙΟΣ 2013

ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

61

ΠΡΟΣΚΛΗΣΗ
ΤΑΚΤΙΚΗΣ ΓΕΝΙΚΗΣ ΣΥΝΕΛΕΥΣΗΣ - ΚΑΤΑΣΤΑΤΙΚΗΣ

Καλούνται τα μέλη της Ελληνικής Επιστημονικής Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής να προσέλθουν στη Γενική και Καταστατική Συνέλευση που θα γίνει την Πέμπτη 12 Σεπτεμβρίου 2013 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 Πέμπτη 3 Οκτωβρίου 2013 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 2012) προς την ΕΕΕΕΓΜ.

Σε περίπτωση που δεν επιτευχθή πάλι απαρτία, η Γενική Συνέλευση θα γίνει την **24η Οκτωβρίου, ημέρα Πέμπτη και ώρα 6.00 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 8ης Μαΐου 2012 μέχρι σήμερα.
2. Οικονομικός απολογισμός έτους 2012.
3. Έκθεση Εξελεγκτικής Επιτροπής.

(συνέχεια στην σελ.3)

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

(συνέχεια από την πρώτη σελίδα)

4. Έγκριση απολογισμού πεπραγμένων και οικονομικών απολογισμών και απαλλαγή της Εκτελεστικής Επιτροπής από κάθε ευθύνη.

5. Διάφορες ανακοινώσεις.

6. Συζήτηση επί των προτεινομένων αλλαγών στο Καταστατικό που αφορούν στην αλλαγή του ονόματος της Εταιρείας και στην συγκρότηση Σώματος Κοσμητόρων.

7. Έγκριση προτεινομένων αλλαγών στο Καταστατικό.

Ο ΠΡΟΕΔΡΟΣ — Η ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΑΣ

ΧΡΗΣΤΟΣ ΤΣΑΤΣΑΝΙΦΟΣ
Δρ. Πολιτικός Μηχανικός

ΜΑΡΙΝΑ ΠΑΝΤΑΖΙΔΟΥ
Δρ. Πολιτικός Μηχανικός

ΠΡΟΤΑΣΕΙΣ ΑΛΛΑΓΩΝ ΚΑΤΑΣΤΑΤΙΚΟΥ Ε.Ε.Ε.Ε.Γ.Μ.

1. Το Άρθρο 1ο γίνεται:

Άρθρο 1ο
ΕΠΩΝΥΜΙΑ – ΕΔΡΑ

Συνιστάται επιστημονικό μη κερδοσκοπικό Σωματείο με την επωνυμία «**Ελληνική Επιστημονική Εταιρεία Γεωμηχανικής (Ε.Ε.Ε.Γ.)**», αγγλιστί «**Hellenic Society of Geomechanics**», ως Εθνική Εταιρεία – Μέλος της Διεθνούς Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (International Society of Soil Mechanics and Geotechnical Engineering, ISSMGE) και της Διεθνούς Εταιρείας Βραχομηχανικής (International Society for Rock Mechanics, ISRM).

Έδρα της **Ελληνικής Επιστημονικής Εταιρείας Γεωμηχανικής** είναι η Αθήνα.

Το γραφείο της Γραμματείας της και η αίθουσα συνεδριάσεων στεγάζονται στα κτίρια του Τομέα Γεωτεχνικής του Εθνικού Μετσόβιου Πολυτεχνείου. Η στέγαση του γραφείου της Γραμματείας και η αίθουσα συνεδριάσεων μπορούν να αλλάζουν με απλή απόφαση της Εκτελεστικής Επιτροπής.

2. Όπου στο Καταστατικό αναφέρεται η επωνυμία της εταιρείας, αυτή τροποποιείται σε «**Ελληνική Επιστημονική Εταιρεία Γεωμηχανικής**». Επίσης το αρκτικόλεξο Ε.Ε.Ε.Ε.Γ.Μ. αντικαθίσταται με το **Ε.Ε.Ε.Γ.**

3. Προστίθεται Άρθρο 15ο:

Άρθρο 15ο
ΣΩΜΑ ΚΟΣΜΗΤΟΡΩΝ

Οι **διατελέσαντες Πρόεδροι και Γενικοί Γραμματείς** της ΕΕΕΓ συγκροτούν μόνιμο Σώμα Κοσμητόρων. Έργο του Σώματος Κοσμητόρων θα είναι η **παροχή συμβουλευτικής γνώμης** σε θέματα τα οποία θα θέτει υπ' όψη του η Εκτελεστική Επιτροπή.

4. Η αρίθμηση των υφισταμένων μετά το νέο Άρθρο 15ο μεταβάλλεται ως ακολούθως:

Το Άρθρο 15ο ΣΥΝΔΡΟΜΕΣ ΜΕΛΩΝ λαμβάνει τον αριθμό 16.

Το Άρθρο 16ο ΠΟΡΟΙ ΤΗΣ ΕΤΑΙΡΕΙΑΣ λαμβάνει τον αριθμό 17.

Το Άρθρο 17ο λαμβάνει τον αριθμό 18.

Το Άρθρο 18ο ΔΙΑΛΥΣΗ ΤΗΣ ΕΤΑΙΡΕΙΑΣ λαμβάνει τον αριθμό 19.

ΑΝΑΚΟΙΝΩΣΗ ΔΙΑΛΕΞΗΣ

ΔΙΑΛΕΞΗ

την Πέμπτη, 24 Οκτωβρίου 2013, ώρα 19:00

στην Αίθουσα Εκδηλώσεων της
Σχολής Πολιτικών Μηχανικών Ε.Μ.Π.
στην Πολυτεχνειούπολη Ζωγράφου

«Μελέτη και κατασκευή οπλισμένων επιχώσεων αντιστήριξης»

από την

Χάιδω Δούλαλα - Rigby

Πολιτικό Μηχανικό

Chief Civil Engineer, Tensar International

ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

Η παρουσία της εταιρίας Tensar στα Ηνωμένα Αραβικά Εμιράτα ξεκίνησε στις αρχές του 2000 με την μελέτη και κατασκευή οπλισμένων επιχώσεων αντιστήριξης για τη διάνοιξη του αυτοκινητόδρομου της Dibba. Στο έργο αυτό, το μέγιστο ύψος των οπλισμένων επιχώσεων σε μονή αναβαθμίδα έφτασε μέχρι και τα 19 μέτρα και με κλίση αναβαθμού στους 86° ενώ η συνολική κατακόρυφη πρόσοψη των οπλισμένων επιχώσεων που κατασκευάστηκαν για την ολοκλήρωση του έργου ήταν της τάξης των 45.000 m^2. Η επιτυχής, ταχεία και οικονομική ολοκλήρωση του έργου καθιέρωσε το όνομα της Tensar στον Αραβικό κόλπο συντελώντας στην διαδοχή του επόμενου μεγάλου έργου στην ίδια περιοχή, τη διάνοιξη του καινούριου αυτοκινητόδρομου μεταξύ Fujairah και Dubai, το οποίο θα είναι και το αντικείμενο αυτής της παρουσίασης. Το έργο περιλαμβάνει την μελέτη και κατασκευή 29 αυτόνομων οπλισμένων επιχώσεων με μέγιστο αριθμό αναβαθμίδων έως 3 και συνολικό ύψος αναβαθμίδων μέχρι και 60 μέτρα ενώ η συνολική κατακόρυφη πρόσοψη των τοίχων που κατασκευάστηκαν για την ολοκλήρωση του έργου ήταν της τάξης των 100.000 m^2. Η παρουσίαση περιλαμβάνει την μέθοδο μελέτης, τα υλικά κατασκευής, τον τρόπο κατασκευής καθώς και μετρήσεις μετακινήσεων των πολυμερικά οπλισμένων επιχώσεων τόσο κατά τη διάρκεια κατασκευής καθώς και μετά την ολοκλήρωσή τους.

ΣΥΝΤΟΜΟ ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΡΙΑΣ

Η Χάιδω Δούλαλα-Rigby (Γιούλη) είναι Πολιτικός Μηχανικός με εξειδίκευση στα Γεωτεχνικά και εμπειρία 21+ χρόνων. Είναι μέλος του Hong Kong Institution of Engineers (Geotechnical), Chartered (CEng) του UK Engineering Council και Fellow of the Institution of Civil Engineers.

Η Γιούλη εργάζεται σαν Chief Civil Engineer στην Tensar International με έδρα τα κεντρικά γραφεία στο Blackburn της Αγγλίας και έχει υπό την εποπτεία της τον τεχνικό έλεγχο των υπόλοιπων γραφείων της Tensar τα οποία βρίσκονται στη Γερμανία, Ολλανδία, Γαλλία, Αφρική, Ρωσία, Ηνωμένα Αραβικά Εμιράτα, Σαουδική Αραβία, Μαλαισία, Ινδονησία, Κίνα, Αυστραλία και Νέα Ζηλανδία.

Πήρε το πρώτο της πτυχίο από το Τεχνολογικό Εκπαιδευτικό Ίδρυμα (ΤΕΙ) Θεσσαλονίκης στα Έργα Υποδομής το 1991. Από εκεί συνέχισε της σπουδές της στην Αγγλία με υποτροφία του «ERASMUS». Πήρε το πτυχίο Bachelor of Engineering με ειδικότητα Πολιτικού Μηχανικού (BEng in Civil Engineering) από το Πανεπιστήμιο του Sunderland και στη συνέχεια έκανε Master of Science με ειδικότητα στη Βραχομηχανική και Θεμελιώσεις (MSc in Rock Mechanics and Foundation Engineering) στο Πανεπιστήμιο του Newcastle upon Tyne. Μετά την αποφοίτησή της εργάστηκε σαν γεωτεχνικός μηχανικός για ένα χρόνο στην διάνοιξη / επέκταση της σήραγγας Jubilee Line του υπόγειου σιδηρόδρομου του Λονδίνου (London Underground). Στη συνέχεια μετέβη στο Χονγκ Κονγκ το 1996, όπου παρέμεινε για τα επόμενα 10 χρόνια. Εκεί εργάστηκε σαν γεωτεχνικός μηχανικός για την Αγγλική μελετητική εταιρεία Mouchel σε διάφορα και πολυποίκιλα έργα γεωτεχνικής φύσης και κυρίως σε έργα σταθεροποίησης ασταθών πρανών. Το 2005 η Γιούλη επέστρεψε στην Αγγλία και συνέχισε την γεωτεχνική της καριέρα πηγαίνοντας στην Tensar σαν εποπτεύων μηχανικός της Αγγλικής μελετητικής ομάδας αρχικά και στη συνέχεια σαν Chief Civil Engineer.

Η Γιούλη είναι ενεργό μέλος της τεχνικής επιτροπής γεωσυνθετικών της Αγγλίας (Committee member of the International Geosynthetics Society, UK Chapter) καθώς επίσης και της οργανωτικής επιτροπής του Ινστιτούτου Πολιτικών Μηχανικών της Βορειοδυτικής Αγγλίας (ICE NW).

ΑΡΘΡΑ

Τα παρακάτω δύο άρθρα αποτελούν την συμμετοχή των εκπροσώπων της ΕΕΕΕΓΜ Άννας Καρατζέτζου και Κωνσταντίνου Τζιβάκου στο 5ο Διεθνές Συνέδριο Νέων Γεωτεχνικών Μηχανικών (5th iYGEC 2013), που διεξήχθη από τις 31 Αυγούστου έως την 1 Σεπτεμβρίου 2013 στο Παρίσι.

SOIL-FOUNDATION-STRUCTURE INTERACTION IN DEMAND SPECTRA

INTERACTION SOL-FONDATION-STRUCTURE EN SPECTRES DE DEMANDE

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ABSTRACT - Seismic demand of soil-foundation-structure interaction (SFSI) systems is evaluated herein in the light of performance-based design approaches, accounting for soil-foundation compliance effects. Due to kinematic and inertial interaction, structural response may be substantially different from the one traditionally calculated. For a linear SFSI system, seismic demand is identical to the notion of seismic performance and unique for every system. We evaluate seismic demand using three approaches: a) the traditional fixed-base or free-field approach, b) a finite element numerical code and c) the analytical approach proposed in FEMA440. We propose use of effective foundation motion (EFM) to estimate demand. EFM is measurable directly from actual records and field measurements, takes into account inertial and kinematic interaction and gives a good estimation of structural response, compared to the direct method.

1. Introduction

One of the widely used methods to evaluate structural response in the light of performance based design is the capacity spectrum method (CSM), originally developed by Freeman, 1975 and extended later by Fajfar and Gaspercic, 1996. In both approximations, performance of a structure is evaluated as the intersection of the capacity curve with the demand spectrum in Acceleration-Displacement Response Spectrum coordinates. The capacity curve is obtained by standard nonlinear static procedures. The demand spectrum is usually estimated from free-field motion (FFM).

Effects of SFSI on dynamic structural response were neglected until recently, when influence of foundation compliance on design and assessment was highlighted (Mylonakis and Gazetas, 2000). Even when SFSI effects are considered, kinematic interaction effects on foundation input motion (FIM) are neglected in most cases in the analyses. However, there is FEMA440 simple approximation in order to consider the effect of the kinematic interaction effects on structural response of shallow foundations. However, even if the kinematic interaction effects are considered, the inertial interaction effects on FIM are neglected at this methodology. FIM is probably not a proper index of the complete soil-foundation-structure interaction phenomenon.

According to Iguchi et al., 2001, more appropriate index expressing SFSI effects on seismic input is the effective input motion (EIM), including effects of both inertial and kinematic interaction effects. The EIM is useful when studying SFSI using actual earthquake records at the foundation level, or when the whole SFSI phenomenon is being studied using the direct method.

The aim of this paper is to highlight the effects of SFSI on structural response for the simple case of linear systems. For linear elastic systems, soil foundation compliance affects directly seismic demand (Pitilakis and Karatzetzou, 2012). Moreover, as it will be further explained, spectral demand and performance are notions practically identical for flexible-base linear elastic structures, as only one pair of demand spectral coordinates exists, a unique performance point for any SFSI system.

2. Evaluation of elastic performance of structures

Three different approaches are presented for the estimation of seismic performance of structures.

2.1. Fixed base structure with free field motion

In engineering practice, seismic demand to dynamic excitation is calculated directly from the free-field motion (FFM). Free-field response is not influenced by the presence of structures and thus demand for all systems is the same irrespectively the dynamic characteristics of the soil-foundation structure system. Such an approximation is irrelevant for structures founded on soft soil profiles.

2.2. Direct FEM

Direct finite-element approach for the whole SFSI system is used herein for two reasons (a) to calculate the response at the foundation in a single step. The performance point of the flexible-base system is estimated from the demand that stems from the response at the foundation level, in combination with the effective period of the system TSFSI. (b) To estimate the response at the top of the structure directly as output of the analysis. When considering the SFSI effects, spectral demand and performance are notions practically identical and the performance point is unique for any SFSI system.

2.3. FEMA440 methodology

A simplified approach for including SFSI effects in seismic assessment is proposed in FEMA440, 2005. More specifically, kinematic interaction and foundation damping effects are approximately taken into consideration in estimating the FIM. Inertial interaction effects are partially addressed in FEMA356, 2000 procedures for including foundation stiffness and strength of the geotechnical components of the foundation in the structural analysis model.

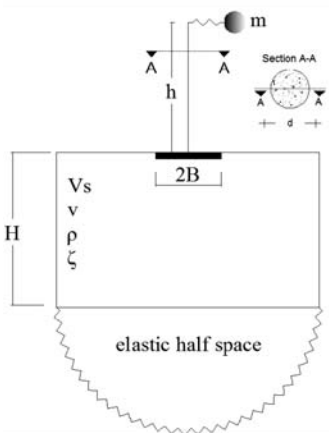
3. Soil foundation structure system

A set of dynamic analyses is performed in order to study the effect of interaction on seismic demand. As a first step the dynamic analyses are performed for the soil system only, while as a second step for the complete SFSI system. The soil, the structure and the foundation, compose the Finite Element Model. The soil is a homogeneous soil profile of H=50 m thickness.

The soil deposit is simulated by 4-node linear elements. The elastic bedrock is simulated using Lysmer-Kuhlemeyer dashpot coefficients (Lysmer-Kuhlemeyer, 1969) at the base of the soil profile. The bedrock has shear wave velocity equal to Vs=1500 m/s and soil density is equal to ρ=2400 kg/m^3. Plane strain conditions are assumed for both soil layer and elastic bedrock. The foundation is a surface, rigid foundation and simulated by linear elastic beam elements.

The structure represents a typical single-column bridge pier having a cylindrical cross section, which is common choice for bridges in Europe. The structure is simulated by linear elastic beam elements. The structural mass is assumed to be lumped at the top of the pier. The damping for soil and structure is 5% for the first mode of vibration.

Material properties and geometry of the studied models are depicted in Fig. 1. The concrete elasticity modulus which highly influences the stiffness matrix of the system is equal to E=32GPa for all models. The soil's density in all cases is stable and equal to ρ=2000 kg/m^3 and the Poisson's ratio v=0.333. All models are triggered at the level of bedrock by the Northridge 1994 earthquake record (NGA_1011) with T_p=0.16s and a_{max}=0.95m/s2.



Model 1:
h = 6 m
2B =6m
Vs = 100, 200, 300, 400, 450 m/s
ρ_{soil} = 2 t/m3
m = 100 t, 200 t, 400 t, 800 t, 1200 t
v=0.333
v_{str}=0.25
H = 50m
d = 0.8, 1.2, 1.6, 2.0, 2.2m

Figure 1. Soil foundation structure systems studied

4. Conceptual example

We consider Model 1 with Vs=300 m/s, m= 400t and d= 2.2m. Elastic demand spectra that occur from the obtained free field motion from analysis of the soil profile only (FFM) and the SFSI motion at the foundation level using the direct method (EFM) are depicted at the same graph, together with the demand spectrum that occurs when following the FEMA440 method (Fig. 2).

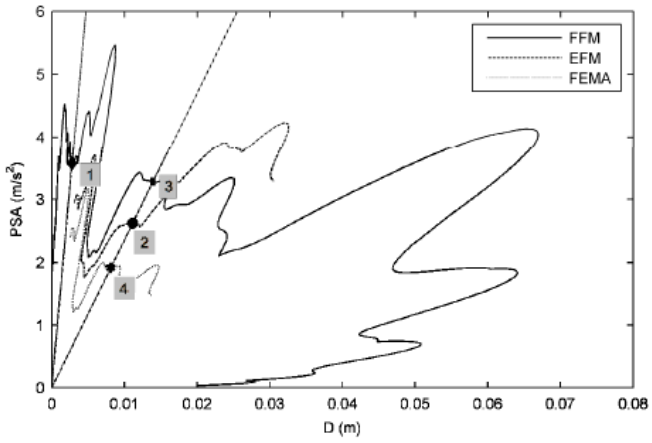


Figure 2. Performance points using different approximations

All demand spectra are depicted graphically by elastic spectra with equivalent viscous damping ratio equal to 5%. Fig. 2 depicts the performance points (PPs) which are the intersection of the following curves:

- PP1 is the intersection of the free field demand spectrum with fixed base structural period TFIX.
- PP2 is the pair of values of the total (maximum) acceleration and displacement relative to the foundation that result directly at the top of the structure from the analysis. These values give also TSFSI from Eq. 1.
- PP3 is the intersection of the FFM demand spectrum with TSFSI.
- PP4 represents the PP which is the intersection of the demand curve that results after utilizing the FEMA440 methodology with the TSFSI.

For each analysis the output is in terms of acceleration and displacement at the top of the structure, at free-field and at the level of foundation.

Moreover all parts of disTOP (Fig. 3) are also estimated. Finally, each analysis gives the results in terms of drift values at the top and foundation's rotation values.

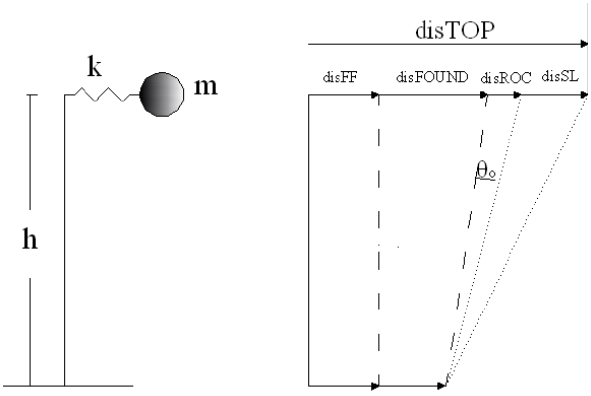


Figure 3. Response at the top of the SFSI system in terms of displacements

5. Results

The results of the parametric study conducted herein are depicted in Fig. 4 to 7. Results are expressed in terms of relative soil to structure stiffness ratio 1/σ (Eq. 2) and normalized mass m_{norm} (Eq. 3) and concern the same value for the h_{norm}=h/B=2 ratio. More specifically Fig. 4 shows the resulted T_{SFSI}/T_{FIX} values in terms of 1/σ and m_{norm}.

$$T_{SFSI} = 2 \cdot \pi \cdot \sqrt{\frac{reldisTOP}{amaxTOP}} \quad (1)$$

$$1/\sigma = \frac{h}{T_{FIX} \cdot V_s} \quad (2)$$

$$m_{norm} = \frac{m}{B^3 \cdot \rho} \quad (3)$$

Fig. 5 shows the maximum acceleration at the top amaxTOP using the EFM demand (see PP2 in Fig. 2) and the maximum acceleration at the top $a_{maxTEST}$ values (see PP3 in Fig. 2) using the FFM demand curve together with the 1:1 curve. In most cases the acceleration value at the top of the structure for the SFSI system is smaller than the acceleration at the top of a structure with effective period equal to T_{SFSI} triggered by the free field motion. In this specific case after linear regression the a_{maxTOP} to $a_{maxTEST}$ ratio is equal to 0.7573 (Fig. 5).

Finally, displacement at the top of the structure (reldisTOP) is composed by two parts, the displacement due to foundation rocking (disROC) and the displacement due to foundation slenderness.

Fig. 6 and Fig. 7 show the disROC/reldisTOP and disSL/reldisTOP ratios respectively in terms of 1/σ and m_{norm} ratios. As the soil becomes softer and the structural mass value greater the disROC/reldisTOP and disSL/reldisTOP values are greater (Fig. 6, Fig. 7).

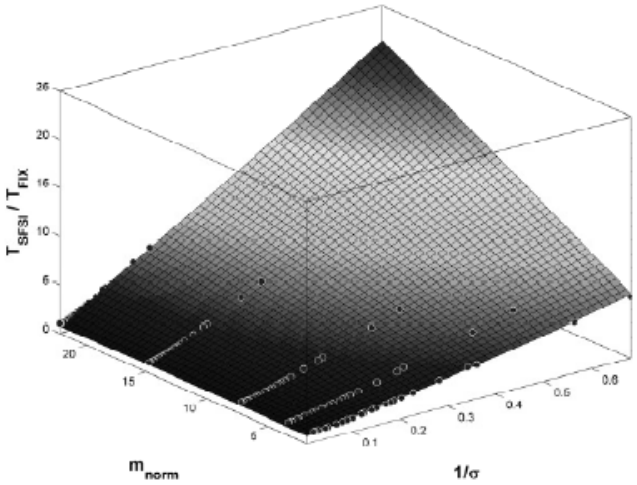


Figure 4. Effective period to fixed base period, TSFSI/TFIX values in terms of soil to structure stiffness ratio 1/σ and normalized mass m_{norm}

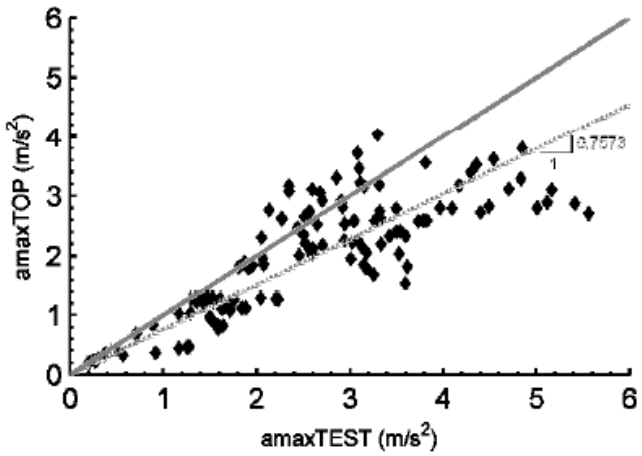


Figure 5. Maximum acceleration at the top of a structure with TSFSI when subjected to EFM (a_{maxTOP}) and when subjected to FFM ($a_{maxTEST}$)

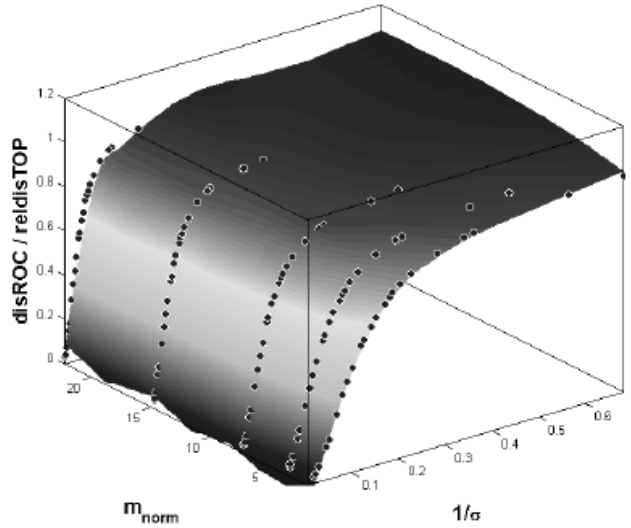


Figure 6. disROC/reldisTOP ratio in terms of 1/σ and normalized mass m_{norm} ratios

6. Proposed methodology and its application

The methodology that is proposed herein could be described by the following steps:

1. Estimate the dynamic and geometrical characteristics h, m, Vs, 2B of the soil and structure and soil response acceleration at free-field conditions.

2. Evaluate 1/_, m_{norm}, TFIX, h_{norm} using the Eq.2,3.

3. Estimate the TSFSI/TFIX ratio in terms of 1/σ and m_{norm} (Fig. 4).

4. Estimate amaxTOP using the proposed in terms of $a_{max-TEST}$ modification value (Fig. 5).

5. Calculate reldisTOP from the TSFSI period value combined with the amaxTOP value.

The reldisTOP is the sum of the disROC and disSL. The values of both two parts could be estimated by the proposed curves in Fig. 6 and Fig. 7. The resulting values, when applying the proposed methodology, are in a very good agreement with the ones from the time history analysis.

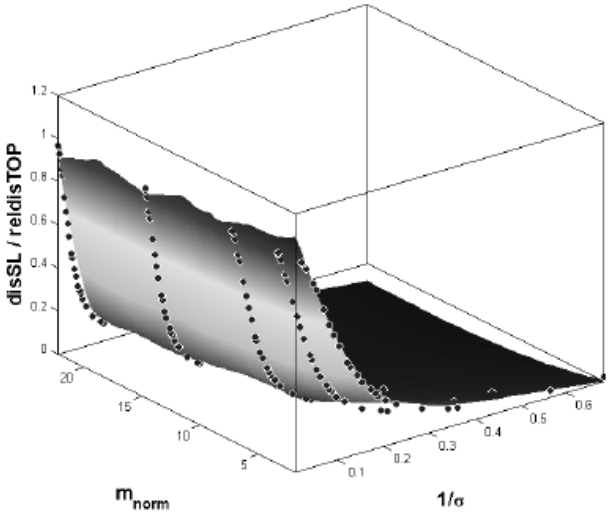


Figure 7. disSL/reldisTOP ratio in terms of 1/σ and m_{norm} ratios

7. Comparison between FEMA and FEM

The comparison of PP2 and PP4 for all the analyses in terms of per cent acceleration modification factor (PP_{FEMA}-PP_{FEM})/PP_{FEM} % are depicted in Fig. 8. The trend line shows that for stiff soil profiles (1/σ<0.1) FEMA440 gives up to 50% higher values, while for soft soil profile FEMA440 gives up to 100% smaller values comparing to the direct methodology that is proposed herein.

8. Conclusions

- For the SFSI system we propose the EFM demand curve combined with the $T_{SFSI(TOP/FOUND)}$ that stems from the division of the Fourier spectrum at the top of the structure with the one at the level of foundation. This combination gives results in good agreement with the response values from the direct method.

- The abovementioned seismic performance concerns total lateral displacement. However, both parts of total displacement are easily evaluated by the proposed methodology. Final performance depends on the limit state to be considered.

- Structural response can be calculated only if the main characteristics of the system and the motion at free filed conditions are known. The final result considers both kinematic and inertial interaction.

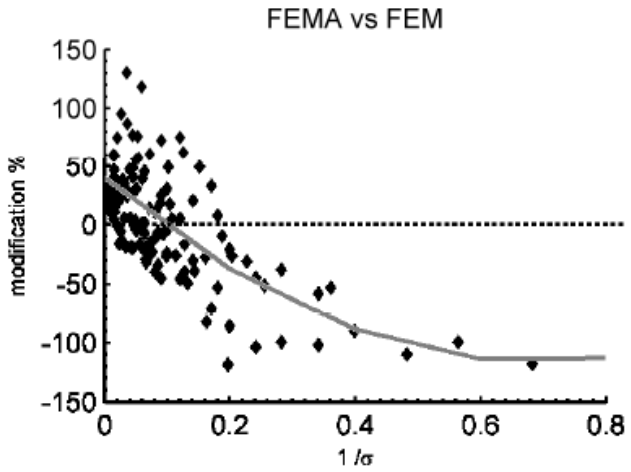


Figure 8. Comparison between FEMA440 and FEM methodologies

- TSFSI/TFIX values are up to 5 for normal soil profiles.

- For a structure with first mode period TSFSI, $0.4a_{maxTEST}<a_{maxTOP}<1.35a_{maxTEST}$.

- For very soft soils the main part of disTOP is disROC, while for stiff soils and slender structures the main part of disTOP is disSL.

- For usual soil profile cases FEMA seems to be unconservative.

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NUMERICAL INVESTIGATION OF THE LATERAL LOAD RESPONSE OF PILES IN SOFT CLAY

ETUDE NUMÉRIQUE DE LA RÉPONSE DE PIEUX SOUS CHARGEMENT LATERAL DANS L'ARGILE MOLLE

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ABSTRACT - The paper presents a numerical study on the undrained lateral response of a single, free-head, reinforced concrete pile in soft clays. Soil conditions simulating normally consolidated clays are examined and the pile-soil interaction under static lateral loading is analyzed. The non-linear p-y curves proposed in literature for soft clays are imported into suitable software in order to predict the distribution of the horizontal displacement and bending moment along the pile. The striking differences among these methods require further investigation via 3D finite element analyses. The determination of the ultimate soil resistance p_{ult} from the results of the finite element analyses aims at providing the estimation of a range of values for the ultimate soil resistance coefficient N_p with depth and the comparison of the derived values to the corresponding ones proposed by existing methodologies.

1. Introduction

P-y curves are nowadays a common practice for the calculation of bending moment and horizontal displacement along laterally loaded piles.

Numerous methodologies of p-y curves are applicable for different soil types and serve the presence of non-linear, horizontal springs along the pile. Various p-y curves have been proposed for clayey soils (Matlock, 1970; Det Norske Veritas, 1977; Sullivan et al., 1980; Wu et al., 1998) taking into account the undrained shear strength *cu* and the characteristic strain at half the maximum compressive strength *ε50* of the soil, with the ones of Georgiadis and Georgiadis (2010) being the most recent. However, only Matlock (1970) and Det Norske Veritas (1977) clearly claim that their p-y curves are applicable to soft clays.

Therefore, it is necessary to evaluate the aforementioned methodologies and test whether other unified methods are applicable to soft clays, namely normally consolidated clays with linear distribution of the undrained shear strength with depth. P-y curve formulations mainly consist of three parts: the initial small-strain stiffness, the yielding section of the curve and the ultimate lateral resistance. The scope of the present paper is the determination of the last part of the p-y curves for normally consolidated clays.

2. P-y curves for soft clays

There are various methodologies for the design of laterally loaded piles in cohesive soils using p-y curves. The striking differences between the p-y curves computed by different methodologies for soft clays at a specific depth are presented in Figure 1.

The existence of such a variety of p-y curves for a specific soil type leads to the computation of different deformational values and internal forces along the pile for each separate case. Therefore, a comparison between the p-y curves for soft clays is very important. The present study compares the values of horizontal displacements, bending moments and shear forces along the pile, computed by the application of different p-y curve formulations.

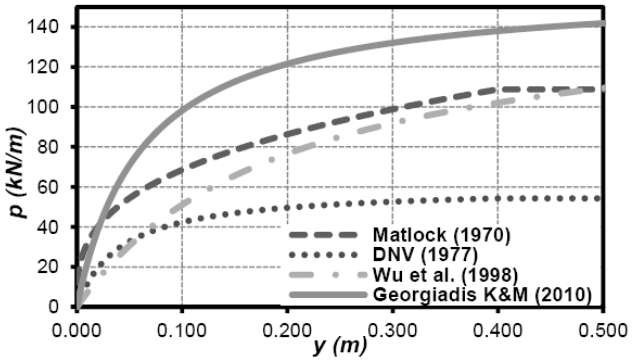

Figure 1. Typical p-y curves for soft clay (z=3m).

3. Simulation Parameters

3.1. Soil conditions

The investigation of the pile response is carried out for the case of undrained conditions, since this is considered critical. In this paper, the ultimate lateral soil resistance of soft, normally consolidated clays is investigated. The undrained shear strength of such clays is considered to increase linearly with depth, according to the following Equation:

$$c(z) = c_{u0} + A.\sigma'_{vo}(z) \qquad (1)$$

For soft to medium-stiff clays, A ranges from 0.15 to 0.35 (Bowles, 1997). In order to simulate natural states of a soft clay, the present study considered c_{u0}=10kPa at ground surface, A=0.15-0.25, buoyant soil unit weight γ'=10 kN/m3, ground water table at ground surface and coefficient of horizontal geostatic stress k_o=0.60. Finally, the ratio of the undrained Young's modulus to the in situ undrained shear strength E_u/c_u of the present study is taken into account according to Table 1 (Skempton, 1951).

Table 1. Representative values of E_u/c_u for normally consolidated clays.

Clay consistency	Average value of c_u (kPa)	E_u/c_u
Soft	< 48	50
Medium	48 - 96	100

3.2. Pile lateral loading

The results presented herein for p-y curves in soft clays are derived from numerical lateral loading tests of a free-head, reinforced concrete pile with length L=20m and diameter D=1m. The pile is loaded with a concentrated lateral load H at its head, applied in load increments. Structural design demands the elastic behavior of the pile. Therefore, the pile is considered elastic with Young's modulus E_p=25 GPa and Poisson's ratio v=0.20.

4. 2D simulation of a single laterally loaded pile

A 2D finite element code developed in NTUA Geotechnical Department is utilized in order to acquire y_0-H, y-z and M-z graphs (where y_0=pile head horizontal displacement, H=pile head lateral load, y=horizontal displacement, z=soil depth, M=bending moment) of the laterally loaded pile described in the previous paragraph. The code incorporates p-y curves for different soil depths, pile properties and loading conditions and calculates the displacement, rotation, bending moment, shear force and soil lateral pressure along the pile for each load increment applied.

The procedure aims at an initial estimation of the differentiation of the aforementioned results, when simulating the soft clay with p-y curves proposed by different methodologies. The p-y curves are derived every 0.5m along the pile

for each case of undrained shear strength distribution (A=0.15, 0.25). A total concentrated lateral load H=3000kN is applied at the pile head in load increments of 100kN. The analysis is terminated when convergence of the solution is judged unlikely. In order to discern the impact of the p-y curves differentiation on the displacements and the internal forces along the pile, the comparative graphs of Figure 2 are presented.

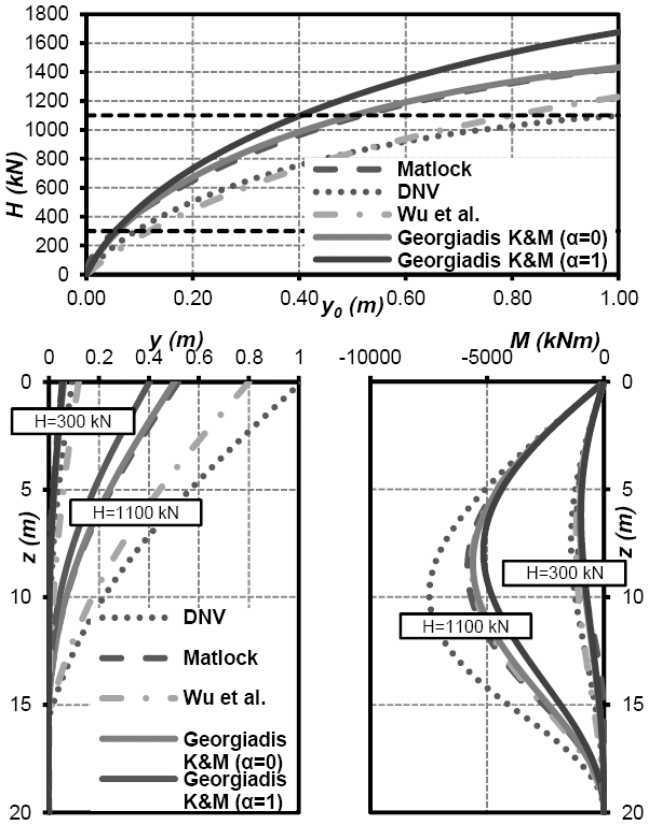

Figure 2. Pile head lateral load-horizontal displacement (up), horizontal displacement and bending moment along the pile (down) for different p-y curves methodologies (A=0.25).

It is obvious that different p-y curves methodologies compute a wide range of displacements, moments and shear forces along the pile, especially for high lateral loads. For H=1100kN in Figure 2, the divergence of pile head lateral displacements $y0$ from an average value is 40%, whilst the same measurement for the maximum bending moment along the pile is 50%. Therefore, the ultimate lateral resistance of NC clays is investigated in the following paragraphs.

5. Ultimate lateral soil resistance of soft clays

The ultimate lateral resistance of clays is quantified by the non-dimensional coefficient N_p (Equation 2).

$$N_p = \frac{p_{ult}}{c_u \cdot D} \qquad (2)$$

A variety of methods referring to the ultimate lateral resistance of clays is located in the literature. An attempt is made to group these methods in a single diagram representative of a soft, NC clay with undrained shear strength increasing linearly with depth. The aforementioned methods are presented in Figure 5, depicting the variation of N_p for the specific soil type, especially at small depths (z<6D). The existence of such a miscellaneous diagram for the coefficient of ultimate lateral soil resistance N_p imposes the numerical simulation of the problem. In order to clarify the typical range of N_p for soft clays, 3D finite element analyses are carried out and their results are presented in the following paragraphs.

6. 3D simulation of a single laterally loaded pile

6.1. The 3D finite element model

A 3D finite element model is designed in the commercial code ABAQUS in order to simulate the single laterally loaded pile. Half the cross-section of the pile together with the surrounding soil block is simulated for symmetry reasons (Figure 3). Solid, 8-node, full integration elements are used to model the soft clay, while 3D, 2-node beam elements simulate the pile. The Drucker-Prager constitutive model is assigned to the soil elements and total stress analyses are carried out. The material of the pile is considered elastic. The surface interaction between the pile and the surrounding soil is simulated according to the Mohr-Coulomb friction law, allowing the formulation of a gap behind the pile and relative slippage of the pile against the soil.

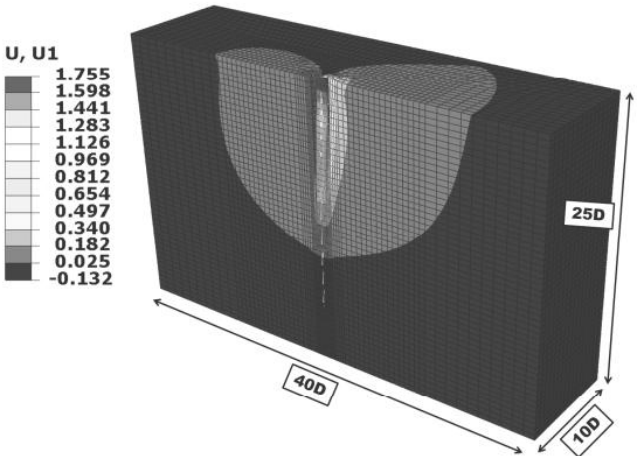

Figure 3. Horizontal displacement contours $U1$ (m) of the laterally loaded pile of the 3D FEA.

The calculation of the ultimate lateral soil resistance p_{ult} through FEA is complicated. Initially, the assumption is made that the lateral soil pressure p is calculated according to the beam-on-elastic foundation solution:

$$p = E_p I_p \frac{d^4 y}{dz^4} = \frac{dQ}{dz} \qquad (3)$$

Furthermore, the ultimate lateral soil resistance in the present study is treated as the asymptote of the hyperbolic p-y curve in very large horizontal displacements. In order to acquire this ultimate value, a transformation of the hyperbolic p-y equation to an equivalent linear equation is necessary:

$$p = \frac{y}{\frac{1}{k} + \frac{y}{p_{ult}}} \quad \rightarrow \quad \frac{y}{p} = \frac{1}{p_{ult}} \cdot y + \frac{1}{k} \qquad (4)$$

Thus, the results of the FEA are depicted in y-y/p diagrams and via linear regression the ultimate lateral soil resistance for each depth is determined (Figure 4).

The simulation of the physical problem leads the surrounding clay to yield up to a specific depth range. Moreover, the upper part of the pile-soil interaction (z/D<6) is crucial in static lateral loading. Thereafter, the coefficient of ultimate lateral resistance N_p remains constant with depth.

6.2. Parametric investigation of the simulation variables

Two main variables of the problem are studied parametrically. The coefficient of horizontal geostatic stress k_o and the pile-clay adhesion factor a, which receives values 0÷1 for a smooth or rough pile-soil interaction respectively. The analyses of Table 2 are carried out for this verification.

Table 2. 3D FEA of the present study.

Analysis	c_u (kPa)	α	k_o
1	10+0.15σ'$_{vo}$	1	0.60
2	10+0.15σ'$_{vo}$	1	1.00
3	10+0.15σ'$_{vo}$	0	0.60
4	10+0.25σ'$_{vo}$	1	0.60
5	10+0.25σ'$_{vo}$	1	1.00
6	10+0.25σ'$_{vo}$	0	0.60

The results of the specific study showed that for both undrained shear strength distributions (A=0.15, 0.25) the divergence between the p_{ult} values obtained by altering k_o is less than 5% for depth to diameter ratios z/D<8. On the contrary, the adhesion factor a is of significant importance for the computation of p_{ult}, with the difference of the specific results ranging between 10-20% for the same z/D ratios.

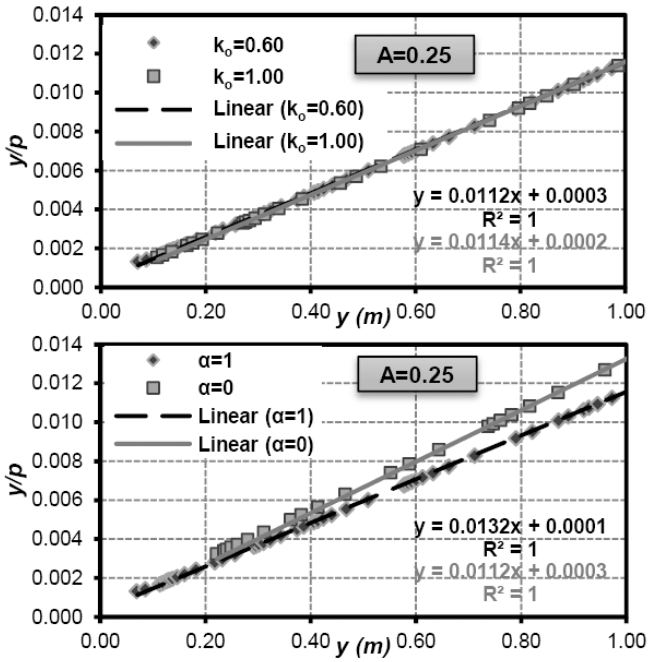

Figure 4. The effect of the coefficient of horizontal geostatic stress k_o (up) and the pile-soil adhesion factor a (down) on the calculation of p_{ult} at depth z=1m.

6.3. Estimation of the ultimate lateral soft clay resistance coefficient N_p

The coefficient of ultimate lateral soil resistance N_p that resulted from the 3D finite element analyses is presented in the same graph with the corresponding proposals of the existing methodologies for comparative reasons (Figure 5).

It is clearly distinguished that the calculated N_p values are higher than almost every other existing methodology. Both the ultimate lateral soil resistance for pile-clay adhesion a=0 as for a=1 receive a N_p value between 3÷4.5 at ground level. For depth to diameter ratios z/D>4, a stabilization of N_p occurs. For a=0, N_p=11÷12 for z/D>4, while for a=1 the corresponding value is N_p=13÷14. The values of N_p in the midrange are closer to the ones proposed by Stevens-Audibert (1979) or the upper bound of Murff-Hamilton (1993), Randolph-Houlsby (1984) and Georgiadis and Georgiadis (2010), i.e. for a=1. Attention needs to be drawn to the assumption of the present study for the ultimate lateral soil resistance; p_{ult} is considered the soil pressure value of the asymptote of the p-y curve at high lateral displacements of the soil.

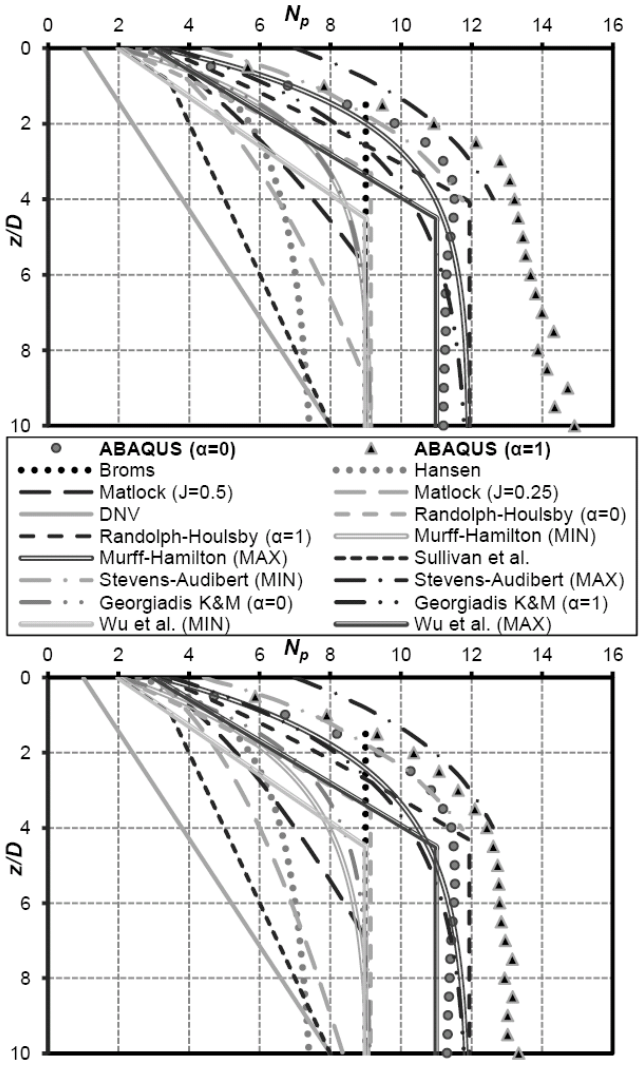

Figure 5. N_p from existing methodologies and 3D FEA for NC clay A=0.15 (up) and A=0.25 (down).

7. Conclusions

A thorough study has been carried out on the ultimate lateral resistance p_{ult} of soft, NC clays under undrained loading conditions. The existing methodologies seem to underestimate the actual lateral resistance of such soils. Three-dimensional finite element analyses in the comercial code ABAQUS demonstrate closer association of the calculated ultimate lateral soft clay resistance to the proposals of Stevens-Audibert (1979) and the upper bound of Murff-Hamilton (1993), Randolph-Houlsby (1984) and Georgiadis and Georgiadis (2010) for soil depth less than 4 pile diameters. Ultimate soil resistance values acquired for greater depth are higher than almost all the existing methodologies. The coefficient of ultimate lateral soil resistance for the latter case is calculated N_p=11÷12 and N_p=13÷14 for a smooth and rough pile-soil interaction respectively.

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Sinkholes and Seepage: Embankment Repair at Hat Creek 1

Robert Bowers, Kevin Burlingham and Joseph Sun

When a sinkhole caused a seepage issue at the Hat Creek No. 1 forebay, a geotechnical investigation and a unique engineering solution were required to design and construct a solution to the problem that would prevent future sinkholes and seepage.

Pacific Gas and Electric Company's Hat Creek No. 1 and Hat Creek No. 2 Hydroelectric Project was constructed in 1921. In 2002, a new Federal Energy Regulatory Commission operating license for the project allowed for a 1-foot increase in the forebay water elevation. The water surface elevation was raised to this height in 2005, and within a year seepage was evident at the toe of the northern embankment. PG&E made several attempts between 2006 and 2009 to eliminate the seepage.

On March 14, 2012, a sinkhole was discovered on the crest of the embankment that led PG&E to remove the powerhouse from service and drain the forebay to determine the source of the problem and craft a long-term solution. An in-depth geotechnical investigation by PG&E and AMEC Environmental & Infrastructure was followed by a unique engineering solution to address the restrictive site and environmental constraints while correcting the larger issue.

Background of the issue

The northern embankment in the forebay of the Hat Creek No. 1 facility is 310 feet long, with the maximum section having a height of 14 feet. Before 2005, the normal maximum water surface elevation was 3,206.7 feet. FERC issued a new license for the Hat Creek project on Nov. 4, 2002. In 2005, PG&E raised the normal maximum water surface elevation to 3207.7 feet, as required by the new FERC license.

Soon after the increase in water surface elevation, PG&E personnel discovered new and consistent seepage along the eastern portion of the landside toe of the northern embankment. Most of the waterside forebay embankment slopes were lined with original construction rock and mortared rock covered by several layers of gunite (or shotcrete) applied over the life of the project. A combination of many animal burrows on both the landside and waterside of the berm and construction practices of the time were thought to have contributed to the seepage problems.

After a site reconnaissance by the PG&E Geosciences Department in 2006, visual observation led to the conclusion that the seepage likely occurred through the lining, which was cracked. To remedy this problem, the forebay elevation was lowered below the level where the observed seepage stopped, and a shotcrete lining was applied by PG&E General Civil Construction crews over an approximately 12-foot-wide by 300-foot-long section of the northern embankment's waterside slope. The repair was keyed into the existing lining starting at about 1 foot below the water surface elevation. The shotcrete was applied up to the crest of the embankment. This repair appeared to slow, but not completely stop, the observed seepage once the water level returned to normal maximum operating elevation.

In February 2009, seepage had once again increased as measured by a Parshall Flume installed at the site. A site reconnaissance and evaluation was conducted by the PG&E Geosciences Department to develop recommendations for mitigating the seepage. The reconnaissance revealed that the discharge occurred along the landside interface between the embankment fill materials and native bedrock elevation, providing evidence of minor piping and/or erosion of materials from the dam. Additionally, plant operations personnel had observed since 2005 that the seepage noticeably decreased when the forebay reservoir water level was lowered by as little as 1 foot. Appropriate notifications to FERC and fish and game agencies were made shortly after the site reconnaissance, and the forebay elevation was lowered by 1 foot, which caused the seepage to cease completely. The importance of the sensitivity of this 1-foot forebay level change affecting the seepage was not fully recognized. An extensive investigation to find the root cause of this unusual sensitivity was not performed.

In response to the increased seepage, the PG&E Geosciences Department designed a landside earthen berm and seepage collection system in July 2009 to capture seepage coming through the northern forebay embankment and stop the migration of fines. This design assumed a dominant seepage path transverse to the dam axis. The design did not take into account the possibility of undocumented elements buried in the dam that could facilitate seepage longitudinal to the dam axis.

In July 2009, PG&E General Civil Construction constructed a 40-foot-long berm near the embankment's maximum section. Once the berm construction and drainage work were completed, the water level in the forebay was returned to the normal maximum water surface elevation of 3,207.7 feet.

Seepage was not visible at the landside toe of the embankment but instead was being captured in the new embankment drain system. Observed seepage was less than 1 gallon per minute.

However, in January 2011, seepage reappeared, this time at the toe of the embankment near the intake structure where the berm and drainage measures were not constructed. After consultation with the agencies and a FERC notification, the water surface elevation was again lowered 1foot in January, and again the seepage ceased.

In July 2011, PG&E Geosciences contracted with AMEC to develop repair alternatives. Based on the construction, repair, and seepage history, several contributing conditions were identified: possible leakage through gunite construction joints and/or interfaces with mortared rock or through features beneath the existing lining and animal burrows. AMEC suggested repair alternatives that could be implemented using a phased approach, from least intrusive methods to test pits within the berm section. By early fall 2011, with the forebay water surface elevation still at reduced, a plan to implement the repairs was developed. The repair alternatives had yet to be implemented by the time a sinkhole was discovered.

This photo shows the location of the seepage at the Hat Creek No. 1 forebay embankment, as well as where the new berm was built to prevent seepage.

Studies of the site

Upon discovery of the sinkhole on March 14, 2012, and subsequent draining of the forebay, PG&E and AMEC engineers visited the site to observe the location and condition of the sinkhole. Once the forebay was drained, PG&E and AMEC engineers visited the site to observe the location and condition of the sinkhole. The sinkhole (about 3.5 feet long by 2 feet wide x 5 feet deep) was located near the interface of the original berm and the 2009 repair berm. During the site visit, the sinkhole was photographed, measured and probed with a hand soil probe to evaluate the character of the soil. Numerous animal burrows were observed on the landside slope of the embankment. An interview with a PG&E crew member also revealed that while the forebay was being drained, water was seen on the waterside face of the berm at several locations along the joint between the new and old shotcrete.

To determine both the cause of the seepage and the final repair alternatives, PG&E and AMEC performed an in-depth comparison of the original design drawings with existing conditions, which showed a couple important factors to be considered. First, the original forebay lining had been overlaid with various generations of gunite or shotcrete, indicating that the embankments had a history of seepage. Second, as much as 6 to 8 feet of soil/sediment were located on the landside slope of the embankment over the years as a result of sediment collecting in the forebay.

To support the development and design of the repair measures, PG&E initiated a physical site investigation to develop an understanding of the cause(s) and extent of the sinkhole as well as the character and composition of the northern embankment and the underlying foundation materials.

Exploration of the sinkhole was accomplished using a phased approach. In Phase I, California Push Technologies, performed 21 cone penetrometer test (CPT) soundings to help develop an understanding of the extent of the sinkhole and the character and composition of the northern embankement and underlying foundation materials. Shallow test pits were also excavated and logged in the vicinity of the historically observed seepage. The CPTs showed that the embankment material in the vicinity of the sinkhole and intake was indicative of very low-strength soil or voids.

Excavation of the test pits demonstrated that the original embankment was constructed without significant foundation preparation, resulting in seepage coming from thin lenses of sand between old fill and recent fill.

Phase I also included visual inspection of the slopes of the embankment, where seepage was found to still be occuring near the sinkhole, even though the forebay reservoir had been drained for more than a week. No evidence of piping of the foundation or embankment materials was observed around the northern embankment. The outlet pipe from the 2009 berm seepage collection system was dry.

Phase II consisted of backfilling the sinkhole with low-strength slurry concrete material, excavating and logging an exploratory pit (about 40 feet long by 20 feet wide by 8 feet deep) centered on the sinkhole, and excavating a "slot trench" (about 20 feet long by 4 feet wide by 14 feet deep) at the bottom of the pit to the embankment foundation. Additional test pits were excavated along the landside toe, west of the sinkhole. A FERC representative was present during the investigation.

This portion of the investigation showed dozens of animal burrows in the vicinity of the sinkhole. Dredged sediment was also identified on the landside of the northern embankment. All fill observed was relatively soft and loose, silty sand that would be susceptible to animal burrowing. The Phase II investigation also revealed that the waste soil/sediment on the landside slope of the northern embankment was placed directly on a rock facing slope protection that was likely a continuation of the existing exposed rock facing nearest the intake structure. The rock facing was encountered in the bottom of the exploratory pit.

The test pits excavated along the landside toe of the original northern embankment encountered loose/soft fill that was prone to caving and susceptible to animal burrowing. Rock facing similar to that revealed by the exploratory pit and slot trench was encountered in all but the westernmost test pit.

Based on the northern embankment's performance history and the Phase I and Phase II field investigations, it was determined that the sinkhole was caused by a combination of factors, as listed below.

Deterioration of the original northern embankment caused by animal burrowing played a role because once the forebay elevation was raised by 1 foot, the dens were flooded and the unobstructed pipe from the lake to the animal burrows provided a seepage path through the embankment. Further lateral seepage paths were seen in the buried rock facing that was present on the landside slope of the original embankment. This rock facing likely allowed the seepage to eventually bypass the 2009 berm seepage collection system. Erosion of the embankment fill through the voids in the waterside shotcrete/gunite lining likely shortened the seepage path through the embankment fill. Additional weight of the 2009 berm acting on the waste soil and sediment that had been placed on the landside embankment slope could have contributed to the collapse of the loose and weakened embankment fill and the formation of the sinkhole.

Choosing a solution

Both near-term and long-term repair scenarios were explored to address the deteriorated condition of the northern embankment. The goal was to mitigate the leakage, refill the forebay and return the powerhouse to service as quickly as possible while a long-term solution was designed for future implementation.

Because the exploratory test pits in Phase II of the site investigation revealed favorable foundation conditions, a sheet pile wall was considered as a short-term means to provide a seepage cutoff barrier within the embankment. Because it appeared that the seepage was occurring through the uppermost embankment fill, the sheet piles would not need to extend significantly into the underlying

foundation materials to reduce the observed leakage. A system of subsurface drains and instrumentation would also have to be installed to monitor seepage and the phreatic surface within the embankment. It was also recommended that the forebay water level continue to be restricted by 1 foot below the maximum under this repair.

The final repair included drivings sheet piles down to the bedrock, removing the 2009 berm, constructing a sub-drainage system, building a wider, more stable embankment, and more.

The long-term repair scenarios centered on either a complete rebuild of the northern embankment or construction of a setback embankment on the landside slope of the original northern embankment. The setback embankment would also require internal seepage control and monitoring measures.

Several factors contributed to the selection of the final repair method. Design alternatives that concentrated on the landside of the embankment were desirable from a schedule standpoint because this would reduce work within the waterway and therefore the need for long lead permits and agency approvals. Any short-term repair options, expected to be in place for no more than one to two years, would likely require forebay water level restrictions and careful performance monitoring. From an operating perspective, it was desirable to implement a long-term remediation to limit future outages, forebay drains and subsequent fish rescues in this popular camping and fishing location.

To eliminate future outages for long-term repairs and limit the total area of disturbance, the project team decided to implement a combination of the near-term and long-term repair recommendations while the forebay and canal were already drained.

The final repair method consisted of driving sheet piles through the center of the original embankment down to the bedrock foundation; removing all of the 2009 berm and a portion of the original embankment; exposing the bedrock foundation in the excavated area; constructing a sub-drainage system and placing a sand filter on the exposed original embankment slope; placing and compacting imported embankment fill to create a wider, more stable embankment; and installing instrumentation along the crest of the embankment.

Once a design scheme was chosen, AMEC performed analyses to support the design of the northern embankment repairs. These analyses included compatibility of filter/drain materials with the existing embankment fill and foundation soils, and stability analyses to establish the size and configuration of the new landside berm and assess performance during earthquake shaking.

Early in the design process, the length of the sheet pile wall and new landside berm had to be determined, based on the past performance, findings from the site investigation, and topography of the landside slope. For the eastern extent of the sheet pile wall, it was decided that in order to minimize the risk of damaging the existing intake structure foundation, the sheet pile wall would start about 2 feet from the intake structure wing wall. The seepage that would travel through this gap would be intercepted by the filter and drain in the new landside berm. To minimize any deformations during a seismic event and help mitigate any future issues with the embankment, the new landside berm was designed to widen the crest and have a 2(H):1(V) landside slope.

Following the preliminary design of the repairs, the stability of the repaired northern embankment was evaluated for representative and potentially critical loading conditions, including static loading during construction, at end of construction, during steady-state seepage, and immediately following rapid drawdown, as well as seismic loading during steady-state seepage. The benefit the sheet pile cutoff wall might have on the stability of the temporary and permanent waterside and landside slopes of the analyzed sections was conservatively not considered in the stability analyses.

Embankment cross-sections at two locations were developed for the stability analyses. One section represented the northern embankment's maximum section. The other section was located near the intake structure where the waterside slope steepens to about 0.7(H):1(V) and represents a small portion of the northern embankment, roughly 20 to 30 feet.

The minimum static factor of safety for the embankment sections was for the long-term case and corresponds to a potential slip surface located on the waterside slope where steepened slopes exist. This computed factor of safety is less than that required for acceptable performance, although the long-term performance of this steep slope has been satisfactory. The forebay was drawn down several times in its history of operation, most recently when the sinkhole was first discovered, and the performance of this waterside slope was satisfactory. The satisfactory performance reflects the conservative strength parameters and assumptions used in the analysis.

The stability of the embankment immediately after excavation of the waste soil/sediment that exists on the landside slope of the northern embankment was also evaluated. Because the factor of safety was marginal for this case, it was recommended that heavy equipment should not be allowed access to the top of the temporary cut slope during construction of the repairs.

A quality control and inspection program was developed to ensure the materials and construction activities were inspected and tested to the correct specification and frequency. Additionally, it was decided to have the engineer-of-record (or representative) onsite during construction to monitor quality control, answer questions regarding the design and observe material conditions as they were encountered. Piezometers were also specified to be installed through the crest of the embankment, with readings required on a monthly basis for the first two years after embankment repairs are implemented. Regular monitoring of the piezometers can be used to evaluate the effectiveness of the sheet pile cutoff wall and whether or not adverse seepage conditions are developing.

In addition to the engineering analysis completed as a basis for the design, a temporary construction potential failure mode analysis workshop was conducted jointly by PG&E, AMEC and FERC. The workshop participants postulated a number of potential failure modes for the various loading conditions for the northern embankment during construction.

For each failure mode that was deemed credible, the participants listed the factors that made it more likely to occur (adverse factors) and those that made it less likely to occur (favorable factors). Each adverse condition was then mitigated with risk reduction measures that were carried forward into the design process.

A new, wider, and more stable embankment was constructed at the Hat Creek No. 1 facility once the sub-drainage system was installed.

Construction process

The investigation, design and agency consultation phases of this project were extensive. With appropriate permits and approvals in place, construction commenced on Nov. 5, 2012. PG&E's Hydro General Civil Construction was the construction lead for the work. Beginning an earthwork project late in the year proved to be challenging due to wet and frozen conditions typical for the region. Many adjustments to schedule, construction methods and materials were necessary to maintain quality control while achieving the desired embankment remediation.

After several weeks of weather delays, and following removal of a significant portion of the original embankment along with any rock fill/facing that was buried, the bedrock foundation for the new landside berm was exposed and prepared for placement of embankment fill. The bedrock foundation was proof-rolled (rolled over with heavy equipment to ensure it was sound) and any frozen material was excavated before placement of any embankment fill. The original embankment slope that remained after the completion of the excavation was compacted using an HED shaker vibratory plate compactor mounted on an excavator arm.

The sub-drainage system was installed after the foundation was exposed. The collection pipe consisted of 6-inch-diameter corrugated high-density polyethylene (HDPE) pipe. A new seepage monitoring weir was placed at the east end of the system that matched the existing weir at the site. The sub-drainage system was split into two sections (east and west) so as to be able to determine in the future through which section of the embankment the seepage was occurring.

After completion of the sub-drainage system, embankment fill was placed and compacted on the landside of the northern embankment to form the new landside berm. The imported embankment fill consisted, at first, of a red clayey sand at the base of the new landside berm followed by a brown silty sand with gravel for the upper portion of the berm.

Overnight temperatures during the embankment construction were below 0 degrees F, while daytime temperatures rarely reached above 10 F. These temperatures caused the exposed embankment to freeze to a depth of 6 to 9 inches, which necessitated that any frozen material on the original embankment had to be removed before the granular filter material was placed on the slope.

Three piezometers were installed along the crest of the repaired embankment, on the landside of the sheet pile wall, to observe any seepage through the cutoff wall. All three were installed down into the weathered bedrock to a tip elevation of 3,198 feet. Readings of the water levels in the piezometers were taken before and during the refilling of the forebay. Work was completed in March 2013.

Conclusion

This work successfully repaired the conditions that led to the creation of the sinkhole and mitigated future seepage.

Owners of aged earthen canals and forebays are accustommed to finding areas of seepage and leakage. Recognizing changes in seepage conditions after an operational change is vital to avoiding a potential failure.

In the case of Hat 1, fluctuations in the forebay elevation showed the condition to be elevation-dependent but did not give indication of where the seepage was entering the berm. Recognizing when to lower the forebay elevation or call for a complete draw-down of the canal due to changes in seepage locations or increases in seepage volume greatly reduced the risk of a potential failure and subsequent environmental damage.

The investigation to determine the cause of the Hat 1 sinkhole was critical to determining the appropriate repair and its limits. Previous efforts to compare as-built conditions with original design drawings were not thorough enough to reveal potential sources of the seepage and cause of the subsequent sinkhole.

Additionally, the first two attempts to repair the seepage were completed with limited knowledge of subsurface conditions. The need to "dig deeper" to find out what is leading to the observed conditions is critical. Although the previous repair attempts may have been appropriate for some applications, it was eventually apparent that an "off-the-shelf" design would not work for this site without revealing the cause of the seepage and its extent.

Having a representative of the engineer-of-record onsite during construction allowed for decisions regarding materials, methods and design alterations to be made in a timely manner. Assembling an experienced and knowledgeable team familiar with all aspects of dam construction and remediation was essential. As with any project, a technically diverse team will provide the best solutions to persistent and difficult issues.

Robert Bowers is a civil engineer with Pacific Gas and Electric Company. Kevin Burlingham is a project engineer at AMEC Environmental & Infrastructure. Joseph Sun is principal geotechnical engineer at PG&E.

http://www.hydroworld.com/articles/hr/print/volume-32/issue-7/cover-story/sinkholes-and-seepage-embankment-repair-at-hat-creek-1.html

Το μέλος της ΕΕΕΕΓΜ Ανδρέας Γιαννακογιώργος, ο οποίος εργάζεται στην εταιρεία Coffey Geotechnics (NZ) Limited στην Νέα Ζηλανδία, μας έστειλε την παρακάτω πολύ ενδιαφέρουσα έκθεση της Earthquake Commission της Κυβέρνησης της Νέας Ζηλανδίας σχετικά με την βελτίωση εδαφών που είναι επιρρεπή σε ρευστοποίηση.

http://www.eqc.govt.nz/sites/public_files/Ground%20Improvement%20Trials%C5%B8v3_1.pdf

EQC
EARTHQUAKE COMMISSION
Kōmihana Rūwhenua

New Zealand Government

Ground Improvement Trials for Liquefaction Vulnerable Land

Introduction

One of the features of the Canterbury earthquakes was the significant damage caused by liquefaction. We now have a better understanding of what land is vulnerable to liquefaction and the need to improve resilience if building on liquefaction vulnerable land, like in TC3 areas.

The design of a home's foundations is clearly an important part of achieving resilience in these areas. Improving the resilience to liquefaction of the land itself, or strengthening the land, also has the potential to play a key role. There are some known methods for doing this but they are not proving to be effective in Canterbury. As part of its research function, EQC is looking to identify new methods that are practical to apply on liquefaction vulnerable properties. The aim is to find a balance between improving the land and foundation design to contribute to cost effective, consentable construction solutions, and better outcomes for homeowners.

The Trials

EQC is funding a programme, run by leading experts from New Zealand and around the world, to trial a number of ground improvement methods that are tried and true in large scale civil construction projects, to see if they can be applied in residential construction in Canterbury.

There are four methods being trialled. Some of them are intended to strengthen soil on bare land prior to a rebuild. In other situations, land that is materially vulnerable to liquefaction lies beneath a lightly damaged house. In these cases a land improvement technique that avoids the need to move or demolish the house is needed and we are trialling a method for this.

The testing programme is world-leading, smart, and rigorously applied research. It is being run for EQC by leading experts from New Zealand and around the world. Geotechnical engineering firm Tonkin and Taylor is guiding the trials, supported by reviewers from the University of Canterbury, Cornell University, UC Berkeley, University of Texas and leading engineering consultancy firms.

The trials are being conducted on unoccupied cleared land in parts of the residential red zone, at three sites in Wainoni, Avonside, and Bexley. These areas have soil characteristics representative of almost all of TC3 residential properties. The sites were selected by an international academic panel, convened by Tonkin & Taylor and the University of Canterbury, and were based on extensive geotechnical and geophysical analysis of representative soil conditions in the different areas.

To assist in the investigations, we have helped bring the specialised truck-mounted geophysical test equipment, known as the T-Rex, over from the University of Texas.

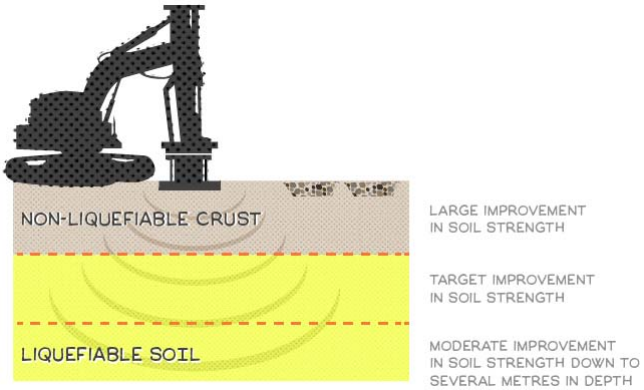
The T-Rex truck uses a large metal plate to create intense, but highly localised, shaking that diminishes rapidly with increasing distance from the truck. This shaking is applied to areas of test site land to assist in the evaluation of the strengthening methods being trialled.

The T-Rex triggers localised liquefaction to particular areas of land – a couple of metres in diameter by a couple of metres deep directly beneath the truck. This allows the researchers to undertake the trials in a very controlled manner and increases the accuracy of the results.

The Methods

Rapid Impact Compaction (RIC)

RIC is a smaller-scale version of a method called Dynamic Compaction which has been widely used on projects in New Zealand and around the world. It was used in the foundation work of Te Papa Museum in Wellington, for example.



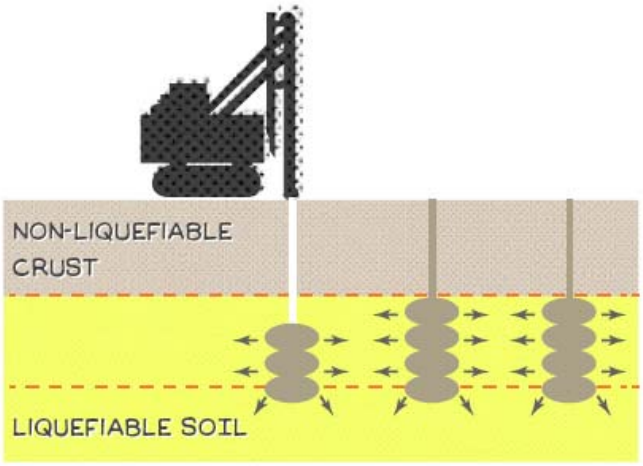
The RIC equipment is effectively a pile-driving hammer attached to a large steel end-plate, installed on the arm of an excavator. This end-plate is driven into the ground with rapid hammering. This improves the density of the ground in two ways – first, due to the physical compaction near the surface as the plate is hammered (with craters then filled in) and second, by vibro-compaction of the soils down to several metres depth.

The advantage of this improvement process is that it does not target a specific layer – all soils within several metres of the surface are treated.

This technique may offer advantages in cost and efficiency for well-suited sites, such as those with sandier soils. It requires sufficient working room and, due to vibrations, may be best applied on sites with vacant neighbouring properties or in cases where work can be sequenced across multiple properties.

Low Mobility Grout (LMG)

Also known as Compaction Grouting, this method works by injecting low-mobility (concrete consistency) grout to form a column of concrete "bulbs" within the soils. This squeezes out the existing soil sideways, providing densification and a positive increase in horizontal soil stresses, while the concrete columns also provides a stiffening of the soil.

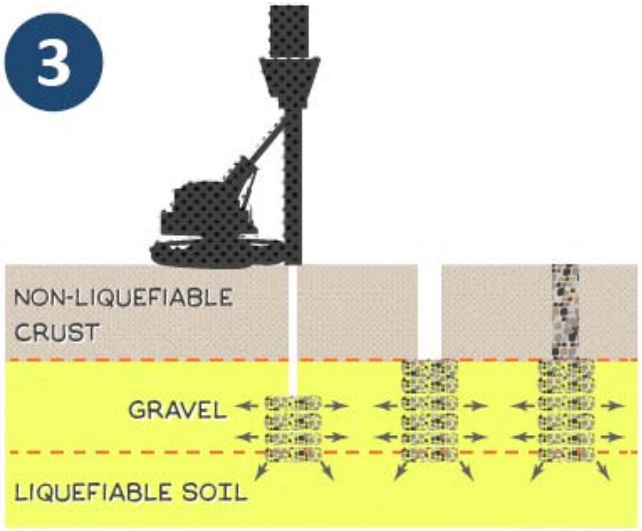


The grouting process usually starts at the bottom bulb and works upwards, so it generally improves only the target 'new' crust and provides only minor improvement for the liquefiable soil directly under the target layer.

The LMG technique offers advantages in cleared sites but where it's still preferable not to disturb the soil or groundwater (e.g. on sites with historical ground contamination). It also offers the opportunity to provide moderate improvement of soils that are too silty to improve using the Rapid Impact Compaction and Rammed Aggregate Piers methods, but which are still susceptible to liquefaction.

Rammed Aggregate Piers (RAP)

Working on a similar principle as the LMG method, this technique uses gravel, instead of concrete, to create columns that help stiffen the soil. A mandrel is pushed into the ground with a very powerful hydraulic ram, down to the target improvement depth. Gravel is fed down the hollow stem of the mandrel and released into the ground at depth.

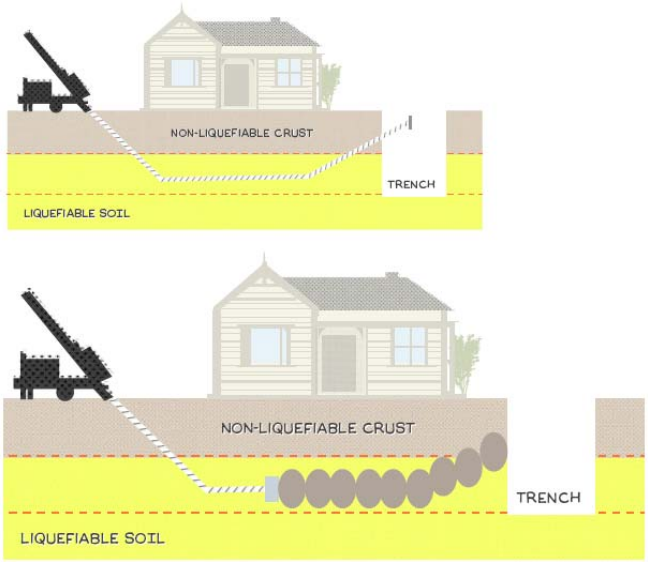


The mandrel then pushes back into the released gravel, compacting it and forcing the gravel to push outwards into the surrounding soil. This process is repeated as the mandrel is raised, forming a column of compacted gravel. This provides densification and increases positive horizontal soil stresses in the surrounding soil.

The RAP method is a proprietary ground improvement technique that offers advantages in sites with suitable ground conditions (sand through to sandy silt) and requires sufficient working room.

Horizontal Soil Mixing (HSM)

This technique offers advantages in situations where an existing building is to remain in place or where vibration and space constraints exist due to close proximity to neighbouring properties.



HSM works by drilling horizontally under an existing property, through the target layer out to a trench where it is then fitted with a horizontal axis rotary mixing tool. The tool is withdrawn back through the drilled hole, as cement mix is pumped through the drill steel and mixed with the soil by the rotary mixing tool.

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Timing and impact on rebuild

The first phase of the ground improvement trials were completed in mid-July 2013.

A final round of geotechnical testing is being planned for September 2013. In the mean-time the team is undertaking an extensive programme of data analysis. This analysis will help inform a pilot programme where successful techniques will be deployed in actual residential settings. This will help us understand whether the methods are cost effective, commercially viable and will help the Christchurch City Council and Ministry of Business innovation and Employment understand if they are consentable.

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EQC EARTHQUAKE COMMISSION Kōmihana Kōwhenua

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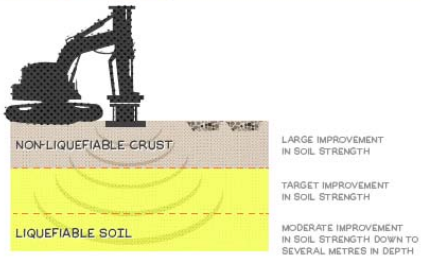
1



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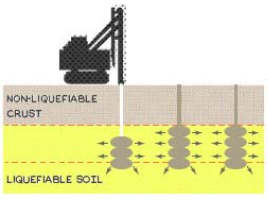
2



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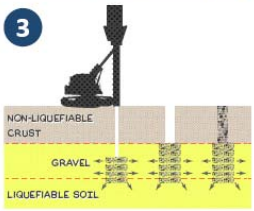

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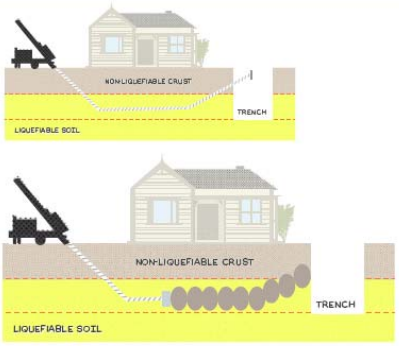

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For more information go to: www.eqc.govt.nz or freephone 0800 DAMAGE (0800 326 243)

This research programme is supported by:

Ministry of Business, Innovation & Employment

Housing New Zealand
Housing New Zealand Corporation

ΑΡΧΕΙΟ ΕΛΛΗΝΙΚΩΝ ΔΙΔΑΚΤΟΡΙΚΩΝ ΔΙΑΤΡΙΒΩΝ

Οι ελληνικές διδακτορικές διατριβές στο www.didaktorika.gr από το ΕΚΤ

Οι διδακτορικές διατριβές των Ελλήνων επιστημόνων, ένα πολύτιμο αρχείο και μια σημαντική πηγή γνώσης, βρίσκονται συγκεντρωμένες σε έναν ανανεωμένο δικτυακό τόπο (http://www.didaktorika.gr), με νέες δυνατότητες αναζήτησης, πλοήγησης και πρόσβασης στο πλήρες περιεχόμενο. Πρόκειται για την ηλεκτρονική "στέγη" του Εθνικού Αρχείου Διδακτορικών Διατριβών (ΕΑΔΔ), του οποίου την ευθύνη συγκρότησης και διατήρησης έχει το Εθνικό Κέντρο Τεκμηρίωσης (ΕΚΤ).

Στο αποθετήριο του ΕΑΔΔ περιλαμβάνονται περισσότερες από 29.000 βιβλιογραφικές εγγραφές διατριβών, συστηματικά τεκμηριωμένες (με στοιχεία όπως τίτλος, περίληψη, συγγραφέας, επιστημονικό πεδίο, εκπαιδευτικό ίδρυμα, μέλη επιτροπής, έτος απονομής του διδακτορικού τίτλου, λέξεις-κλειδιά, χώρα, γλώσσα). Οι χρήστες μπορούν να αναζητήσουν το υλικό που τους ενδιαφέρει, χρησιμοποιώντας πολλαπλά φίλτρα, και να πλοηγηθούν με εύκολο τρόπο στα επιμέρους πεδία: επιστημονικό πεδίο, ίδρυμα, συγγραφέας, χώρα, γλώσσα, ημερομηνία.

Για περισσότερες από 21.300 διατριβές παρέχεται η πρόσβαση στο πλήρες κείμενο της διατριβής - το ΕΑΔΔ περιλαμβάνει σήμερα 4.500.000 ψηφιοποιημένες σελίδες, ένας αριθμός που διαρκώς αυξάνεται. Εκτός από τη δυνατότητα ξεφυλλίσματος και εκτύπωσης ανά σελίδα, οι χρήστες μπορούν πλέον να αποθηκεύσουν τη διατριβή σε μορφή αρχείου pdf, μετά από την εγγραφή τους στο αποθετήριο και την αποδοχή των σχετικών όρων χρήσης (για προσωπική, μη εμπορική χρήση ή για εκπαιδευτικούς/ερευνητικούς σκοπούς).

Οι εγγεγραμμένοι χρήστες μπορούν, επίσης, να παραγγείλουν online μια διατριβή σε έντυπη μορφή ή σε CD/DVD, ή να εκδηλώσουν το ενδιαφέρον τους για την ψηφιοποίηση/ανάρτηση του πλήρους κειμένου μιας διατριβής που δεν διατίθεται διαδικτυακά. Επίσης, στο νέο διαδικτυακό περιβάλλον λειτουργεί το Κέντρο Ηλεκτρονικής Υποστήριξης Χρηστών ΕΑΔΔ (http://helpdesk.didaktorika.gr), που παρέχει τη δυνατότητα για ηλεκτρονική υποβολή και απάντηση αιτημάτων, και πρόσβαση σε Συχνές Ερωτήσεις και Χρήσιμα Αρχεία.

Το ΕΑΔΔ, συγκεντρώνει τις διδακτορικές διατριβές που έχουν εκπονηθεί στα ελληνικά πανεπιστήμια από Έλληνες και ξένους διδάκτορες, και σε πανεπιστήμια του εξωτερικού από Έλληνες διδάκτορες (αναγνωρισμένες από το ΔΟΑΤΑΠ). Το ΕΚΤ, βάσει νόμου, είναι από το 1985 ο υπεύθυνος φορέας για την τήρηση του Εθνικού Αρχείου Διδακτορικών Διατριβών. Το μεγαλύτερο ποσοστό των διατριβών που περιλαμβάνονται στο ΕΑΔΔ έχει εκπονηθεί από το 1985 και μετά, ενώ ένα μικρό ποσοστό διατριβών (περίπου 6%) αφορά την περίοδο 1932 -1985. Το έντυπο αρχείο περισσότερων από 30.000 διδακτορικών διατριβών διατηρείται στη Βιβλιοθήκη Επιστήμης και Τεχνολογίας του ΕΚΤ στο Εθνικό Ίδρυμα Ερευνών.

Το ΕΑΔΔ αποτελεί ένα σημαντικό απόθεμα επιστημονικής γνώσης και το ΕΚΤ αξιοποιεί όλες τις δυνατότητες των νέων Τεχνολογιών Πληροφορίας και Επικοινωνίας για την ελεύθερη διάθεση του στην επιστημονική κοινότητα και την κοινωνία. Συγκεκριμένα, το ΕΚΤ μετέφερε το Εθνικό Αρχείο Διδακτορικών Διατριβών, παράλληλα με μαζικές ψηφιοποιήσεις των παλαιότερων διατριβών, σε υποδομή ηλεκτρονικού αποθετηρίου, με αυξημένη λειτουργικότητα και υπηρεσίες.

Έτσι εξασφαλίζεται η αναζήτηση, η ανάκτηση και η μακροχρόνια διατήρηση των διατριβών, καθώς και η διαλειτουργικότητα με διεθνή αποθετήρια. Παράλληλα, αυξάνεται η ευκολία εντοπισμού των διατριβών, αφού η ενσωμάτωση τους στο ΕΑΔΔ τις καθιστά αναζητήσιμες από μηχανές αναζήτησης (π.χ. Google). Επιπλέον, κάθε διατριβή που καταχωρείται στο αποθετήριο ΕΑΔΔ αποκτά μια μόνιμη διεύθυνση (URL), ενώ εξασφαλίζεται η μακροχρόνια διατήρηση του ψηφιακού αντικειμένου και η διαχρονική παρουσίαση και προβολή του έργου.

Το ΕΚΤ συμμετέχει ενεργά στο διεθνές δίκτυο DART-Europe, μια συνεργασία μεταξύ ερευνητικών βιβλιοθηκών και κοινοπραξιών βιβλιοθηκών ανά την Ευρώπη, με σκοπό τη βελτίωση της πρόσβασης στις ευρωπαϊκές διδακτορικές διατριβές. Έτσι, διαθέτει τις ελληνικές διδακτορικές διατριβές στην ευρωπαϊκή πύλη DART (www.dart-europe.eu), η οποία παρέχει ανοικτή πρόσβαση σε περισσότερες από 400.000 διδακτορικές διατριβές από 27 ευρωπαϊκές χώρες, μέσα από ένα ενιαίο περιβάλλον αναζήτησης και πλοήγησης.

Η ανανεωμένη έκδοση του Αποθετηρίου του Εθνικού Αρχείου Διδακτορικών Διατριβών αναπτύσσεται στο πλαίσιο του έργου "Εθνικό Πληροφοριακό Σύστημα Έρευνας και Τεχνολογίας (ΕΠΣΕΤ)-Κοινωνικά Δίκτυα και Περιεχόμενο Παραγόμενο από Χρήστες", (Επιχειρησιακό Πρόγραμμα "Ψηφιακή Σύγκλιση", ΕΣΠΑ, με τη συγχρηματοδότηση της Ελλάδας και της ΕΕ-Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης) (www.epset.gr), που αποτελεί το κύριο αναπτυξιακό έργο του ΕΚΤ.

Ενισχύοντας τον ερευνητή: Οφέλη από τη διάθεση μιας διατριβής στο ΕΑΔΔ

Η ανοικτή πρόσβαση στην επιστημονική γνώση αποτελεί κεντρικό πυλώνα του Ευρωπαϊκού Ψηφιακού Θεματολογίου με ορίζοντα το 2020, κυρίαρχη τάση στη διεθνή επιστημονική κοινότητα και βασικό όρο ανάπτυξης σύμφωνα με τις εθνικές και ευρωπαϊκές πολιτικές για την επιστημονική και πολιτιστική γνώση και παραγωγή.

Το ΕΚΤ, εκπληρώνοντας τον θεσμικό του ρόλο, δημιουργεί την υποδομή για τη συγκέντρωση, τεκμηρίωση και διάθεση έγκριτου επιστημονικού και πολιτιστικού περιεχομένου στην ελληνική και διεθνή επιστημονική κοινότητα. Βασικό σημείο της δράσης αυτής του ΕΚΤ αποτελεί και το Εθνικό Αρχείο Διδακτορικών Διατριβών (ΕΑΔΔ). Οι βασικές αρχές που διαμορφώνουν την πολιτική διάθεσης του περιεχομένου του ΕΑΔΔ είναι: η προάσπιση και ενίσχυση της ανοικτής πρόσβασης στην ερευνητική γνώση και παραγωγή, και η ενίσχυση των νέων ερευνητών στην προσπάθειά τους να καταστήσουν το έργο τους γνωστό και προσβάσιμο στην ελληνική και διεθνή επιστημονική κοινότητα, αλλά και το ευρύ κοινό.

Η ανοικτή διάθεση των διδακτορικών διατριβών από την κεντρική, έγκυρη, αξιόπιστη διαδικτυακή υπηρεσία του ΕΑΔΔ έχει αδιαμφισβήτητα οφέλη για τους ίδιους τους διδάκτορες, την ερευνητική κοινότητα και το ευρύ κοινό. Το ΕΑΔΔ αποτελεί την πύλη για την προβολή των αποτελεσμάτων πρωτότυπης επιστημονικής έρευνας, αλλά και την αξιοποίηση και επανάχρησή τους. Έτσι, για τον ερευνητή που καταθέτει τη διατριβή του, το ΕΑΔΔ αποτελεί σημείο διαχρονικής προβολής και διάδοσης της εργασίας, αυξάνοντας τις πιθανές παραπομπές και τη διεθνή αναγνώριση της.

Λαμβάνοντας, μάλιστα, υπόψη, ότι η κάθε διδακτορική διατριβή αποτελεί ένα από τα πρώτα κείμενα με τα οποία ένας ερευνητής γίνεται γνωστός στην ακαδημαϊκή κοινότητα, γίνεται αντιληπτή η ιδιαίτερη σημασία που έχει η σωστή απόθεση, τεκμηρίωση και διάθεση της διατριβής για μεταγε-

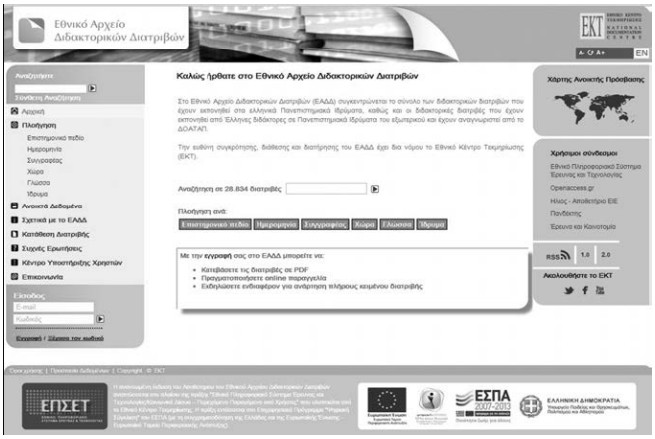
νέστερη εξέλιξη του νέου ερευνητή. Παράλληλα, οι διαδικασίες αυτές εξασφαλίζουν διαφάνεια στη διεξαγωγή της έρευνας, ενώ συντελούν στην αποτροπή της λογοκλοπής. Στον δικτυακό τόπο του ΕΑΔΔ μπορεί κάποιος να βρει αναλυτικές πληροφορίες, τόσο για τις διαδικασίες κατάθεσης όσο και για τα πολλαπλά οφέλη που απορρέουν από τη διαδικασία κατάθεσης των διατριβών.

Ιδιαίτερα θετική η υποδοχή των νέων υπηρεσιών του ΕΑΔΔ

Η ευρεία δημοσιότητα στις νέες υπηρεσίες του ΕΑΔΔ που εξασφαλίζουν την εύκολη και φιλική προς τον χρήστη αναζήτηση/πλοήγηση, αλλά και την ανάκτηση, ανάγνωση και μακροχρόνια διατήρηση των διατριβών, οδήγησε σε σημαντική αύξηση της επισκεψιμότητας. Χαρακτηριστικά αναφέρεται ότι το διάστημα 3-16 Απριλίου 2013, επισκέφθηκαν τον δικτυακό τόπο του ΕΑΔΔ περισσότεροι από 60.000 μοναδικοί επισκέπτες (75.000 επισκέψεις συνολικά, εκ των οποίων 75% περίπου ήταν νέες επισκέψεις).

Ο αριθμός των εγγεγραμμένων χρηστών, οι οποίοι μπορούν να παραγγείλουν μια διατριβή που δεν είναι ακόμη διαθέσιμη online ή να μεταφορτώσουν το πλήρες κείμενο περισσότερων από 20.500 διατριβών που είναι ήδη διαθέσιμες, διπλασιάστηκε στο ίδιο διάστημα, ξεπερνώντας τους 8.000 χρήστες. Αντίστοιχα, διπλασιάστηκε σχεδόν ο αριθμός των μεταφορτώσεων αρχείων των διατριβών, φθάνοντας τις 20.000 μεταφορτώσεις μέσα σε μόλις 15 ημέρες.

Δεδομένου ότι κύριος στόχος της αναβαθμισης και διαρκούς υποστήριξης του ΕΑΔΔ είναι η προάσπιση και ενίσχυση της ανοικτής πρόσβασης στην ερευνητική γνώση και παραγωγή, σε συνδυασμό με την προβολή του έργου των Ελλήνων ερευνητών, η θερμή υποδοχή των νέων υπηρεσιών του ΕΑΔΔ επιβεβαιώνει έμπρακτα τις αρχές και την πολιτική διάθεσης του περιεχομένου του, όπως αυτές έχουν προσδιοριστεί από το ΕΚΤ. Υποστηρίζοντας με συνέπεια την ενίσχυση της ελληνικής ακαδημαϊκής δραστηριότητας και τη διάχυση των ερευνητικών αποτελεσμάτων μέσω των ΤΠΕ, το ΕΚΤ αναλαμβάνει πρωτοβουλίες που διευκολύνουν το έργο των Ελλήνων ερευνητών και το καθιστούν προσβάσιμο στη διεθνή ακαδημαϊκή και φοιτητική κοινότητα, καθώς και στο ευρύτερο κοινό.



info

Το Εθνικό Αρχείο Διδακτορικών Διατριβών
http://www.didaktorika.gr

Ο ελληνικός δικτυακός τόπος για την Ανοικτή Πρόσβαση
http://www.openaccess.gr

Εθνικό Πληροφοριακό Σύστημα Έρευνας και Τεχνολογίας
http://www.epset.gr

ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΤΕΚΜΗΡΙΩΣΗΣ / ΕΡΕΥΝΑ ΚΑΙ ΚΑΙΝΟΤΟΜΙΑ, Τεύχος 91, Μάρτιος – Μάιος 2013,
http://www.ekt.gr/content/img/product/87452/16_21.pdf

ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΜΗΧΑΝΙΚΩΝ

Δημοσίευση Άρθρων Νέων Γεωμηχανικών στο Frontiers of Structural and Civil Engineering - Springer

Η Οργανωτική Επιτροπή του 5ου Διεθνούς Συνεδρίου Νέων Γεωτεχνικών Μηχανικών (5th iYGEC 2013), που διεξήχθη από τις 31 Αυγούστου έως την 1 Σεπτεμβρίου 2013 στο Παρίσι, σε συνεργασία με την επιτροπή αξιολόγησης του διεθνούς επιστημονικού περιοδικού ***Frontiers of Structural and Civil Engineering - Springer*** επέλεξαν 10 εργασίες για δημοσίευση στο εν λόγω περιοδικό. Ανάμεσα στις εργασίες που επιλέχθησαν και θα δημοσιευθούν στις αρχές του 2014 είναι και οι εργασίες των εκπροσώπων της Ελλάδας κας Α. Καρατζέτζου και κου. Κ. Τζιβάκου:

- **Άννα Καρατζέτζου** από το Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης με την εργασία της "Soil-foundation-structure interaction in demand spectra" και
- **Κωνσταντίνος Τζιβάκος** από το Εθνικό Μετσόβιο Πολυτεχνείο με την εργασία του "Numerical investigation of the lateral load response of piles in soft clay".

Τα άρθρα των δύο νέων συναδέλφων δημοσιεύονται σε άλλη ενότητα του περιοδικού.

Το μέλος Ηλίας Μιχάλης Keynote Speaker στο International Urban Tunnelling Conference London 16th – 19th September 2013

Το μέλος της ΕΕΕΕΓΜ **Ηλίας Μιχάλης** προσεκλήθη ως Keynote Speaker στο International Urban Tunnelling Conference, που διεξήχθη στο Λονδίνο (16-19 Σεπτεμβρίου), στην Ενότητα ΙΙΙ : Advances in tunnel linings and construction: assessing new developments and cost savings, όπου παρουσίασε το άρθρο "Evaluating the application limits of unreinforced concrete tunnel final linings", που συνέταξε σε συνεργασία με το επίσης μέλος μας **Γιώργο Κουρετζή**.

Ο Ηλίας Μιχάλης είναι Tunnel Expert, Technical Office of Qatar Rail, Deutsche Bahn International GmbH και ο Γιώργος Κουρετζής είναι Senior Lecturer στο University of Newcastle, Australia.

Η παρουσίαση έχει αναρτηθή στην ιστοσελίδα της ΕΕΕΕΓΜ.

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ ΓΙΑ ΓΕΩΜΗΧΑΝΙΚΟΥΣ

ATKINS

Το μέλος της ΕΕΕΕΓΜ Κώστας Σουφλής μας προώθησε τον παρακάτω κατάλογο θέσεων εργασίας στην εταιρεία συμβούλων μελετητών μηχανικών WSAtkins:

Code 1. Senior Materials Engineer

Atkins requires a Senior Materials Engineer in Qatar. Applicants must have minimum qualification BSc / BEng, chartered status, 14+ years of professional experience, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 2. Site Engineer (Structures)

Atkins requires a Site Engineer (Structures) in Qatar. Applicants must have minimum qualification BSc / BEng, 10+ years of professional experience, 7 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 3. Site Engineer (Utilities)

Atkins requires a Site Engineer (Utilities) in Qatar. Applicants must have minimum qualification BSc / BEng, 10+ years of professional experience, 7 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 4. Senior Safety Engineer

Atkins requires a Senior Safety Engineer in Qatar. Applicants must have minimum qualification BSc / BEng, be Certified Safety Professionals (CSP), have 14+ years of professional experience, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 5. Senior Quantity Surveyor

Atkins requires a Senior Quantity Surveyor in Qatar. Applicants must have minimum qualification BSc / BEng, be chartered (QS) by CIOB or RICS, have 14+ years of professional experience, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 6. Quantity Surveyor

Atkins requires a Quantity Surveyor in Qatar. Applicants must have minimum qualification BSc / BEng in Quantity Surveying, 10+ years of professional experience, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 7. Senior Planning Engineer

Atkins requires a Senior Planning Engineer in Qatar. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of professional experience in highway projects, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 8. Senior Land Surveyor

Atkins requires a Senior Land Surveyor in Qatar. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of professional experience, 5 being similar to this role. Regional experience is preferred. English CV to wsa@wsatkins.gr

Code 9. Senior Inspector – Roads

Atkins requires a Senior Inspector in Qatar. Applicants must have minimum qualification BSc / BEng, 3+ years of professional experience, 3 years being similar to this role. Local experience is required. Computer literacy, communication skills - essential. English CV to wsa@wsatkins.gr

Code 10. Senior Inspector – Drainage

Atkins requires a Senior Inspector in Qatar. Applicants must have minimum qualification BSc / BEng, 3+ years of professional experience, 3 years being similar to this role. Local experience is required. Computer literacy, communication skills - essential. English CV to wsa@wsatkins.gr

Code 11. Senior Inspector – Structures

Atkins requires a Senior Inspector in Qatar. Applicants must have minimum qualification BSc / BEng, 3+ years of professional experience, 3 years being similar to this role. Local experience is required. Computer literacy, communication skills - essential. English CV to wsa@wsatkins.gr

Code 12. Senior Inspector – Utilities

Atkins requires a Senior Inspector in Qatar. Applicants must have minimum qualification BSc / BEng, 3+ years of professional experience, 3 years being similar to this role. Local experience is required. Computer literacy, communication skills - essential. English CV to wsa@wsatkins.gr

Code 13. Works Inspector – Roads

Atkins requires a Works Inspector in Qatar. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience, 3 years being similar role. Local experience is required. Computer literacy, excellent communication skills - essential. English CV to wsa@wsatkins.gr

Code 14. Works Inspector – Drainage

Atkins requires a Works Inspector in Qatar. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience, 3 years being similar role. Local experience is required. Computer literacy, excellent communication skills – essential. English CV to wsa@wsatkins.gr

Code 15. Works Inspector - Structures

Atkins requires a Works Inspector (Structures) in Qatar to supervise our contractor's site and maintain compliance of the delivery of respective health, quality and safety regulations. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience. English CV to wsa@wsatkins.gr

Code 16. Works Inspector - Structures

Atkins requires a Works Inspector (Structures) in Qatar. Applicants must have minimum qualification Technical Diploma or equivalent; 5+ years of professional experience, 3 years being similar role. Local experience is required. Computer literacy, excellent communication skills - essential. English CV to wsa@wsatkins.gr

Code 17. Works Inspector - Materials

Atkins requires a Works Inspector (Materials) in Qatar to supervise our contractor's site and maintain compliance of the delivery of respective health, quality and safety regulations. Applicants must have minimum qualification Techni-

cal Diploma or equivalent, 5+ years of professional experience. English CV to wsa@wsatkins.gr

Code 18. Works Inspector - Electrical

Atkins requires a Works Inspector (Electrical) in Qatar to supervise our contractor's site and maintain compliance of the delivery of respective health, quality and safety regulations. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience. English CV to wsa@wsatkins.gr

Code 19. Works Inspector - Landscape

Atkins requires a Works Inspector (Landscape) in Qatar to supervise our contractor's site and maintain compliance of the delivery of respective health, quality and safety regulations. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience. Local experience is required. English CV to wsa@wsatkins.gr

Code 20. Works Inspector - Utilities

Atkins requires a Works Inspector (Utilities) in Qatar to supervise our contractor's site and maintain compliance of the delivery of respective health, quality and safety regulations. Applicants must have minimum qualification Technical Diploma or equivalent, 5+ years of professional experience. English CV to wsa@wsatkins.gr

Code 21. Resident Engineer - Roads

Atkins requires a Resident Engineer (Roads) in Qatar, responsible for day to day operation of Atkins' site supervision contract. Applicants must have minimum qualification BSc / BEng, chartered status, 14+ years of professional experience. English CV to wsa@wsatkins.gr

Code 22. Resident Engineer - Drainage

Atkins requires a Resident Engineer (Drainage) in Qatar, responsible for day to day operation of Atkins' site supervision contract. Applicants must have minimum qualification BSc / BEng, chartered status, 14+ years of professional experience. English CV to wsa@wsatkins.gr

Code 23. Resident Engineer – Structures

Atkins requires a Resident Engineer (Structures) in Qatar, responsible for day to day operation of Atkins' site supervision contract. Applicants must have minimum qualification BSc / BEng, chartered status, 14+ years of professional experience. English CV to wsa@wsatkins.gr

Code 24. Resident Engineer – Utilities

Atkins requires a Resident Engineer (Utilities) in Qatar, responsible for day to day operation of Atkins' site supervision contract. Applicants must have minimum qualification BSc / BEng, chartered status, 14+ years of professional experience. English CV to wsa@wsatkins.gr

Code 25. Senior Electrical Engineer

Atkins requires a Senior Electrical Engineer in Qatar to monitor the quality of work produced by the contractor from procurement to commissioning. Applicants must have minimum qualification BSc in Electrical/Electronic Instrumentation and Control Engineering, 15+ years of professional experience in the construction/supervision of electrical LV/MV/HV/EHV networks. English CV to wsa@wsatkins.gr

Code 26. Senior Site Engineer

Atkins requires a Senior Site Engineer to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

Code 27. Site Engineer – Roads

Atkins requires a Site Engineer (Roads) to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

Code 28. Senior Site Engineer – Drainage

Atkins requires a Site Engineer (Drainage) to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

Code 29. Senior Site Engineer (Structures)

Atkins requires a Site Engineer (Structures) to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

Code 30. Senior Site Engineer (Utilities)

Atkins requires a Site Engineer (Structures) to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc / BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

Code 31. Site Engineer (Drainage)

Atkins requires a Site Engineer (Drainage) to monitor the contractor's site and maintain delivery standards including quality, health and safety. Applicants must have minimum qualification BSc /, BEng, chartered status, 10+ years of relevant professional experience. English CV to wsa@wsatkins.gr

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

International Society for Soil Mechanics and Geotechnical Engineering

ISSMGE Council Meeting 1 September 2013

Key discussions and decisions made at the Council Meeting:

Membership: The membership has grown to 88 member societies with nearly 20,000 individual members. Belarus and Bosnia & Herzegovina joined as Member Societies in July 2012 and May 2013 respectively and the applications form Malaysia and Guatemala were approved at the Board Meeting on 31 August 2013. The Corporate Associates had grown to 59.

The incoming Regional Vice-Presidents were noted as:

Dr Fatma Baligh (Vice-President Africa)
Professor Ikuo Towhata (Vice-President Asia)
Professor Mark Jaksa (Vice-President Australasia)
Professor Antonio Gens (Vice-President Europe)
Professor Paul Mayne (Vice-President North America)
Professor Jarbas Milititsky (Vice-President South America)

Professor Roger Frank was elected as ISSMGE President 2013 - 2017.

The next Council Meeting will be held on Sunday 13 September 2015 in association with the 16th European Conference on Soil Mechanics and Geotechnical Engineering in Edinburgh, UK.

The 19th International Conference on Soil Mechanics and Geotechnical Engineering will be held in Seoul, Korea on 2017.

Η ΕΕΕΕΓΜ εκπροσωπήθηκε στο Council Meeting από τον Αντιπρόεδρο για την Ευρώπη καθηγητή Ivan Vaniček.

International Society for Rock Mechanics
ISRM
newsletter

ISRM Council Meeting
22 September 2013

The ISRM held its Council meeting in Wrocław, Poland, in conjunction with EUROCK 2013, organised by the Polish ISRM National Group, the Polish Society for Rock Mechanics. 40 of the 53 National Groups were either present or represented. The Council was also attended by two Past-Presidents, the Chairmen of the ISRM Commissions and representatives of the IAEG the ISSMGE and the ITA.

Dr. Eda Quadros elected as ISRM President for the term 2015-2019

One nomination for President of the ISRM for the term 2015-2019 was received: Dr Eda Quadros, from Brazil. Dr Quadros was elected by acclamation as the next ISRM President. She will start her term of office after the 14th International Congress of the ISRM, in Montréal, Canada, in 2015.

Membership

The ISRM has now 7063 individual members and 145 corporate members, belonging to 53 National Groups. Albania, Hungary, Tunisia and Vietnam joined the ISRM in the last year. This is the highest number of individual members ever and represents an increase of 4% since 2012. 42% of the members come from Europe, and Asia has been the fastest growing region in the last years.

Initiatives of the ISRM

The President Prof. Xia-Ting Feng, explained the initiatives that are underway and the main recent achievements. He mentioned the growth in the number of individual members and National Groups, the Commissions that were created, the production of Suggested Methods, the online lectures, the rock mechanics multilingual glossary, the ISRM book series and the Foundation for Education.

Applications to host the 14th International Congress in 2019

Two applications were received, from Brazil and India. Prof. Sérgio Fontoura presented to the Council meeting the proposal of the Brazilian Rock Mechanics Committee to host the Congress in Foz do Iguaçu, Brazil. Dr Manoj Vermon, on behalf of the Indian National Group of the ISRM, presented to proposal to host the Congress in Agra, India.

Communication

The website www.isrm.net continues to be the main source of information about the Society and most benefits are offered to the members in a password protected members' area. A new home page will be inaugurated shortly

The digital newsletter is sent to all ISRM members and subscribers every 3 months. It includes news about the society and other news of interest to rock mechanics. Contributions are welcome with news on issues of general interest.

The latest issue of the **News Journal** contains the annual review of the Society's activity along 2012. It can be read online on the website or it can be downloaded.

The **Digital Library**, hosted by OnePetro.org, continues to be updated with papers from ISRM sponsored conferences. It has now 6,000 papers from 29 conferences, with over 42,000 pages. Members can download 100 papers per year at no cost.

Commissions

A report on the activities of the Commissions was presented by Prof. Yuzo Onishi, chairman of the Technical Oversight Committee.

The following Commissions are now active:

- Application of Geophysics to Rock Engineering
- Rock Engineering Design Methodology
- Underground Research Laboratory Networking
- Underground Nuclear Power Plants
- Coupled THMC processes in Geological Materials and Systems
- Preservation of Ancient Sites
- Radioactive Waste Disposal
- Crustal Stress and Earthquake
- Petroleum Geomechanics
- Testing Methods
- Rock Dynamics
- DDA
- Soft Rocks
- Hard Rock Excavation
- Spall prediction
- Education
- Grouting

ISRM Online Lectures

The ISRM started a series of online lectures in 2013. They are broadcast at fixed dates and you can ask questions to the lecturers during a few days. Afterwards, they stay online on the website, where they can be watched. Three were already given. The 4th lecture is planned for December and will be given by Prof. Eduardo Alonso, from Spain, on *Catastrophic landslides; the legacy of Vajont*, to mark the 50th anniversary of this large landslide.

Rocha Medal 2014

The Board awarded the Rocha Medal 2014 to Dr Mandadige Samintha Anne Perera, from Australia, for the thesis *Investigation of the effect of carbon dioxide sequestration on coal seams: A coupled hydro-mechanical behaviour*. She will receive the award at the 2014 ISRM International Symposium in Sapporo, Japan. The Board also awarded 2 runner-up certificates to Dr Ricardo Resende, from Portugal, for the thesis *An investigation of stress wave propagation through rock joints and rock masses* and to Dr Sevda Dehkhoda, from Australia, for the thesis *Experimental and numerical study of rock breakage by pulsed water jets*.

Η ΕΕΕΕΓΜ αντιπροσωπεύθηκε στο Council Meeting από τον καθηγητή της Σχολής Μεταλλειολόγων – Μεταλλουργών Μηχανικών Δρ. Αλέξανδρο Σοφιανό.

ice publishing

The annual **ICE Publishing Awards** ceremony**,** acknowledging the best work published in our 30 journals, will soon take place at the Institution's London offices.

Our winning authors, from industry and academia, have produced work judged by their peers to be of **exceptional quality** and benefit to the international civil engineering community.

Each paper is made free to view in perpetuity on ICE Virtual Library as part of our commitment to furthering knowledge and best practice in civil engineering.

2013 Award Winning Papers

The 2013 ICE Publishing Awards, for papers published in 2012, are available for you to read **here**

If you think your colleagues would benefit from these papers, please forward this email to them or share it using the social media links below.

ICE Publishing sends out a limited number of emails promoting free journal papers, so to ensure you receive future alerts, please join our mailing list for Best of Research and Practice.

Thank you and Kind regards,

Ben Ramster
Journals Editorial Manager
ICE Publishing

ΠΑΡΟΥΣΙΑΣΕΙΣ ΕΚΔΗΛΩΣΕΩΝ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ

5th International Young Geotechnical Engineers Conference

Το 5ο Διεθνές Συνέδριο Νέων Γεωτεχνικών Μηχανικών (5th iYGEC 2013) διεξήχθη από τις **31 Αυγούστου** έως την **1 Σεπτεμβρίου 2013** στο Παρίσι. Το 5thiYGEC 2013 διοργανώθηκε από τη Γαλλική Ένωση Εδαφομηχανικής (CFMS) με συνεπικουρία της Διεθνούς Ένωσης Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ISSMGE). Οι διεργασίες του συνεδρίου έλαβαν χώρα στη Σχολή Πολιτικών Μηχανικών Ecole Nationale des Ponts et Chaussées του Paris Institute of Technology.

Στο συνέδριο συμμετείχαν 139 νέοι γεωτεχνικοί μηχανικοί ηλικίας εως 35 ετών από 58 κράτη παγκοσμίως. Την Ελλάδα εκπροσώπησαν οι υποψήφιοι διδάκτορες:

- **Άννα Καρατζέτζου** από το Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης με την εργασία της "Soil-foundation-structure interaction in demand spectra" και
- **Κωνσταντίνος Τζιβάκος** από το Εθνικό Μετσόβιο Πολυτεχνείο με την εργασία του "Numerical investigation of the lateral load response of piles in soft clay".

Την έναρξη του συνεδρίου κήρυξε στο Amphitheatre Cauchy ο καθηγητής της Ecole des Ponts Paris Tech Yu-Jun Cui και ακολούθησαν σύντομοι χαιρετισμοί από τον κοσμήτορα της σχολής Armeldela Bourdonnaye, τον Ph. Mestat και την J. Nicks. Χαιρετισμό της το συνέδριο κατά τη διάρκεια της τελετής έναρξης απεύθυνε μέσω βιντεοσκοπημένου μηνύματος και ο πρόεδρος της Διεθνούς Ένωσης Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ISSMGE) καθηγητής Jean-Louis Briaud. Ακολούθησε η εναρκτήρια ομιλία του συνεδρίου από τον τεχνικό διευθυντή της FUGRO France Alain Puech με τίτλο "Gassysoils: a challenging issue in offshore geotechnical engineering".

Κατά τη διάρκεια της πρώτης μέρας του συνεδρίου (**31 Αυγούστου**) παρουσιάστηκαν εργασίες σε τρεις παράλληλες συνεδρίες (a – Amphitheatre Cauchy, b–Amphitheatre Navier, c–Room M001), ταξινομημένες της ακόλουθες έξι γενικές θεματικές ενότητες: 'Slope stability' (9 εργασίες), 'Laboratory testing' (5 εργασίες), 'Ground improvement' (20 εργασίες), 'Foundations' (13 εργασίες), 'Earthworks' (7 εργασίες) και 'Modelling' (14 εργασίες). Αντιστοίχως, τη δεύτερη μέρα του συνεδρίου (**1 Σεπτεμβρίου**) της τρεις παράλληλες συνεδρίες παρουσιάστηκαν εργασίες από επτά γενικές θεματικές ενότητες: 'Foundations' (7 εργασίες), 'Tunnel and underground structure' (7 εργασίες), 'In-situ testing' (7 εργασίες), 'Soil behaviour' (19 εργασίες), 'Earthquake and geodynamics' (13 εργασίες), 'Retaining structures' (12 εργασίες) και 'Monitoring' (6 εργασίες). Η οργανωτική επιτροπή του 5thiYGEC 2013 παραχώρησε δείπνο της συνέδρους την πρώτη ημέρα στο παραδοσιακό γαλλικό εστιατόριο Le Procope.

Το απόγευμα της δεύτερης μέρας κηρύχθηκε η λήξη των εργασιών του συνεδρίου με την επιλογή των δύο ακόλουθων εργασιών που διακρίθηκαν:

- An innovative deep foundation macro-element model for seismic analysis of pile/column supports (António A. Correia).
- Effect of wood degradation and soil creep on the behavior of wooden pile foundation in Venice (Francesca Ceccato).

Οι παραπάνω εργασίες παρουσιάστηκαν σε ειδική συνεδρία της δεύτερης μέρας του 18ου Διεθνούς Συνεδρίου Εδαφομηχανικής και Γεωτεχνικής Μηχανικής στο Παρίσι (18th ICSMGE).

Επιπρόσθετα της ανωτέρω διακριθείσες εργασίες, η οργανωτική επιτροπή του συνεδρίου σε συνεργασία με την επιτροπή αξιολόγησης του διεθνούς επιστημονικού περιοδικού ***Frontiers of Structural and Civil Engineering – Springer*** επέλεξαν 10 εργασίες για δημοσίευση στο εν λόγω περιοδικό. Ανάμεσα της εργασίες που επιλέχθησαν και θα δημοσιευθούν της αρχές του 2014 είναι και οι εργασίες των εκπροσώπων της Ελλάδας κας Α. Καρατζέτζου και κου. Κ. Τζιβάκου.

Της παροχές του συνεδρίου συμπεριλαμβάνονται τα πρακτικά έκτασης 624 σελίδων, τόσο σε έντυπη όσο και σε ηλεκτρονική μορφή, της τα επιμελήθηκε ο καθηγητής Yu-Jun Cui και η υπόλοιπη οργανωτική επιτροπή. Η γραμματέας κα. Sevérine Beaunier (Ponts Formation Conseil) κατέβαλε τα μέγιστα για την επιτυχημένη οργάνωση και γραμματειακή υποστήριξη του συνεδρίου.

Τέλος, αξίζει να αναφερθεί η συμμετοχή της πλειοψηφίας των συνέδρων του 5th iYGEC 2013 της διεργασίες των δύο πρώτων ημερών του 18ου Διεθνούς Συνεδρίου Εδαφομηχανικής και Γεωτεχνικής Μηχανικής που έλαβε χώρα στον εκθεσιακό χώρο του Palais des Congrés στο Παρίσι. Η εμπειρία της παρακολούθησης κεντρικών ομιλιών διακεκριμένων γεωτεχνικών μηχανικών από όλο τον κόσμο στο πιο κλασικό παγκόσμιο συνέδριο Εδαφομηχανικής ήταν μοναδική.

Παρακάτω παρουσιάζεται η αναμνηστική φωτογραφία του συνεδρίου με την πλειοψηφία των συμμετεχόντων.

Το πρόγραμμα του συνεδρίου παρατίθεται στον σύνδεσμο: http://www.lepublicsystemepco.com/files/modules/freezones/iYGEC%202013%20-%20Detailed%20programme12%2007.pdf.

(Άννα Καρατζέτζου και Κωνσταντίνος Τζιβάκος)

ΠΡΟΣΕΧΕΙΣ ΕΚΔΗΛΩΣΕΙΣ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΣΤΗΝ ΕΛΛΑΔΑ

2ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΦΡΑΓΜΑΤΩΝ ΚΑΙ ΤΑΜΙΕΥΤΗΡΩΝ
Σχεδιασμός – Διαχείριση – Περιβάλλον
Αθήνα, 7 - 8 Νοεμβρίου 2013
http://waterstorage2013.com

Μετά το πολύ επιτυχημένο πρώτο συνέδριο στη Λάρισα το 2008, η Ελληνική Επιτροπή Μεγάλων Φραγμάτων (ΕΕΜΦ) διοργανώνει το **2ο Πανελλήνιο Συνέδριο Φραγμάτων και Ταμιευτήρων στις 7 & 8 Νοεμβρίου του 2013 στην Αθήνα, στην Αίγλη Ζαππείου**.

Η απαίτηση για ορθολογική διαχείριση του υδατικού δυναμικού είναι μεγαλύτερη παρά ποτέ. Στις αυξανόμενες ανάγκες για ύδρευση, άρδευση, ενέργεια και αντιπλημμυρική προστασία προστίθεται ολοένα και πιο επιτακτικά η ανάγκη για προστασία και επανατροφοδότηση των υπόγειων υδροφορέων και η αναβάθμιση και προστασία των ποτάμιων και λιμναίων οικοσυστημάτων.

Ο ρόλος των φραγμάτων και ταμιευτήρων είναι κομβικός για την αντιμετώπιση των ανωτέρω. Η χώρα μας, αν και καθυστέρησε σημαντικά στην εκμετάλλευση του υδάτινου δυναμικού, έχει κατασκευάσει τις τελευταίες δεκαετίες μεγάλο αριθμό φραγμάτων, και ταμιευτήρων, ενώ ένας μεγάλος αριθμός νέων έργων είναι τώρα σε φάση μελέτης ή υλοποίησης.

Τα φράγματα και οι ταμιευτήρες είναι πολύπλοκα έργα με πολλές συνιστώσες που δημιουργούν αυξημένες απαιτήσεις κατά το σχεδιασμό, την υλοποίηση και τη λειτουργία τους. Ο σεβασμός στο περιβάλλον, η ολοκληρωμένη διαχείριση των υδατικών πόρων, η χρήση νέων τεχνολογιών, η μακροχρόνια συμπεριφορά και ασφάλεια, η ευθύνη του κυρίου του έργου ή του διαχειριστή για την ασφαλή λειτουργία των έργων, είναι θέματα στα οποία θα επικεντρωθούν οι εργασίες του συνεδρίου.

Το συνέδριο στοχεύει στην παρουσίαση, ανάδειξη και συζήτηση των ανωτέρω ζητημάτων και απευθύνεται σε όλους όσοι με την μελέτη, κατασκευή και διαχείριση έργων φραγμάτων και ταμιευτήρων.

Θεματολόγιο

1. Φράγματα και Ολοκληρωμένη Διαχείριση Υδατικών Πόρων

- Ο ρόλος των ταμιευτήρων στην ολοκληρωμένη διαχείριση υδατικών πόρων
- Ταμιευτήρες πολλαπλού σκοπού
- Αντιπλημμυρική προστασία
- Τεχνικο-οικονομικά κριτήρια υλοποίησης νέων φραγμάτων
- Ο ρόλος των φραγμάτων στον ενεργειακό σχεδιασμό - Σύγχρονες τάσεις και τεχνολογικές εξελίξεις
- Ταμιευτήρες – Αντλητικά και υβριδικά συστήματα παραγωγής ενέργειας

2. Εξελίξεις στις Μεθόδους Σχεδιασμού & Κατασκευής

- Υλικά κατασκευής φραγμάτων - Μέθοδοι κατασκευής - Νέες τεχνικές
- Εκτίμηση, επιλογή και αναθεώρηση πλημμυρών σχεδιασμού
- Σχεδιασμός και αναβάθμιση υπερχειλιστών
- Έργα στεγάνωσης και αποστράγγισης φράγματος και θεμελίωσης
- Η επιρροή των γεωλογικών συνθηκών στον σχεδιασμό
- Εξελίξεις στον γεωτεχνικό σχεδιασμό
- Εξελίξεις στον αντισεισμικό σχεδιασμό
- Εξελίξεις στον Η/Μ εξοπλισμό

3. Ασφάλεια Φραγμάτων και Ταμιευτήρων

- Κανονισμοί μελέτης, κατασκευής και λειτουργίας φραγμάτων
- Η πρόταση της ΕΕΜΦ για την σύνταξη εθνικού κανονισμού ασφάλειας φραγμάτων
- Αποτίμηση της διακινδύνευσης φραγμάτων (risk assessment)
- Δημόσιοι και ιδιωτικοί φορείς εμπλεκόμενοι στη διαχείριση φραγμάτων – θέματα οργάνωσης και τεχνικής ικανότητας
- Κίνδυνοι σχετιζόμενοι με προβλήματα οργάνωσης του κυρίου - διαχειριστή του έργου
- Απαιτήσεις παρακολούθησης συμπεριφοράς
- Ασφάλεια ταμιευτήρα (ευστάθεια πρανών, εκτεταμένες διαρροές κτλ)
- Αναλύσεις θραύσης φράγματος και επιπτώσεις
- Μακροχρόνια συμπεριφορά, γήρανση των έργων και εργασίες αποκατάστασης
- Κίνδυνοι οφειλόμενοι σε αστοχίες Η/Μ εξοπλισμού
- Παρουσίαση πρόσφατων συμβάντων ή περιστατικών
- Φράγματα, ταμιευτήρες και δημόσια ασφάλεια
- Ασφαλής παροχέτευση εκτάκτων πλημμυρικών παροχών κατάντη – απαιτήσεις οριοθέτησης της κοίτης

4. Φράγματα, Ταμιευτήρες και Περιβάλλον

- Φιλικές προς το περιβάλλον κατασκευές φραγμάτων και ταμιευτήρων
- Φράγματα, ταμιευτήρες και αειφορία
- Περιβαλλοντική και κοινωνικά αποδοχή φραγμάτων και ταμιευτήρων – Συμμετοχικές διαδικασίες στο σχεδιασμό και υλοποίηση
- Περιορισμός υδρομορφολογικών αλλοιώσεων και αισθητική αποκατάσταση περιβάλλοντος
- Αρχιτεκτονικός σχεδιασμός φραγμάτων και συναφών κατασκευών
- Τα φράγματα ως μέρος της πολιτιστικής κληρονομιάς
- Εμπλουτισμός και αποκατάσταση υπόγειων υδροφορέων - Δημιουργία υγροβιότοπων κ.λπ.
- Χρονική εξέλιξη των ποιοτικών χαρακτηριστικών των ταμιευτήρων - Διατήρηση και βελτίωση ποιότητας υδατικών πόρων
- Φερτές ύλες

5. Παρουσίαση έργων

Κρίσιμες ημερομηνίες για την αποστολή εργασιών:

- Υποβολή περιλήψεων: **15 Δεκεμβρίου 2012**
- Αποδοχή περιλήψεων: **15 Ιανουαρίου 2013**
- Υποβολή πλήρους κειμένου: **30 Απριλίου 2013**
- Αποδοχή πλήρους κειμένου: **30 Ιουνίου 2013**

Οδηγίες για την αποστολή των περιλήψεων θα βρείτε στη ιστοσελίδα της ΕΕΜΦ www.eemf.gr.

Οι περιλήψεις θα αποστέλλονται ηλεκτρονικά στην διεύθυνση της ΕΕΜΦ eemf@eemf.gr.

ΕΛΛΗΝΙΚΗ ΕΠΙΤΡΟΠΗ ΜΕΓΑΛΩΝ ΦΡΑΓΜΑΤΩΝ, μέσω ΔΕΗ – ΔΥΗΠ, Αγησιλάου 56-58, 104 36 ΑΘΗΝΑ, τοτ. 210 - 5241223, Η/Δ : eemf@eemf.gr, www.eemf.gr

6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ
Αθήνα 11 - 14 Νοεμβρίου 2013

Το Εργαστήριο Λιμενικών Έργων του Ε.Μ.Π. διοργανώνει το 6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ. Θα πραγματοποιηθεί στην Αθήνα στις 11-14 Νοεμβρίου 2013.

Αντικείμενο του Συνεδρίου είναι η παρουσίαση των νεοτέρων εξελίξεων στο χώρο των επιστημών και των τεχνολογιών που σχετίζονται με τα Λιμενικά Έργα και ειδικότερα την έρευνα, τον σχεδιασμό, την μελέτη, κατασκευή, προστασία, συντήρηση, διαχείριση, στις επιπτώσεις στο περιβάλλον καθώς και η ενημέρωση, η ανταλλαγή απόψεων και η προώθηση της τεχνογνωσίας στους τομείς αυτούς. Στόχος του είναι η ενημέρωση, η ανταλλαγή απόψεων και η προώθηση της τεχνογνωσίας.

Απευθύνεται στους ερευνητές, μελετητές, κατασκευαστές, ΑΕΙ, δημόσιους φορείς, ΟΤΑ, Ο.Λ., Λιμενικά Ταμεία, περιβαλλοντικές οργανώσεις και υπηρεσίες που ενδιαφέρονται και ασχολούνται με τα Λιμενικά Έργα, τους οποίους και προσκαλεί να παρουσιάσουν το έργο και τις εμπειρίες τους.

Θεματολόγιο

- Περιβαλλοντικά μεγέθη σχεδιασμού και κατασκευής λιμενικών έργων
- Σχεδιασμός λιμένων, μελέτη και κατασκευή λιμενικών έργων
- Χωροθέτηση λειτουργιών, διαμόρφωση λιμενικής ζώνης
- Αστοχίες, βλάβες λιμενικών έργων. Επιθεώρηση, αποκατάσταση, συντήρηση
- Μελέτη λιμένων σε φυσικό προσομοίωμα
- Περιβαλλοντικές επιπτώσεις από την κατασκευή και λειτουργία λιμένων
- Το Ελληνικό Λιμενικό Σύστημα υπό το πρίσμα της Ευρωπαϊκής οικονομικής κρίσης
- Διαχείριση, διοίκηση, λειτουργία λιμένων. Θεσμικό πλαίσιο. Ιδιωτικοποιήσεις δραστηριοτήτων.

Οι ενδιαφερόμενοι για περισσότερες πληροφορίες μπορούν να απευθύνονται στο Εργαστήριο Λιμενικών Έργων Ε.Μ.Π. τηλ.: 210.7722367, 210.7722375, 210.7722371, fax: 210. 7722368 (κες Θ. Γιαντσή, Ι. Φατούρου).

e-mail: lhw@central.ntua.gr

30 September - 3 October 2014, Athens, Greece
www.eetc2014athens.org

It is our pleasure to inform you that the Greek Tunnelling Society is organizing the 2nd Eastern European Tunnelling Conference in Athens on September 28 – October 1 2014 (EETC2014, Athens).

The Eastern European Tunnelling Conference is a biennial regional traveling conference. It aims to promote the sharing of knowledge, experience, skills, ideas and achievements in the design, financing and contracting, construction, operation and maintenance of tunnels and other underground facilities among the countries of Eastern Europe, on an organized basis and with agreed aims. EETC2014 aims mainly to bring together colleagues from Eastern Europe but people from the rest of the world are also welcome.

The theme of EETC2014 Athens is:

"Tunnelling in a Challenging Environment"
Making tunnelling business in difficult times

The construction of underground projects is becoming increasingly demanding as new challenges are emerging in every aspect and sector of this multidisciplinary and multifarious business. Further to the usual geological, geotechnical, structural and operational challenges, we are now facing a difficult business and financial environment, which requires the deployment of even more intelligent and effective tools and solutions.

I really do hope that the EETC2014 Athens will contribute and further facilitate the growth of the tunnelling business and will be a forum for scientific and professional collaboration.

TOPICS:

- Innovative methods for Analysis and Design
- Tunnelling in difficult ground conditions
- Conventional urban or shallow tunnelling
- Mechanized tunnelling
- Hydraulic tunnels
- Underground complexes
- Caverns for Hydropower or Storage
- Pipe jacking and microtunnelling
- Innovations in tunnelling construction technology
- Tunnels and shafts for mining
- Rehabilitation and repair
- Safety and security in tunnels and tunnelling
- Contractual and financial issues
- Education and training
- Case histories
- Underground space use
- Tunnels and monuments

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

HYDRO 2013 International Conference and Exhibition Promoting the Versatile Role of Hydro, 7 to 9 October 2013, Innsbruck, Austria, www.hydropower-dams.com/hydro-2013.php?c_id=88

VAJONT 2013 - International Conference Vajont, 1963 – 2013 Thoughts and Analyses after 50 years since the catastrophic landslide, 8-10 October, 2013, Padova, Italy, http://www.vajont2013.info/vajont-pd

The 5th International Conference on Geoinformation Technologies for Natural Disaster Management (GiT4NDM 2013), October 9 – 11, Ontario, Canada, www.igrdg.com/5thGiT4NDM.php

The 1st International Symposium on Transportation Soil Engineering in Cold Regions - A Joint Conference with the 10th SHAHUNIANTS Lecture, October 10-11, 2013, Xining, China, http://subgrade.sinaapp.com

Geotechnical Seminar: 14th Šuklje´s Day
Unsaturated Soil Mechanics:
Theoretical Background and Case Histories
11 October 2013, Ljubljana, Slovenia
www.sloged.si

The Šuklje's day is an annual event, prepared by Slovenian Geotechnical Society, honouring the life and work one of the pioneers of Soil Mechanics, the late professor Lujo Šuklje. This year Šuklje's Lecture will be delivered by Prof. Antonio Gens of University of Catalonia, Vice President of ISSMGE for Europe.

Geotechnical works are frequently carried out in unsaturated soils, in which the small changes of moisture can cause large changes in suction. These changes are fundamentally influencing the mechanical and hydraulic soil properties and behaviour. The research in the mechanics of the unsaturated soils started relatively late in comparison with the research of suction in hydrogeology, partly because of the lack of the appropriate research tools and partly due to the fact that a new approach was needed to understand some phenomena that were impossible to explain using the traditional mechanics of saturated soils. With the relatively recent developments of the suction measuring devices there was the opening of new possibilities for the research and understanding of the unsaturated soil behaviour. In particular, the development of the constitutive models for unsaturated soils enabled the development of geotechnical modeling tools, which are now an integral part of the contemporary geotechnical engineering, both in design and monitoring. We are honoured that 14th Šuklje´s Lecture will be delivered by Prof. Antonio Gens of Technical University of Catalonia, who is one of the leading authorities in this field. The current state of knowledge and practice in Slovenia with regard to the unsaturated soil behaviour will be presented by a hydrogeology engineer Dr Jože Ratej and a geotechnical engineer Dr Matej Maček.

The lecturers:

Prof. Antonio Gens, Technical University of Catalonia, Barcelona, Spain
dr. Jože Ratej,IRGO, Institute for mining, geotechnology and environment, Ljubljana
dr. Matej Maček, Faculty of Civil and Geodetic Engineering, University of Ljubljana

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International Symposium on Design and Practice of Geosynthetic-Reinforced Soil Structures, 13-16 October, 2013, Bologna, Italy, www.civil.columbia.edu/bologna2013

The Mediterranean Workshop on Landslides: Landslides in hard soils and weak rocks - an open problem for Mediterranean countries, 21 and 22 October, 2013, Naples, Italy, www.mwl.unina2.it

International Conference Geotechnics in Belarus: Science and Practice, 23-25 October 2013, Minsk, Belarus, geotechnika2013@gmail.com belgeotech@tut.by

GeoME 2013 6th International Conference GEOSYNTHETICS Middle East, 29 - 30 October 2013, Abu Dhabi, UAE www.geosyntheticsme.com

Hydropower 2013--CHINCOLD 2013 Annual Meeting and the 3rd International Symposium on Rockfill Dams, 1-3 November 2013, Kunming, China www.chincold.org.cn/dams/special/A2022index_1.htm

Problems and experience of the engineering protection of the urbanized territories and a safeguarding of the heritage under conditions of the geo-ecological risk, 5-7 November 2013, Kyiv, Ukraine, http://new.sophiakievska.org/en

IRF 17th World Meeting & Exhibition, November 9 - 13, 2013, Riyadh, Saudi Arabia, www.IRF2013.org

6th Annual Bridges Middle East & Tunnels Middle East, 11 - 13 November, 2013 - Doha, Qatar, www.bridgesme.com

Workshop Dams: Incidents and Accidents – What Can We Learn?", November 11-13, 2013, Stockholm, Sweden, www.conferencemanager.dk/swedcold

6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ, Αθήνα 11 - 14 Νοεμβρίου 2013, lhw@central.ntua.gr

GEOMATE 2013 3rd International Conference on Geotechnique, Construction Materials & Environment, November 13-15, 2013, Nagoya, Japan, www.geomat-e.com

International Conference Built Heritage 2013 - Monitoring Conservation Management, 18-20 November 2013, Milano, Italy, www.bh2013.polimi.it

GEOAFRICA2013 Geosynthetics for Sustainable Development in Africa - 2nd African Regional Conference on Geosynthetics, 18-20 November 2013, Accra, Ghana, http://geoafrica2013.com

www.nispana.com/pilingdeepfoundation

Qatar is currently the fastest growing economy in Middle East owing to the rapid industrialization that has been noted in the last 5 years. While heavily supporting development and infrastructure projects; construction fever is running high as the Qatar presses ahead with visionary plans to invest and diversify its economy as the country enters a critical stage in preparation for 2022 FIFA World Cup and realizing Qatar National Vision 2030, the market is becoming more and more competitive as tenders are being awarded. Qatar's construction industry will be given a big boost by USD 125 billion worth Infrastructure projects planned for the coming 6 years. Huge investments and resources are going into foundation infrastructure of these mega-projects.

Piling & Deep foundation has regained its market in the current infrastructure Boom in Qatar. Hence Nispana is proud to announce Piling & deep Foundation Summit 2013 on 19th & 20th November at Doha, Qatar; which brings together industry leaders to discuss and debate key issues including:

- **Innovation:** benchmark your projects against those using the latest techniques and technology to deliver cost and time savings.
- **Growth:** identify future opportunities and improve your capacity to respond to emerging areas such as energy, rail and housing.
- **Pile design:** are we over-designing piles and as a result driving up industry and project costs
- **Geological interpretations:** to understand the ground conditions and groundwater regime and foundations challenges

Highlight of the summit:

- Geological interpretations of soil and construction challenges they pose
- Estimation of soil properties for foundations design – soil testing and soil improvement methods
- Environmental pollution control for piling, foundations and civil engineering projects
- Future opportunities and challenges for the piling industry
- Steel Foundation Solutions
- High rise structures – what are the special piling systems required?
- Addressing the issue of durability through in-depth analysis, accurate study and planning
- Delivering quality foundations through soil testing and cavity management
- Identifying the nature of soil displacement while selecting the piling technique for the project
- Solving piling problems during the construction phase
- Improving the safety of deep foundations and piling industry in difficult geotechnical conditions
- Road to ground improvements by vibrocompaction, soil mixing and jet grouting
- The importance of quality site investigation for successful geotechnical design
- Cost and energy optimised foundations of high-rise buildings in varying ground conditions – basics and practical applications

International Workshop on Geomechanics and Energy
The Ground as Energy Source and Storage
26 - 28 November 2013, Lausanne, Switzerland
www.eage.org/events/index.php?eventid=890&Opendivs=s3

Geomechanics plays an important role in the utilization of conventional or alternative energy sources and in the development of sustainable energy management. The understanding and the prediction of the mechanical behaviour of geomaterials involved in the exploitation or the storage of energy resources request robust sciences. This could be summarized as follows:

- Facing the limited fossil fuel resources, the way we exploit the hydrocarbon reservoir must be optimized (eg. enhanced oil recovery, borehole stabilization, oriented borehole).
- Alternative sources of energy must be promoted and developed to reduce the worldwide dependency of fossil fuel. In geothermal energy, the earth being a primary renewable heat resource, geomechanics is of paramount importance.
- Energy exploitation also means waste production. The ground offers a possible host environment as a definitive solution for the storage of those wastes, providing that the interaction between waste and earth are predictable and safe. Similar concepts could be applied to CO2 sequestration.

Consequently, the development of the energy sector, sustainably and in harmony with the geological environment, requires rigorous understanding and assessment of the highly coupled geomechanical response of the geo-system.

The goal of the workshop is to discuss the most recent contributions of geomechanics to various fields of energy. The areas of interest are related to geomechanical application in the subsurface extraction of energy and the storage of various wastes as well as CO2. It is therefore expected to provide a comprehensive contribution, which has the potential

to become reference material for engineers and scientists involved in the design and the exploitation of energy geosystems. High-quality scientific work and contributions in innovative applied-oriented technologies will be encouraged.

We hope this workshop will have general appeal to everybody involved in geomechanical engineering of energy geosystems. It includes experts, companies, contractors, installers and academic researchers facing the need for a deeper understanding of the highly coupled response of geomaterials in interaction with energy infrastructures or waste storage.

We look forward to welcoming you to Lausanne in November 2013!

Kind regards,

The Workshop Committee chairs

Lyesse Laloui, *Swiss Federal Institute of Technology, Switzerland*
Bertrand François, *Université Libre de Bruxelles, Belgium*

Topics

01. Hydrocarbon Exploration and Production

- Naturally and Hydraulically Fractured Reservoir
- Wellbore Stability
- Unconventional Energy Sources (shale gas, methane hydrate, etc)
- Subsidence
- Fault Reactivation
- Etc.

02. Interactions Between Wastes and Earth

- Nuclear Waste Disposal (THM coupling, engineered barriers systems, close and far fields, etc)
- CO2 Sequestration (multiphysical coupling, reservoirs and cap rock behaviours, etc)

03. Geothermal energy

- Shallow and Deep Geothermal Energy
- Heat Exchanger Geostructures (energy piles, etc)

Short Course
Introduction to the Geomechanical Characterisation and Modelling

This course will be held on Monday 25 November 2013 prior to the start of the International Workshop on Geomechanics and Energy Workshop. The course will be given as an optional extra.

The course will start at 9:00hrs and will conclude at 17:00hrs.

Course Description

The prediction of the behaviour of shales, soils and rocks is a fundamental requirement for the exploitation of a geosystem and the design of man-made systems.

Multiphase and non-isothermal conditions are found in numerous engineering applications, such as petroleum engineering, nuclear waste storage engineering, unconventional energy resources and CO2 geological sequestration. These applications require an understanding of the behaviour of geomaterials (soils, rocks and shales) and an increased ability to predict their behaviours in variable situations.

The course gives an insight into modern trends in geomechanics for multiphase and non-isothermal geomaterials. The course introduces the basic concepts for the characterisation of materials and their numerical modelling.

Course Objection

Upon completion of the course, participants will have a first-order understanding of the rheological behaviour of soils, shales and rocks under a variety of saturation conditions and temperature variations. Fundamental constitutive concepts will be well understood and a basic knowledge on the numerical simulation of geomechanical problems will be gained.

Course Outline

- Introduction to geomechanics
- Multiphase composition of geomaterials
- Multiphysical testing of geomaterials
- Behaviour of geomaterials in variable saturation conditions
- Behaviour of geomaterials in non-isothermal conditions
- Mathematical modelling of multiphase geomaterials – REV concept
- Elasticity and elasto-plasticity; critical state concept
- Effective stress concept for multiphase systems
- Constitutive modelling for multiphase geomaterials including temperature-dependency
- Thermo-hydro-mechanical coupling for geomaterials: governing equations
- Practical session: calibration of an advanced constitutive model plus simulation of a thermal-consolidation problem

For more information about this event, please contact
ms. Fraukje (Kia) Heida, Conference Coordinator

European Association of Geoscientists and Engineers
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10th International Symposium of Structures, Geotechnics and Construction Materials, 26-29 November 2013, Santa Clara, Cuba, ana@uclv.edu.cu, quevedo@uclv.edu.cu, www.uclv.edu.cu

Piling & Deep Foundations 2013 : Design, Testing & Insertion of Foundations on Time & Within Budget, 27 - 28 November 2013, Sydney, Australia www.pilingtechniques.com.au

International Conference on Geotechnics for Sustainable Development, 28-29 November 2013, Hanoi, Vietnam, www.geotechn2013.vn

3rd International Symposium and Exhibition on Underground Excavations for Transportation
29th -30th November 2013, Istanbul, Turkey
www.uyak2013.org

Underground excavations for transportation purposes have gained big importance especially in the last 20-25 years. The 1st Symposium on Underground Excavations for Transportation was realized in Istanbul by the Istanbul Branch of Turkish Chamber of Mining Engineers in 1994. Due to a great industrial demand, the 2nd edition of Proceedings of the 1st Symposium was published in 2004. The 2nd of the Symposium was successfully realized again in Istanbul by attendance of 350 delegates from Turkey and abroad.

Recent developments in excavation technologies and many interesting projects realized in Turkey and abroad within the last 6 years of period after the 2nd Symposium indicate a necessity of the 3rd Symposium to record/collect the accumulated multidisciplinary knowledge in both tunnelling and mining sectors. Raising trends in both sectors in Turkey make also this necessity more noticeable. Along with these reasons and consistent demand of the shareholders in the sector, it is decided to realize "The 3rd International Symposium and Exhibition on Underground Excavations for Transportation" in 29-30 November, 2013, in Istanbul.

The basic purpose of the 3rd International Symposium and Exhibition on Underground Excavations for Transportation, in parallel with growing demand on infrastructure, is to bring together all the actors in tunneling and mining industries including representatives and technical staff of the public institutions, contractors, engineering firms, consultants, machine manufacturers and suppliers, and thus, opening an additional window to the sector for gaining a positive momentum. It is believed that this symposium is going to provide for important contributions to the industry by extensive attendance of practicing engineers and scientists from Turkey and abroad, with discussions on many topics and new application examples. We kindly invite all the actors of the industry to attend this symposium, which is expected to be held like a feast, organized by The Chamber of Mining Engineers of Turkey-Istanbul Branch and Turkish Tunneling Society and endorsed also by International Tunneling Association (ITA).

SYMPOSIUM TOPICS

- Use and planning of underground structures
- Site investigations, boreholes, geophysical methods
- Laboratory investigations, experimental studies on soils and rocks
- Geological and geotechnical reporting practices
- Rapid excavation technologies, selection, designing, and performance prediction
- Tunnel Boring Machines (TBM),
- Earth Pressure Balance (EPB) TBMs and Slurry TBMs
- Roadheaders and impact hammers
- Backup units used with rapid excavation technologies
- Mobilization, portals, void grouting
- Probe drilling, ground improvement, jet grouting
- Chemical agents used in underground construction
- Foam applications and soil conditioning, slurry conditioning
- Conventional tunnelling, New Austrian Tunnelling Method
- Umbrella arch and ground reinforcement
- Shotcrete, wire mesh, steel support
- HEPP tunnel applications
- Drilling and blasting in urbanized areas and vibrations
- Ground deformations, surface settlements, geotechnical measurements and monitoring
- Excavation, support, haulage, ventilation, water drainage applications and researches
- Dynamic analysis and earthquake effects on tunnels
- Design of underground structures, computer applications (numerical methods)
- Risk analysis, risk sharing, organization, bidding types and processes, costs
- Environmental effects of underground structures
- Health and safety in underground excavations
- Monitoring, maintenance, rehabilitation of underground structures
- Applications in mega tunnells
- Tunnelling application in mine developments
- Industrial developments and projections

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ISAFE2013 International Symposium on Advances in Foundation Engineering, 5-6 December 2013, Singapore, http://rpsonline.com.sg/isafe2013

Arabian Tunnelling Conference & Exhibition, 10-11 December 2013, Dubai, United Arab Emirates, http://uae-atc2013.com

8th International Conference Physical Modelling in Geotechnics 2014 (ICPMG), 14-17 January 2014, Perth, Australia, http://icpmg2014.com.au

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

Fifth International Conference on Water Resources and Hydropower Development in Asia, 11 to 13 March 2014, Colombo, Sri Lanka, http://www.hydropower-dams.com/ASIA-2014.php?c_id=89

World Tunnel Congress 2014 and 40th ITA General Assembly "Tunnels for a better living", 9 - 15 May 2014, Iguassu Falls, Brazil, www.wtc2014.com.br

CPT'14 3rd International Symposium on Cone Penetration Testing, 13-14 May 2014, Las Vegas, Nevada, U.S.A., www.cpt14.com

International Conference on Piling & Deep Foundations, 21-23 May 2014, Stockholm, Sweden, www.dfi-effc2014.org

Geoshanghai 2014, International Conference on Geotechnical Engineering, 26 - 28 May 2014, Shanghai, China, www.geoshanghai2014.org

EUROCK 2014 ISRM European Regional Symposium Rock Engineering and Rock Mechanics: Structures on and in

Rock Masses, 27-29 May 2014, Vigo, Spain, www.eurock2014.com

World Landslide Forum 3, 2 – 6 June 2014, Beijing, China, http://wlf3.professional.com

8th European Conference "Numerical Methods in Geotechnical Engineering" NUMGE14, Delft, The Netherlands, 17-20 June 2014, www.numge2014.org

2nd International Conference on Vulnerability and Risk Analysis and Management & 6th International Symposium on Uncertainty Modelling and Analysis - Mini-Symposium Simulation-Based Structural Vulnerability Assessment and Risk Quantification in Earthquake Engineering, 13-16 July 2014, Liverpool, United Kingdom, http://www.icvram2014.org

GeoHubei 2014 International Conference Sustainable Civil Infrastructures: Innovative Technologies and Materials, July 20-22, 2014, Hubei, China http://geohubei2014.geoconf.org

ICITG 2014 Second International Conference on Information Technology in Geo-Engineering, 21-22 July 2014, Durham, UK, www.icitg.dur.ac.uk

Second European Conference on Earthquake Engineering and Seismology, 24-29 August 2014, Istanbul, Turkey www.2eceesistanbul.org

TC204 ISSMGE International Symposium on "Geotechnical Aspects of Underground Construction in Soft Ground" - IS-Seoul 2014, 25-27 August 2014, Seoul, Korea, csyoo@skku.edu

International Symposium on Geomechanics from Micro to Macro (TC105), 01 - 03 September 2014, Cambridge, United Kingdom, ks207@cam.ac.uk

JUBILEE CONFERENCE 50th Anniversary of Danube-European Conferences on Geotechnical Engineering Geotechnics of Roads and Railways, 9 - 11 September 2014, Vienna, Austria, www.decge2014.at

IAEG XII CONGRESS Torino 2014 Engineering Geology for Society and Territory, IAEG 50th Anniversary, September 15-19, 2014, Torino, Italy, www.iaeg2014.com

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

14th International Conference of the International Association for Computer Methods and Advances in Geomechanics (14IACMAG), September 22 – 25, 2014, Kyoto, Japan, www.14iacmag.org

ACUUS 2014 SEOUL

14th World Conference of the Associated Research Centers for the Urban Underground Space (ACUUS 2014)
September 24-26, 2014, Seoul, Korea
http://acuus2014.com

It is our pleasure and privilege to invite you to participate in the 14th World Conference of the Associated research Centers for the Urban Underground Space (ACUUS 2014), to be held from September 24-26, 2014 in Seoul, Korea.

The World Conference of ACUUS has been held every two to three years in different countries all over the world. As one of the most highly acclaimed meetings in the field of urban underground space, the ACUUS 2014 Seoul is expected to gather a large number of participants from around the world.

At the 14th Seoul World Conference, under the theme of "Underground Space: Planning, Administration and Design Challenges", a wide range of scientific programs are being organized focusing on the legal and management challenges for underground space use and their accompanying planning and design issues. The Organizing Committee is doing its utmost to produce invaluable and intriguing programs focusing on the latest developments and trends, as well as the future outlook for urban underground space in the world.

We truly believe that the ACUUS 2014 World Conference will be a highly rewarding international festival for everyone and will bring enhancement of the academic level and industrial development, which will contribute to improve the quality of life in urban areas. Therefore, I encourage you to take this chance to explore the many faces of the beautiful city of Seoul and experience the exciting Korean culture.

All of the members of the Organizing Committee look forward to meeting you at the ACUUS 2014 World Conference in Seoul, Korea.

Theme & Topics

The theme for ACUUS 2014 Seoul is **"Underground Space: Planning, Administration and Design Challenges."** The intent is to focus on the legal and management challenges for underground space use and their accompanying planning and design issues.

The Conference will cover the following main topics:

- Legal and administrative issues
- Architecture and design
- Civil engineering
- Technology
- Human Issues
- Planning
- Sustainability
- Geoengineering
- Research
- Applications
- Others

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EETC 2014 ATHENS 2nd Eastern European Tunnelling Conference, 28 September - 1 October 2014, Athens, Greece, www.eetc2014athens.org

International Congress Tunnels and Underground Space risks & opportunities, 13-15 October 2014, Lyon, France, www.congres.aftes.asso.fr/en/content/invitation

ARMS 8 - 8th ISRM Rock Mechanics Symposium, 14-16 October 2014, Sapporo, Japan www.rocknet-japan.org/ARMS8/index.htm

9th International Conference on Structural Analysis of Historic Constructions, 14 – 17 October 2014, Mexico City, Mexico, www.linkedin.com/groups/SAHC-2014-Mexico-City-3930057.S.213150607

1st International Conference on Discrete Fracture Network Engineering, October 19 - 22, 2014, Vancouver, British Columbia, Canada, www.dfne2014.ca

7th International Congress on Environmental Geotechnics, 10-14 November 2014, Melbourne, Australia, www.7iceg2014.com

Third Australasian Ground Control in Mining Conference 2014
2014, Sydney, Australia
www.mining.unsw.edu.au/node/608

The **Third Australasian Ground Control in Mining Conference** follows the second conference held in 2010 and is aimed at practical mine site operators, technical support staff, geotechnical engineers, mining engineers, consultants and researchers in the field of mining geomechanics and ground control.

The conference will provide an update to all mining industry geotechnical personnel best practice in both Australasia and overseas, and an information exchange vehicle between the coal and metalliferous sectors of the industry, with a focus on new technologies and developments; industry needs and mine site problem solving; and practical case studies.

Abstracts are invited from prospective authors, including international submissions to address the issues of: new technologies and developments, industry needs and problem solving, and practical case studies. Papers are particularly encouraged from operating mine site personnel, or jointly authored between consultants/researchers and site personnel. A broad range of practical mining geotechnical topic areas, include:

- Ground support – tendon systems, surface liners, injection systems in opencut and underground mining
- Geotechnical instrumentation and monitoring
- Mine design – geotechnical considerations
- Geotechnical design methodologies
- Geomechanics of multiseam, multireef and complex orebodies
- Geotechnical challenges in extreme mining environments
- Backfill technologies
- Pillar design and performance
- Rock mass characterisation techniques and practice
- Regional stability
- Geotechnical risk management
- Best practice case studies
- New challenges in ground control
- Numerical modelling in design
- Mine subsidence – prediction and control
- Caving mechanics and control
- Dynamic mining and managing large deformations
- Geotechnical education and training
- Civil engineering application in mining.

For all enquiries please contact:
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Proceedings of the Institution of Civil Engineers Geotechnical Engineering

THEMED ISSUE 2015
Construction processes and installation effects

Editors: Benoît Jones, University of Warwick, UK and Stuart Haigh, University of Cambridge, UK

A themed issue of *Geotechnical Engineering* on 'Construction processes and installation effects' is planned for 2015.

'Construction processes' includes temporary works, excavation methods, support installation, foundation/anchorage installation and the use of plant where it interacts with the ground.

The issue will concentrate on six main topics associated with geotechnical engineering in the field of construction processes and installation effects, namely

- improving predictions of the behaviour of onshore and offshore geotechnical structures by modelling construction processes and installation effects
- case histories of innovative construction processes and/or temporary works
- laboratory- and numerical modelling-based research into installation effects and construction processes
- field measurements of installation effects
- the importance of understanding the construction process in design of geotechnical structures
- installation effects for in situ testing.

Examples of relevant topics include diaphragm wall installation; helical, driven and bored pile installation; sheet pile installation; piled walls; pipejacking and microtunnelling; conventional and mechanised tunnelling; shaft construction; dynamic penetrating anchors; drag anchors and other anchorages; and temporary works schemes for ground support.

Engineering practitioners and researchers engaged in any of these general topics are invited to submit abstracts by 22 November 2013 and completed papers, which will be subject to the usual refereeing procedures, by 31 March 2014. Relevant papers outside the main themes outlined above will also be considered.

Geotechnical Engineering is a high-quality, internationally refereed journal, published six times a year as part of the *Proceedings of the Institution of Civil Engineers*. Full-length papers or shorter, less technical briefing articles on any topic within the journal's aims and scope are always welcome.

The deadline for abstracts is 22 November 2013; these should be submitted online at

https://docs.google.com/forms/d/17BG1xv-hIfZb9A6uPhoCaLGjkJs2u9HQZyivFlm4Lak/viewform

The deadline for submissions is 31 March 2014.

To submit an abstract or to request further information, please contact Sarah Walker
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For more information about the journal, visit www.icevirtuallibrary.com

Sendai City, Miyagi Prefecture, Japan
www.unisdr.org/we/coordinate/hfa-post2015

The United Nations General Assembly Resolution 66/199 requested UNISDR to facilitate the development of a post-2015 framework for disaster risk reduction.

The 10-year international disaster risk reduction plan, The Hyogo Framework for Action 2005-2015 (HFA) - Building the Resilience of Nations and Communities to Disasters, is the inspiration for knowledge, practice, implementation, experience and the science for disaster risk reduction. As the world heads toward the end date of the HFA, it is important to outline an approach and shape the discussions on an international framework for disaster risk reduction and resilience to be considered at the World Conference on Disaster Risk Reduction to be held in Sendai, Japan in March 2015.

Subject to an anticipated decision of the UN General Assembly later in 2013, the Third United Nations World Conference on Disaster Risk Reduction (WCDRR) is to take place in Sendai City, Miyagi Prefecture, Japan, from 14 to 18 March 2015 (five days inclusive).

Hosted by the Government of Japan in cooperation with the United Nations Office for Disaster Risk Reduction (UNISDR), as secretariat of the International Strategy for Disaster Reduction, the WCDRR will review the implementation of the Hyogo Framework for Action and is expected to adopt a successor framework for disaster risk reduction.

The post-2015 framework for disaster risk reduction will build on the knowledge and practice developed through the implementation of the International Framework for the International Decade for Natural Disaster Reduction of 1989, the Yokohama Strategy and Plan of Action of 1994, the International Strategy for Disaster Reduction of 1999 and the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. Pursuant to General Assembly resolution 66/199, UNISDR will continue to ensure extensive and inclusive multi-stakeholder consultations for a post-2015 framework for disaster risk reduction.

Innovative Geotechnics for Africa
27 - 30 April 2015, Hammamet, Tunisia

Regional African Conference

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13th ISRM International Congress on Rock Mechanics
Innovations in Applied and Theoretical Rock Mechanics
10 – 13 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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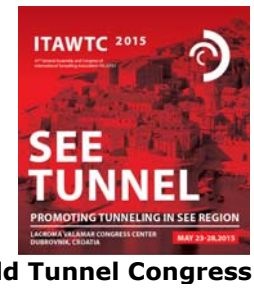

World Tunnel Congress 2015 and 41st ITA General Assembly Promoting Tunnelling in South East European (SEE) Region
22 - 28 May 2015, Dubrovnik, Croatia
http://wtc15.com

Contact
ITA Croatia - Croatian Association for Tunnels and Under-

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Davorin KOLIC, Society President
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ISFOG 2015 3rd International Symposium on Frontiers in Offshore Geotechnics, Oslo, Norway, 10-12 June 2015, www.isfog2015.no

16th European Conference on Soil Mechanics and Geotechnical Engineering "Geotechnical Engineering for Infrastructure and Development", 13 - 17 September 2015, Edinburgh, UK, www.xvi-ecsmge-2015.org.uk

Workshop on Volcanic Rocks & Soils, 24 - 25 September 2015, Isle of Ischia, Italy, www.associazionegeotecnica.it

EUROCK 2015
ISRM European Regional Symposium
64th Geomechanics Colloquy
7 – 9 October 2015, Salzburg, Austria

3rd PanAmerican Regional Conference on Geosynthetics
April 2016, Miami South Beach, USA
NAGSDirector05@gmail.com

The Nordic Geotechnical Meeting
25 - 28 May 2016, Reykjavik, Iceland
www.ngm2016.com

On behalf of the Icelandic Geotechnical Society it is a pleasure to invite you to attend the 17th Nordic Geotecnical Meeting in Reykjavik, Iceland 25th – 28th of May 2016.

The aim of the conference is to strengthen the relationships between practicing engineers, researchers and scientists within the fields of geotechnics and engineering geology with special emphasis on the Nordic region.

All are invited to share their experience and knowledge with their Nordic colleagues. The conference will be held in Harpa, the Concert Hall and Conference Centre in the heart of Reykjavík, Iceland.

Topics of the Conference

- New technology in geotechnic
- Design parameters and modelling
- Site investigation and laboratory testing
- Field instrumentation and measurements
- Shallow and deep foundation
- Construction on peat and other soft soil
- Ground improvements
- Deep excavations and retaining structures
- Slope stability and landslides
- Tunneling and underground structures
- Environmental geotechnics
- Geotechnical risk analysis
- Infrastructure projects

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3rd ICTG International Conference on Transportation Geotechnics
4 - 7 September 2016, Guimaraes, Portugal

The Transportation Geotechnics International Conference series began under the auspices of ISSMGE-TC 3 and was initiated in 2008 at the University of Nottingham, UK, as an International event designed to address the growing requirements of infrastructure for societies. The 2nd International Conference on Transportation Geotechnics took place in 2012, at Sapporo, Japan, under the ISSMGE-TC202 that follows the TC-3 activities for the period 2009-2013. To continue the successful of these conferences and the output of ISSMGE-TC-202, the 3rd was scheduled for 2016, at Guimarães, Portugal. Following the previous one, the challenges addressed by this conference will include a better understanding of the interactions of geotechnics on roads, rails, airports, harbours and other ground transportation infrastructure with the goal of providing safe, economic, environmental, reliable and sustainable infrastructures. The 3rd ICTG will be composed of workshops and several types of sessions, as well as a technical exhibition, to better disseminations of findings and best practices. A special attention will be paid to the publication of all the peer review papers, some of them in specialised international journals. On behalf of the organizing committee I am honoured to invite you to the 3rd ICTG in the City of Guimarães, UNESCO World Heritage (September 4-7, 2016).

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EuroGeo 6 – European Regional Conference on Geosynthetics
25 – 29 Sep 2016, Istanbul, Turkey
eguler@boun.edu.tr

6th Asian Regional Conference on Geosynthetics
November 2016, New Delhi, India
uday@cbip.org

11th International Conference on Geosynthetics (11ICG)
16 - 20 Sep 2018, Seoul South Korea
csyoo@skku.edu

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Le Monde: Έρχονται καταστροφικοί σεισμοί στην Ευρώπη

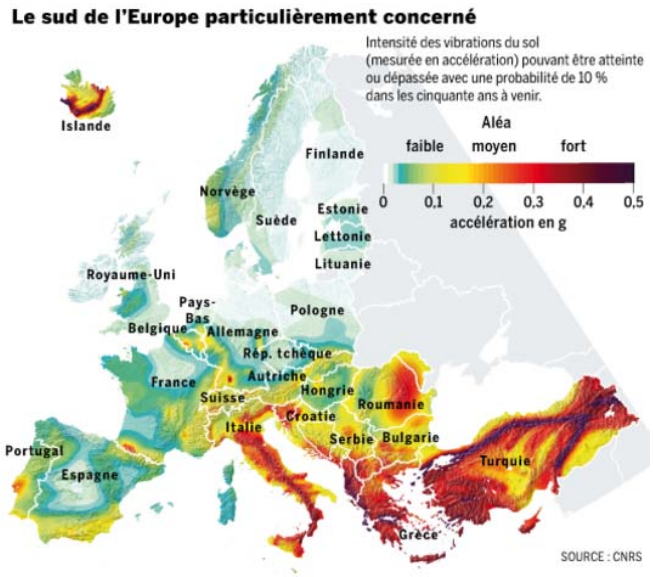
Τρομολαγνικό μπορεί να χαρακτηριστεί το δημοσίευμα της γαλλικής εφημερίδας Le Monde με τίτλο «Σεισμοί χωρίς ιστορικό προηγούμενο είναι πιθανοί στην Ευρώπη», φιλοξενώντας προβλέψεις σοκ και για τη χώρα μας.

Σύμφωνα με όσα τονίζονται στο δημοσίευμα, Ελλάδα, Τουρκία, Ιταλία και Ρουμανία είναι οι χώρες που διατρέχουν τον μεγαλύτερο κίνδυνο, καθώς δεν αποκλείεται να βιώσουν σεισμούς ανάλογου μεγέθους με αυτόν που σημειώθηκε στις 11 Μαρτίου του 2011 στη Φουκουσίμα της Ιαπωνίας, του σεισμού του Τοχόκου και του τσουνάμι που ακολούθησε, με αποτέλεσμα να χάσουν τη ζωή τους 19.000 άνθρωποι.

Στο άρθρο φιλοξενούνται οι πρώτοι χάρτες με τις σεισμογενείς περιοχές όλης της Ευρώπης, όπως αυτοί δημιουργήθηκαν, στο πλαίσιο του προγράμματος SHARE (Seismic Hazard Harmonization in Europe), από πενήντα επιστήμονες, μεταξύ των οποίων διακεκριμένοι σεισμολόγοι και μηχανικοί.

(Η ΑΠΟΨΗ, 4 Σεπτεμβρίου, 2013, http://www.iapopsi.gr/le-monde-erxontai-katastrofikoi-seismoi-stin-europi, ΤΟ ΠΡΩΤΟ ΘΕΜΑ, 4 Σεπτεμβρίου 2013, http://www.protothema.gr/greece/article/307426/i-le-monde-provlepei-seismo-9-rihter-stin-ellada)

Des séismes sans précédent historique sont possibles en Europe

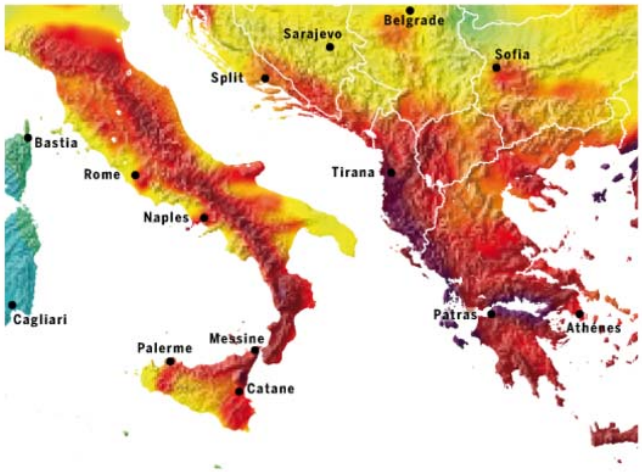


Une cartographie inédite devrait déboucher sur une réévaluation des normes parasismiques. | "Le Monde"

"Il reste beaucoup à faire pour améliorer l'évaluation du risque sismique." Fabrice Cotton, professeur de sismologie à l'université Joseph-Fourier (Grenoble-I), fait partie de la cinquantaine de scientifiques qui viennent de dresser les premières cartes harmonisées de l'aléa sismique à l'échelle de l'Europe, dans le cadre du programme Share (Seismic Hazard Harmonization in Europe). Un outil précieux pour les services chargés de l'élaboration des normes parasismiques comme pour les industriels exploitant des installations sensibles.

La géographie générale de la sismicité sur le continent européen est connue. Elle résulte, principalement, de l'affrontement entre les plaques tectoniques africaine et eurasienne. Le danger est le plus fort en Turquie, en Grèce et dans la péninsule des Balkans, en Italie et en Roumanie.

En France métropolitaine, où les zones les plus actives sont les Pyrénées, les Alpes, le Jura et le fossé rhénan, suivis du Massif armoricain et du Massif central, le seul tremblement de terre de magnitude supérieure à 6 depuis un siècle a été celui de Lambesc (Bouches-du-Rhône), qui fit 46 morts le 11 juin 1909.



"Le Monde"

"Nous n'en sommes qu'au tout début de la compréhension du fonctionnement des failles, souligne pourtant M. Cotton. *Faute de connaissances suffisantes, l'aléa sismique est encore mal évalué."*

Cette évaluation repose, pour les décennies récentes, sur les mesures des instruments terrestres sous-marins ou satellitaires qui enregistrent les déformations de la croûte terrestre. Et, pour les périodes plus anciennes, sur les archives du dernier millénaire. Ainsi du tremblement de terre de Bâle, en 1356, qui ravagea un vaste territoire à cheval sur la Suisse, la France et l'Allemagne. Ou de celui de Lisbonne, en 1755, responsable de 50 000 à 100 000 morts.

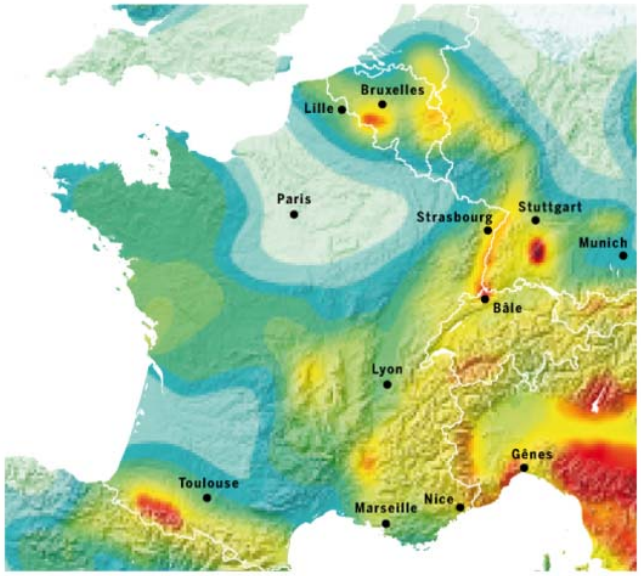
CENTRALES NUCLÉAIRES, BARRAGES HYDRAULIQUES OU SITES INDUSTRIELS CLASSÉS

Mais, prévient le chercheur, *"il peut se produire des secousses beaucoup plus fortes que les séismes historiques de référence"*. Témoin, la catastrophe de Fukushima, le 11 mars 2011. Le séisme de Tohoku, qui, avec le tsunami qui l'a suivi, a fait 19 000 morts et a dévasté la centrale nucléaire japonaise de Fukushima, était de magnitude 9, alors que les tremblements de terre de référence dans la région ne dépassaient pas 7,3. En outre, ajoute le sismologue, *"des failles bloquées généreront, un jour, des séismes là où l'on n'en a pas observé par le passé".*

Or c'est en fonction des séismes historiques qu'est calculée jusqu'à présent la robustesse des centrales nucléaires, des barrages hydrauliques ou des installations industrielles classées, notamment de la chimie. Le séisme de Bâle a ainsi servi de référence à EDF pour la centrale nucléaire alsacienne de Fessenheim. D'où la nécessité de mieux quantifier l'aléa sismique, c'est-à-dire la probabilité de secousses dans une zone et une période de temps données.

Tel était l'enjeu du programme Share. Fédérant treize pays – dont la Turquie et l'Algérie –, pour un coût de 4,1 millions d'euros financé à 80 % par l'Union européenne, il a mobilisé pendant quatre ans sismologues, tectoniciens, géodé-

siens et ingénieurs du génie civil. Avec, côté français, l'Institut des sciences de la Terre (universités de Grenoble et de Savoie, CNRS, IRD, LCPC) et le Bureau de recherches géologiques et minières (BRGM).

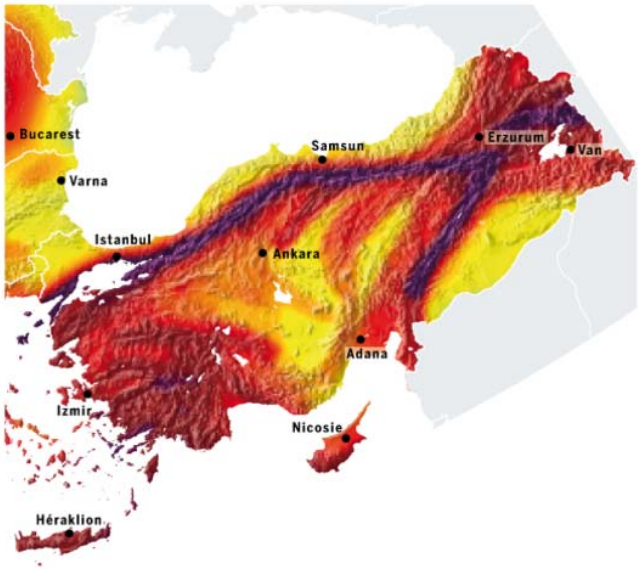


"Le Monde"

Les scientifiques ont passé en revue les données historiques et les enregistrements depuis trente ans. Pour tenir compte de la possibilité d'événements telluriques plus violents que ceux documentés dans le passé, ils ont revu à la hausse les magnitudes maximales envisagées, de 0,5 à 1 degré supplémentaire, un niveau de plus sur l'échelle de Richter équivalant à une multiplication par 32 de l'énergie libérée. Ils ont aussi construit de nouveaux modèles de prédiction des vibrations du sol adaptés au contexte géologique européen, en intégrant les incertitudes. Enfin, ils ont produit des cartes probabilistes de l'aléa sismique en Europe.

ÉVALUER L'ALÉA SISMIQUE À L'ÉCHELLE DE LA PLANÈTE

Cette cartographie prédit, par exemple, le niveau de vibrations que pourraient subir des bâtiments, avec une probabilité de 10 %, dans les cinquante ans à venir. Ou, avec une probabilité de 5 %, dans les cinq prochains siècles. Des échelles de temps qui couvrent la durée de vie de la plupart des constructions et sites industriels, l'objectif final étant d'affiner les futures règles parasismiques européennes.



"Le Monde"

Ce n'est qu'un début. Un nouveau projet de recherche (Strest), qui démarrera en octobre pour trois ans et auquel sont associés des industriels, va étudier les tests de résistance les mieux à même de prémunir les *"infrastructures critiques"* contre les aléas naturels. Et confronter les méthodes d'évaluation des événements extrêmes, séismes, crues ou tsunamis.

L'Europe n'est pas seule à creuser ce sillon. Un programme mondial, le Global Earthquake Model, qui réunit des partenaires publics et privés, vise à évaluer l'aléa sismique à l'échelle de la planète. Une façon de *"partager les connaissances entre pays avancés et pays en développement"*, commente Fabrice Cotton, face à un risque naturel auquel les nations les plus pauvres sont aussi les plus vulnérables.

(Pierre Le Hir / LE MONDE Planète, 16.08.2013, http://www.lemonde.fr/planete/article/2013/08/16/des-seismes-sans-precedent-historique-sont-possibles-en-europe_3462489_3244.html?xtmc=seismic_hazard_harmonization_in_europe&xtcr=2

http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type_item=ART_ARCH_30J&objet_id=1241095&xtmc=seismic_hazard_harmonization_in_europe&xtcr=1)

«ΔΕΝ ΘΑ ΓΙΝΕΙ ΣΕΙΣΜΟΣ 9 ΡΙΧΤΕΡ ΣΤΗΝ ΕΛΛΑΔΑ»

Διαψεύδει ο Κωνσταντίνος Μακρόπουλος τον Γάλλο που πανικόβαλε τη χώρα

Μια φράση που ειπώθηκε εκ παραδρομής και σίγουρα χωρίς επιστημονική βάση χαρακτηρίζει ο καθηγητής Σεισμολογίας του Πανεπιστημίου Αθηνών – και διευθυντής του Γεωδυναμικού Ινστιτούτου Αθηνών μέχρι την περασμένη Τρίτη Κωνσταντίνος Μακρόπουλος**.**

Συμμετέχοντας κι ο ίδιος στο πανευρωπαϊκό πρόγραμμα SHARE, από το οποίο προέκυψαν οι χάρτες που δημοσιεύτηκαν στη γαλλική εφημερίδα Le Monde, είναι σε θέση να γνωρίζει πως «ουδέποτε προέκυψε κάτι τέτοιο και γνωρίζουμε πως στην Ελλάδα δεν δεν υπάρχουν ρήγματα ικανά να δώσουν τόσο καταστροφικούς σεισμούς».

Όπως εξηγεί στο newpost ο Κωνσταντίνος Μακρόπουλος, το πρόγραμμα SHARE ήταν η ανταλλαγή δεδομένων και μεθόδων μεταξύ των επιστημόνων όλης της Ευρώπης, προκειμένου να καταρτιστεί ένας «κατάλογος σεισμών» αποδεκτός από όλους. Έπειτα, με βάση αυτόν τον κατάλογο και με κοινά παραδεκτές μεθόδους υπολογίστηκαν οι παράμετροι που χρειάζονται οι μηχανικοί προκειμένου να καταρτίσουν έναν γενικό οικοδομικό κανονισμό.

Ο κ. Μακρόπουλος επιμένει ότι το πρόγραμμα SHARE δεν ήταν τίποτα παραπάνω από αυτό και δεν είχε κάποια σχέση με πρόγνωση σεισμικής δραστηριότητας.

«Ένας Γάλλος συνάδελφος, που μετείχε του προγράμματος, έδωσε συνέντευξη στη γαλλική εφημερίδα και είπε -εν τη ρήμη του λόγου του - "γιατί να μην γίνει και σε αυτές τις χώρες ένας σεισμός 9 ριχτερ" αναφερόμενος και στην Ελλάδα. Για να γίνει αυτό πρέπει να "σπάσει" ένα ρήγμα μήκους 550 χλιμ. Στην Ελλάδα δεν υπάρχει τέτοιο ρήγμα. Δεν έχει καμία επιστημονική βάση σε όσα είπε ο συνάδελφος. Το ξέρουμε ότι η Ελλάδα έχει τη μεγαλύτερη σεισμικότητα σε όλη την Ευρώπη. Ξέρουμε όμως ότι δεν υπάρχουν ρήγματα ικανά να δώσουν τόσο καταστροφικούς σεισμούς».

Όπως εξηγεί ο κ. Μακρόπουλος, στην Ελλάδα υπάρχει καταγεγραμμένη σεισμική ιστορία από το 550 π.Χ., άρα υπάρχει και μια πολύ καλή βάση δεδομένων για στατιστική ανάλυση.

«Ο μεγαλύτερος σεισμός που έχει καταγραφεί σε όλη την Μεσόγειο ήταν εκείνος του 365 μ.Χ. στη Φαλάσαιρνα Κρή-

της, της τάξεως των 8,1Ρίχτερ. Από το σεισμό αυτό προκλήθηκε ένα από τα μεγαλύτερα τσουνάμι που έχουν γίνει ποτέ στη Μεσόγειο και έφτασε ως την Αλεξάνδρεια.

Μέχρι εκεί μπορεί να "φτάσει" η σεισμικότητα στη χώρα. Αυτό για να επαναληφθεί προϋποθέτει ένα ρήγμα 250χλμ. Ρήγμα μεγαλύτερο δεν υπάρχει στην ελληνική επικράτεια».

(Ντίνα Καραμάνου / NEW POST, http://newpost.gr/post/269783/diapseydei-o-kwnstantinos-makropoylos-ton-gallo-poy-panikobale-th-xwra#ixzz2e0SEs5L5)

Σεισμοί: αλήθειες και μύθοι

Ο διευθυντής του Γεωδυναμικού διαψεύδει γαλλικά δημοσιεύματα

«Ο ελλαδικός χώρος μπορεί να δώσει σεισμούς 7 – 7,5 βαθμούς της κλίμακας Ρίχτερ. Κάθε αναφορά για σεισμούς 9 Ρίχτερ στην Ελλάδα στερείται κάθε επιστημονικής βάσης και δεν είναι αποτέλεσμα επιστημονικής έρευνας», δηλώνει κατηγορηματικά στην «Κ» ο κ. Κωνσταντίνος Μακρόπουλος, διευθυντής του Γεωδυναμικού Ινστιτούτου του Εθνικού Αστεροσκοπείου Αθηνών. Διαψεύδει έτσι δημοσιεύματα του γαλλικού Τύπου, που βασιζόμενα σε δήλωση Γάλλου σεισμολόγου, μίλησαν ακόμα και για σεισμούς 9 Ρίχτερ στον ελλαδικό χώρο. Ταυτόχρονα, ο κ. Μακρόπουλος σημειώνει ότι η σεισμική δραστηριότητα στην Ελλάδα, που παρουσιάζει μια «αφύπνιση» το τελευταίο διάστημα, «είναι εντός του σεισμικού υποβάθρου της χώρας και απλώς επιβεβαιώνει ότι η Ελλάδα είναι η πλέον σεισμογενής χώρα της Ευρώπης».

Ο κ. Μακρόπουλος συμμετείχε στο μεγάλο ευρωπαϊκό επιστημονικό πρόγραμμα SHARE (Seismic Hazard Harmonization in Europe), το οποίο ολοκληρώθηκε τον Νοέμβριο του 2012. «Τα δεδομένα που περιλαμβάνονται στο πρόγραμμα δόθηκαν από τα αρμόδια ελληνικά ιδρύματα. Άρα δεν προκαλεί έκπληξη το κόκκινο χρώμα με το οποίο απεικονίζεται η Ελλάδα. Στη χώρα μας απελευθερώνεται το 50% της ευρωπαϊκής σεισμικής ενέργειας», εξηγεί ο κ. Μακρόπουλος. Όμως τα συμπεράσματα του SHARE δεν έχουν καμία σχέση με «προβλέψεις» για σεισμούς 9 Ρίχτερ, τονίζει. «Υπάρχουν επιστημονικά εργαλεία που συνδέουν την ένταση του σεισμού με το μήκος του ρήγματος, που τον προκάλεσε. Για να προκύψει σεισμός 9 Ρίχτερ απαιτούνται 545 χιλιόμετρα γεωλογικού ρήγματος. Δεν υπάρχει τέτοιο ρήγμα στον ελλαδικό χώρο!», τονίζει ο διευθυντής του Γεωδυναμικού Ινστιτούτου.

«Δεν υπάρχει στοιχείο που να προειδοποιεί για μεγάλο σεισμό», ξεκαθαρίζει ο κ. Μακρόπουλος, παρά την πρόσφατη αναθέρμανση της σεισμικής δραστηριότητας, με πιο χαρακτηριστικό παράδειγμα τον σεισμό του Αυγούστου στο Καλλίδρομο Φθιώτιδας, αλλά και μια σειρά μικρών δονήσεων στην περιοχή του Αιγίου νωρίτερα.

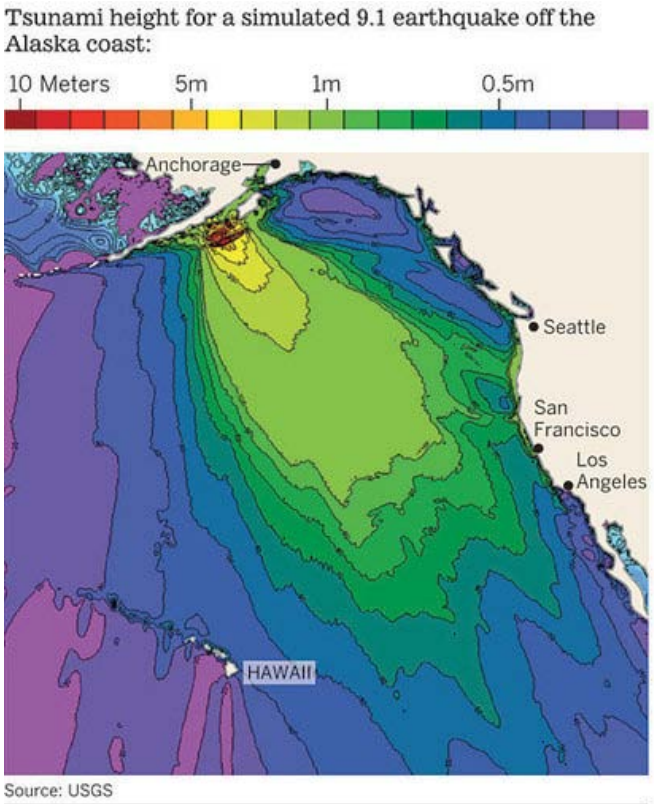
Βεβαίως, εάν στο μέτωπο των σεισμών δεν χωρά κινδυνολογία, ακόμα περισσότερο δεν μπορεί να υπάρχει εφησυχασμός στην αντισεισμική προστασία. «Οι αντισεισμικοί κανονισμοί για την οικοδόμηση κτιρίων στη χώρα μας, ειδικά από το 2000 και μετά, είναι πολύ καλοί. Μάλιστα, δεν υπολείπονται ιδιαίτερα ακόμα και από τις επιταχύνσεις που καταγράφει το πρόγραμμα SHARE (δεν μιλώ για τις υπερβολές που είδαν το φως της δημοσιότητας). Βεβαίως, μερικές φορές η φύση μάς διαψεύδει, γι' αυτό πρέπει να είμαστε καλά προετοιμασμένοι», τονίζει ο κ. Κοσμάς Στυλιανίδης, πρόεδρος του Οργανισμού Αντισεισμικού Σχεδιασμού και Προστασίας. Ιδιαίτερη προσοχή χρειάζεται, σύμφωνα με τον κ. Στυλιανίδη, η κατάσταση και η συμπεριφορά των κτιρίων που ανεγέρθησαν πριν από το 1985, όταν αναθεωρήθηκε ο αντισεισμικός κανονισμός του 1959. «Πολλά από τις 80.000 δημόσια κτίρια, χώροι δημόσιας συνάθροισης, ανήκουν σε αυτή την κατηγορία. Ξεκινήσαμε το 2001 ένα πρόγραμμα, με πρώτο βήμα τον οπτικό έλεγχο των κτιρίων». Δυστυχώς, παρότι πέρασαν 12 χρόνια έχουν εξεταστεί μόλις 12.000 δημόσια κτίρια! Με αυτούς τους ρυθμούς θα χρειαστούν... 70 χρόνια, στην πιο σεισμογενή χώρα της Ευρώπης.

(Γιάννης Ελαφρός / Η ΚΑΘΗΜΕΡΙΝΗ, 15 Σεπτεμβρίου 2013, http://news.kathimerini.gr/4dcgi/_w_articles_ell_2_15/09/2013_533416)

Tsunami study finds Southern California at risk

A theoretical 9.1 quake off Alaska could flood Long Beach and parts of O.C., and force 750,000 to evacuate

The U.S. Geological Survey this week released a report assessing the tsunami risk in California. The research (USGS Open-File Report # 2013-1170 and CGS Special Report #229: http://pubs.usgs.gov/of/2013/1170) simulated a 9.1 quake off the Alaska coast that would send damaging waves to California.



A large tsunami hitting California would cause major flooding in Long Beach and parts of Orange County and force 750,000 people to evacuate coastal areas in just a few hours, according to an extensive simulation published Wednesday by the U.S. Geological Survey.

The study, released two years after a tsunami killed thousands in Japan, identified several communities that are particularly vulnerable to flooding because of their low elevation and lack of protection from waves.

They include Marina del Rey and the ports of Los Angeles and Long Beach as well as the low-lying coastal areas extending from the ports to Newport Beach.

The report, compiled by dozens of scientists, emergency responders and industry representatives, is the most exten-

sive examination of what a tsunami would do to California's coastline. The research simulated a 9.1 quake off the Alaska coast that would send damaging waves to California.

While waves would be larger in Northern California — between 10 and 23 feet — the damage could be greater in Southern California because the region has more coastal development and fewer coastal cliffs.

Tsunami waves of 3 to 10 feet could submerge blocks of Long Beach south of Ocean Boulevard, including the Aquarium of the Pacific and the Long Beach Convention Center as well as the Shoreline Village and Pike shopping centers. Those same-sized waves could cause flooding around the affluent communities of Newport Bay and Huntington Harbour as well.

California has been preparing for decades to deal with major earthquakes. But only more recently have officials begun extensive tsunami planning, including establishing evacuation routes in coastal cities. The research for the simulation was expanded after Japan's tsunami focused more attention on the risk, said Lucy Jones, the U.S. Geological Survey seismologist who led the project.

"The idea is to say: Look, these are not distant events, these could actually happen here," said Kathleen Tierney, director of the Natural Hazards Center at the University of Colorado Boulder. "This is meant to get tsunamis on the public's radar."

Under the study's scenario, the first waves would hit Crescent City, in the far north of the state, in as little as four hours. The waves would then make their way down the coast, arriving in San Diego two hours later.

Researchers said the waters would cause sewage to foul beaches, damage fishing boats in marinas and make more than 8,000 people homeless.

Tsunamis could also travel several miles inland up coastal rivers. Statewide, one out of three boats in coastal harbors and ports could be damaged or sunk, and the cost of the disaster could approach $8 billion.

The biggest challenge would be evacuating everyone before the tsunami hits. Some areas, like Balboa Island in Newport Beach, have only narrow roads for escape routes.

During summer beach season, evacuation could be significantly more difficult. More than 250,000 people at beaches and coastal parks would have to evacuate in the spring. And that number jumps to 1 million in the summer.

"Your life depends on how you respond," Jones said. "People die in tsunamis. They're very, very deadly, but we do have time. We have a few hours."

Unlike earthquakes, which millions of Californians can recall vividly, tsunamis are rare enough that few coastal residents have experienced them, making it difficult for local officials to know how seriously people might take evacuation warnings.

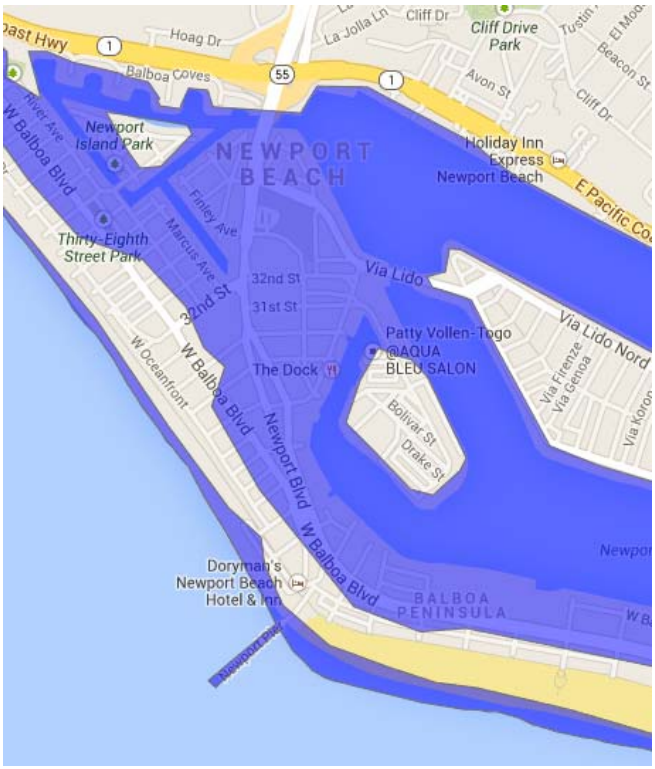
The study's simulation involves a temblor that hits Alaska just before noon on March 27, 2014, which would be the 50th anniversary of the tsunami caused by a 9.2 earthquake in Alaska in 1964.

A tsunami as powerful as that created in the simulation is estimated to occur once every several hundred years.

There's little recorded evidence of a destructive tsunami in Southern California in modern times. But the 1964 Alaska tsunami killed 10 people in Crescent City.

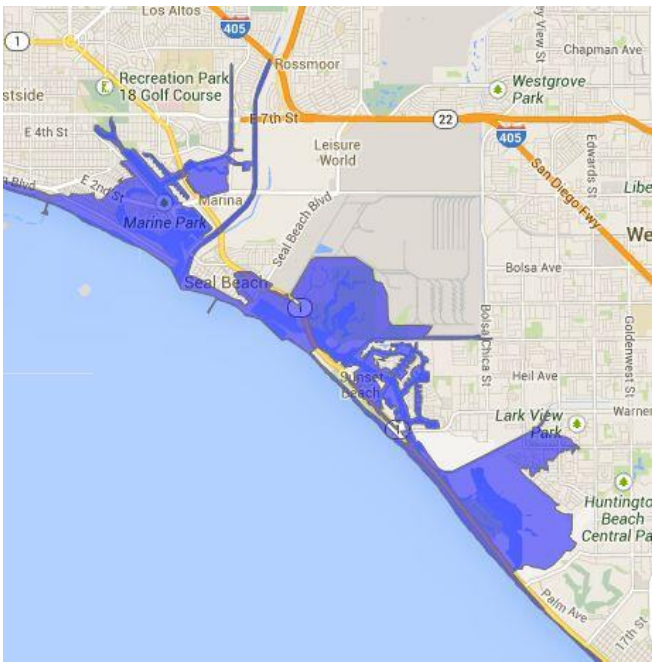
Other areas that could be inundated under this kind of tsunami include parts of Belmont Shore as well as Naples Island in Long Beach, portions of Sunset Beach and Seal Beach in Orange County, much of Balboa Peninsula and all of Balboa Island in Newport Beach, and Mission Beach in San Diego.

What a tsunami from a 9.1 earthquake would do to Newport Beach

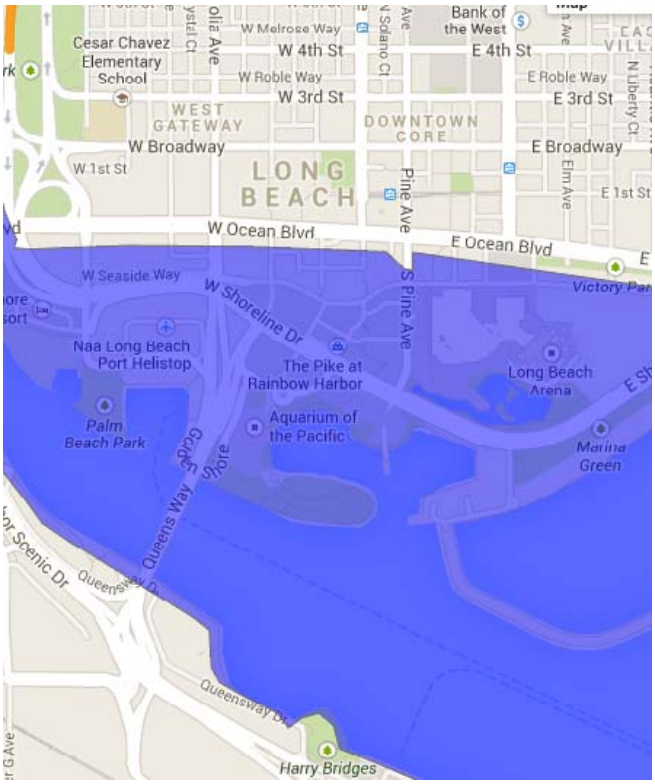


The Ports of Los Angeles and Long Beach would have to order immediate evacuations, and they would be left idle for as many as two days. The warning time the ports would receive in this scenario might not be enough to complete the vessel evacuation plan.

What a tsunami could flood in Huntington Beach after a 9.1 earthquake in Alaska



What a tsunami from a 9.1 earthquake would do to Downtown Long Beach



A toxic stew of ship debris and fuel and pesticide-laden runoff from flooded farms could take years to clean up.

Rich Baratta, the director of risk management for the Port of Long Beach, said damage to Southern California ports would be tempered by the fact that they actually face south, not west.

"There is a benefit to us in the sense that we don't get the surges and potential damage that the ports get up in Humboldt and Northern California, because the mouths of their ports face the open sea," he said.

Roads across the state could be damaged by a tsunami, including Pacific Coast Highway in Malibu and Orange County, Interstate 5 near Camp Pendleton, and Interstate 80 in Emeryville, just north of Oakland.

In Northern California, experts warned of damage to the Port of San Francisco's headquarters and the Bay Bridge toll plaza in Oakland. Pier 39 and Fisherman's Wharf are also in the danger zone. A tsunami could permanently wash away beaches in Malibu and Laguna.

Tsunamis have been an under-scrutinized hazard for years, particularly before the 2004 Sumatra tsunami and the 2011 Japan tsunami brought attention to the hazard.

A map of the inundation zones surmised under this tsunami scenario can be found at the California Department of Conservation (http://www.quake.ca.gov/gmaps/tsunami/SAFRR.htm).

(Rong-Gong Lin II and Shelby Grad / Los Angeles Times, September 4, 2013, http://www.latimes.com/local/la-me-tsunami-study-20130905,0,2145516,full.story)

Seismologist: Fracking doesn't cause earthquakes

MORGANTOWN, W.Va. (AP) — Human activity associated with oil and gas production can sometimes cause earthquakes, but the problem is not hydraulic fracturing, a seismologist from the University of Texas told researchers gathered for a two-day conference on Marcellus shale-gas drilling.

When the rare quakes do occur, they're typically linked to the disposal of drilling fluids in underground injection wells, Cliff Frohlich said Monday at West Virginia University. And the vast majority of injection wells don't cause quakes, either, he said.

Frohlich cited six earthquakes since 2008 in Texas, Arkansas, Colorado, Ohio and Oklahoma, ranging from magnitude 3.3 to magnitude 5.7. Their locations show that human-caused earthquakes are geographically widespread and geologically diverse, but "very rare," given the amount of petroleum produced and the amount of waste being disposed of.

Why some injection wells cause earthquakes and others don't remains unclear, he said. Frohlich hypothesizes that quakes occur when a "suitably oriented" fault lies near an injection site.

"Hydraulic fracturing almost never causes true earthquakes," he told the group gathered for the National Research Council workshop. "It is the disposal of fluids that is a concern."

Texas has 10,000 injection wells, Frohlich said, and some have been in use since the 1930s. That effectively makes the state a giant research lab for the shale-gas drilling issues now facing Appalachian states including West Virginia, Pennsylvania, Ohio and New York.

If injection wells were "hugely dangerous," he said, "we would know."

"Texas would be famous as a state that just rocks with major earthquakes," Frohlich said. "That is not true."

WVU is hosting the conference through Tuesday for the National Research Council, which is the operating arm of the National Academy of Sciences.

WVU Vice President for Research Fred King says the reports that the workshop will generate should be available before the start of West Virginia's legislative session in January and could help guide future regulatory discussions.

Frohlich urged policymakers to consider cultural and population differences if they are weighing regulation aimed at minimizing the risk of earthquakes through either the spacing between or monitoring of injection wells.

"There's places in West Texas you could have a 5.2 earthquake and it wouldn't bother anyone," he said. "If you're going to operate in urban areas, I think you need to invest in incredibly stringent regulations. But in other areas, you probably don't."

WVU Chief of Staff Jay Cole said the university has a special obligation to help industry and government identify critical issues as shale-gas development grows and to identify questions that remain to be answered.

The workshop features representatives of industry and government, including the National Energy Technology Laboratory, U.S. Geological Survey and U.S. Environmental Protection Agency, as well as researchers from 12 universities.

Ray Boswell, technology manager for natural gas technology programs at Morgantown's national lab, said drillers tapping the Marcellus are producing more gas even as they sink fewer wells, and are outpacing production estimates made by the U.S. Energy Information Administration.

The region's reserves, he said, can easily sustain strong production through 2040.

Joseph Frantz, vice president of engineering for the Texas-based oil and gas producer Range Resources, said technology is allowing drillers to create more efficient operations on smaller physical footprints.

Deep horizontal wells today disturb only 1 percent of the surface on a 1,000-acre site, he said, compared with 19 percent disruption with conventional vertical wells set 1,000 feet apart.

Frantz said drillers in the Appalachian basin are now producing nearly 12 billion cubic feet of oil and gas per day from the Marcellus, a figure that has skyrocketed since 2009 as drillers rapidly embrace and deploy technology developed in the nation's other shale-gas fields.

Range and other companies are casing their wells with as many as four layers of steel and cement, redundancies that Frantz said dramatically reduce any risk of groundwater contamination. Range is also using rubber containment pads and berms under every piece of equipment to stop pollution from soaking in the ground or migrating offsite, he said.

It's an expensive way to do business, Frantz said, but "this is the right thing to do."

"We talk about this social license to operate," he said. "We always have to be transparent and honest and open with everybody. ... If we don't do our job, someone's going to come in and tell us how it should be done, and that may not be a pleasant day."

(The Oklahoman (Oklahoma City)/The Associated Press, September 9, 2013, http://newsok.com/seismologist-fracking-doesnt-cause-earthquakes/article/feed/588526)

Scientists demonstrate strengths and shortcomings of method for determining ancient earthquake size

"A giant Cascadia earthquake, with its accompanying tsunami, has the potential to be the biggest natural disaster in this history of the U.S.," says Simon Engelhart, a seismologist at the University of Rhode Island. On Jan. 26, 1700, a magnitude-9 earthquake associated with the nearby Cascadia Subduction Zonestruck the Pacific Northwest. The quake created tsunami waves that left deposits on shorelines as far away as Japan and caused parts of the Pacific shoreline to sink half a meter into the sea. Such a quake will happen again; the question is when. Researchers are attempting to determine how often earthquakes occurred in the past to estimate when the next quake is likely to occur. New experimental research off the coast of Oregon that demonstrates the accuracy of a method for determining the vertical deformation associated with past earthquakes may help scientists answer this question.

"We wanted to check how accurate and precise we are at estimating the size of past earthquakes; we did this by simulating what would happen [to a piece of sediment] if the earthquake were to occur today," says Andrea Hawkes, a coastal geologist at the University of North Carolina at Wilmington and a co-author of the new study, published in Geology.

Researchers transplanted peat along the Oregon Coast to measure subsidence levels over time as a potential way of determining when past earthquakes struck and what size they were. They collected samples of the peat after one year and again after five years.

To do this, Hawkes, Engelhart and their colleagues carried out an experiment at the South Slough National Estuarine Research Reserve in Oregon. The experiment involved moving an intact piece of marsh peat from the upper estuary to a location where the water was slightly deeper. Moving the peat to deeper waters simulated the coastal subsidence that would be expected to accompany a large earthquake in the region, Hawkes says. The team returned to the site after one year and again after five years to take samples of the peat layer and the fresh sediments that had accumulated on top of it.

Peat was transplanted in the South Slough National Estuarine Research Reserve in Oregon.

Upon examining the layers of tiny marine organisms called foramanifera (forams) in the peat and accumulated mud, the researchers made two important discoveries. First, by applying previous empirical relationships between particular groups of forams and elevation, the team accurately predicted the total vertical displacement related to the earthquake. Their estimate of 0.61 meters of subsidence was within three centimeters of the actual simulated subsidence of 0.64 meters. These results provide much-needed evidence that the method is effective for determining the size

and frequency of past earthquakes along the Pacific Northwest coastline, the team wrote.

By examining the types of forams buried in sediments deposited just after a simulated earthquake, researchers accurately predicted the total vertical displacement related to the earthquake.

The second discovery to come from the experiments, however, cast doubt on a potential method of earthquake prediction, Hawkes says. Some evidence suggests that the ground may rise or fall slightly in the months or years leading up to an earthquake. If such changes could be detected for past earthquakes using the foram method, they might allow researchers to find patterns that could help predict earthquakes in the future, the authors wrote.

If the method worked, the sudden subsidence of the land from the earthquake should have shown up as a sudden change in foram type, Hawkes says. However, rather than a sharp transition from high-marsh forams to low-marsh forams at the transition from peat to mud layers marking the time of the earthquake, there was a gradual shift. This was not expected, Hawkes says, and effectively erased any evidence that might have existed for preseismic deformation. The team suggests that burrowing forams dug down into the peat from the mud layers above after the peat was submerged.

Thus, the results show that forams cannot be used to detect subtle changes in water depth related to deformation preceding past earthquakes, the team wrote. For now, Hawkes says, researchers trying to predict quakes using preseismic deformation will have to rely on modern technology like GPS to precisely measure deformation before an earthquake.

Despite this unfortunate finding, Chris Goldfinger, a seismologist at Oregon State University who has studied the Cascadia Subduction Zone in depth, says he is impressed by the team's research. "This study helps improve the precision of subsidence estimates, raising the bar from the original work done in the 1990s; it's very well done," he says. With research such as this, he adds, "eventually, we will have models for past earthquake ruptures."

Next, Hawkes says, "we need to figure out what the actual limits of the method are. It's good for reconstructing deformation of less than one meter, but we need to see if we can increase its application to greater depth ranges."

(Dan Walsh / EARTH MAGAZINE, September 12, 2013, http://www.earthmagazine.org/article/scientists-demonstrate-strengths-and-shortcomings-method-determining-ancient-earthquake-size)

Εξήγηση στο βάθος

Γιατί ο πυρήνας της Γης περιστρέφεται ανάποδα

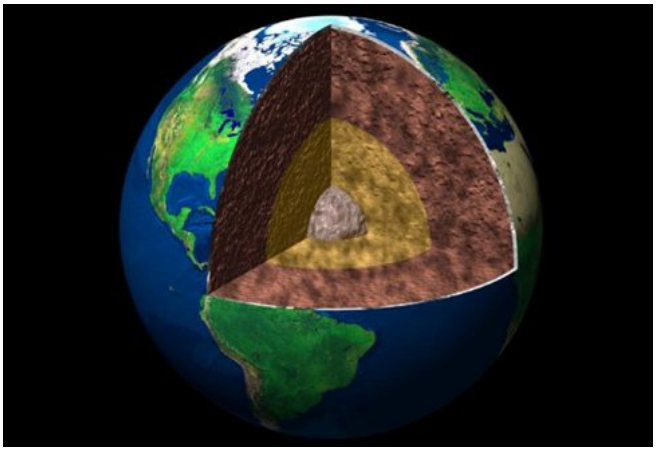
Ακούγεται παράξενο, κι όμως τα τελευταία χρόνια συσσωρεύονται ενδείξεις ότι το εξωτερικό στρώμα του πυρήνα της Γης περιστρέφεται προς τη Δύση, αντίθετα δηλαδή από την επιφάνεια.

Έρευνα του Πανεπιστημίου του Λιντς στη Βρετανία δείχνει τώρα να εξηγεί γιατί ο εξώτερος πυρήνας κινείται με αυτόν τον τρόπο: τον αναγκάζει το μαγνητικό πεδίο του πλανήτη.

Ο πυρήνας της Γης άρχισε να σχηματίζεται όταν ο νεαρός πλανήτης βρισκόταν ακόμα σε διάπυρη, υγρή κατάσταση. Τα βαριά στοιχεία όπως ο σίδηρος βυθίστηκαν προς το κέντρο, ενώ τα ελαφρύτερα παρέμειναν στο φλοιό.

Ο πυρήνας πιστεύεται ότι αποτελείται από δύο στρώματα: τον εξώτερο πυρήνα, ο οποίος αποτελείται από λιωμένο σίδηρο και νικέλιο. Το υλικό αυτό κυκλοφορεί μέσα στον εξώτερο πυρήνα λόγω ρευμάτων μεταφοράς θερμότητας, και η κίνηση αυτή δημιουργεί το προστατευτικό μαγνητικό πεδίο της Γης.

Κάτω από τον εξώτερο πυρήνα βρίσκεται ο εσώτερος, μια σφαίρα στο μέγεθος της Σελήνης που αποτελείται από συμπαγή σίδηρο. Ο εξώτερος πυρήνας πιστεύεται ότι συμπεριφέρεται ως στερεό, λόγω όμως της υψηλότερης θερμοκρασίας του δεν παράγει μαγνητικό πεδίο.



Η Γη αποτελείται από τέσσερα στρώματα: φλοιός, μανδύας, εξώτερος και εσώτερος πυρήνας (Πηγή: University of Michigan)

Τα τελευταία χρόνια έχουν προκύψει ενδείξεις (Richard A. Kerr "Earth's Inner Core Is Running a Tad Faster Than the Rest of the Planet", ***Science***, 26 August 2005: Vol. 309,

no. 5739, p. 1313, http://www.sciencemag.org/content/309/5739/1313.1) ότι ο εσώτερος πυρήνας κινείται με μεγαλύτερη γωνιακή ταχύτητα από ό,τι ο πλανήτης -χρειάζεται δηλαδή λιγότερο από 24 ώρες για να ολοκληρώσει μια πλήρη περιστροφή.

Επιπλέον, υπάρχουν ενδείξεις ότι ο εξώτερος πυρήνας, ή τουλάχιστον το εξωτερικό στρώμα του, κινείται προς τη Δύση, αντίθετα από τον υπόλοιπο πλανήτη. Αυτό γίνεται αντιληπτό στην επιφάνεια ως μετατόπιση του μαγνητικού πεδίου προς τη Δύση, ένα φαινόμενο που είχε παρατηρήσει το 1692 ο Έντμουντ Χάλεϊ, ο οποίος ανακάλυψε επίσης τον ομώνυμο κομήτη.

Την εξήγηση για την ανάποδη κίνηση φαίνεται τώρα να προσφέρει μια νέα μελέτη (Philip W. Livermore, Rainer Hollerbach and Andrew Jackson "Electromagnetically driven westward drift and inner-core superrotation in Earth's core", Proceedings of the National Academy of Sciences of the United States of America, vol. 110, no. 38, http://www.pnas.org/content/early/2013/09/13/1307825110) που βασίστηκε σε προσομοιώσεις.

Οι ερευνητές χρησιμοποίησαν τον υπερυπολογιστή Monte Rosa στην Ελβετία για να τρέξουν ένα υπολογιστικό μοντέλο του πυρήνα με τα δύο του στρώματα. Όπως υποστηρίζουν, η ακρίβεια της προσομοίωσης ήταν 100 φορές μεγαλύτερη σε σχέση με άλλα μοντέλα.

Όπως αναφέρει ο Φίλιπ Λίβερμορ, πρώτος συγγραφέας της δημοσίευσης, η συμπεριφορές του εξώτερου και του εσώτερου πυρήνα «εξηγείται με όρους ίσης και αντίθετης δράσης».

Το μαγνητικό πεδίο που δημιουργεί ο εξώτερος πυρήνας «σπρώχνει τον εσώτερο πυρήνα προς τα ανατολικά, αναγκάζοντάς τον να περιστρέφεται ταχύτερα από τον υπόλοιπο πλανήτη. Ταυτόχρονα όμως σπρώχνει τον εξώτερο υγρό πυρήνα προς την αντίθετη κατεύθυνση, αναγκάζοντάς τον να περιστρέφεται προς τα δυτικά».

Εκτός όμως του ότι εξηγούν την ανάποδη κίνηση του εξώτερου πυρήνα, οι ερευνητές προχωρούν και σε μια πρόβλεψη: επισημαίνουν ότι το μαγνητικό πεδίο της Γης αλλάζει, έστω και με αργούς ρυθμούς, και οι μεταβολές αυτές μπορεί κάποια στιγμή να αλλάξουν τις δυνάμεις που επηρεάζουν την κίνηση του πυρήνα.

Αυτό σημαίνει ότι ο εξώτερος πυρήνας ενδέχεται να μην κινείται πάντα προς τη Δύση: όπως επισημαίνει η μελέτη, τα τελευταία 3.000 υπάρχουν ενδείξεις ότι υπήρχαν περίοδοι κατά τις οποίες ο πυρήνας περιστρεφόταν προς την Ανατολή.

(Βαγγέλης Πρατικάκης / Newsroom ΔΟΛ, 17 Σεπ. 2013, http://news.in.gr/science-technology/article/?aid=1231265439)

Pakistan earthquake creates new island, 'mud volcano' to blame

Mud houses in the mountains crumbled as a 7.7-magnitude earthquake shook western Pakistan early on Tuesday. Meanwhile, on the coast, residents of Gwadar saw a solitary island rise from the sea.

Older residents of the coastal town said the land emergence was déjà vu — an earthquake in 1968 produced an island that stayed for one year and then vanished, Ali Mohammad, 60, and Azeem Baloch, 57, told NBC News.

Seismologists suspect the island is a temporary formation resulting from a "mud volcano," a jet of mud, sand and water that gushed to the surface as the temblor churned and pressurized that slurry under the ocean floor.

"Sandy layers underground are shaken, and sand grains jiggle and become more compact," John Armbruster, a seismologist at the Lamont Doherty Earth Observatory at Columbia University told NBC News. The shifting sand layers are compacted and pressurize the water, which gushed upwards, carrying mud and sand along with it.

This "liquefaction" of sand and mud layers take place after any earthquake, but these sudden islands are usually spotted after strong earthquakes, at least 7- or 8-magnitude events. The distance of the island from the epicenter of the quake is "a little bit surprising," Armbruster said, granted that "the sediments are quite soft and susceptible to this."

Back in the 1940s, a sizable island rose from the sea in the area, but it didn't last long. After an earthquake near Karachi struck, the British Indian Geological survey recorded a new island "big enough that people could land a boat and walk on it," Armbruster said. "Within days, weeks" — he wasn't sure how long — "it washed away."

Researchers at the United States Geological Survey are investigating the new formation, Paul Earle, a USGS geo-physicist told NBC News, but have yet to get independent confirmation of it.

It is clear that "the islands are not created because the ground was ... pushed up by the earthquake," he said, but more likely it was a secondary effect of shifting sediments. He also agrees the formation appears to have been caused by a mud volcano, but added that they don't need an earthquake to set them off. There are "mud volcanoes in Yellowstone that have not been triggered by earthquakes," he said.

While mud volcanoes are typical of watery, loose sediments layers off the coast of Baluchistan, more substantial instant islands — or "land uprisings" — do suddenly appear in other parts of the world, Stephan Graham, a geologist at Stanford University told NBC News.

They're typically seen along fault lines where one tectonic plate slides under another, like the hungry subduction zone under New Zealand. Fault lines like the San Andreas, at which the Pacific Plate and the North American plates slide past each other sideways, are less likely to see such up-crops, Graham said.

It also takes a pretty sizable earthquake to push up an entirely new land feature. "You wouldn't expect to see it in a 3- or 4-magnitude [quake]," Graham said, it would take a stronger temblor of 7 or 8 magnitude to change the landscape.

(Nidhi Subbaraman / NBC News, 24 September 2013, http://www.nbcnews.com/science/pakistan-earthquake-creates-new-island-mud-volcano-blame-4B11248003)

(Οι φωτογραφίες από το in.gr)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Χρυσάφι κρύβει στα σπλάχνα της η Σαντορίνη!

Έλληνες επιστήμονες που ερεύνησαν τον πυθμένα του ηφαιστείου σε βάθος 500 μέτρων κάτω από την επιφάνεια της θάλασσας, διαπίστωσαν σπάνια φαινόμενα που όμοιά τους δεν έχουν παρατηρηθεί ξανά στον κόσμο.

Η Σαντορίνη δεν είναι απλώς ένας από τους δημοφιλέστερους προορισμούς της Μεσογείου λόγω της μοναδικής ομορφιάς της, αλλά φαίνεται ότι κρύβει στα σπλάχνα της κι άλλα μυστικά.

Ο λόγος για χρυσάφι και σπάνια μέταλλα σε ποσότητες που ουδέποτε έχουν καταγραφεί, τα οποία εντόπισαν -για πρώτη φορά- στο νησί Έλληνες επιστήμονες από το Πανεπιστήμιο Αθηνών και το Ελληνικό Κέντρο Θαλάσσιων Ερευνών που διεξήγαγαν έρευνες.

Σύμφωνα με «Τα Νέα», οι επιστήμονες ερεύνησαν τον πυθμένα του ηφαιστείου Κολούμπο σε βάθος 500 μέτρων κάτω από την επιφάνεια της θάλασσας, που βρίσκεται βορειοανατολικά του νησιού και βρήκαν μεταξύ άλλων χρυσάφι, αντιμόνιο, θάλλιο, άργυρο, αρσενικό, υδράργυρο, ψευδάργυρο αλλά και διοξείδιο του άνθρακα, μαζί με μικροοργανισμούς που φαίνεται να διαδραματίζουν καθοριστικό ρόλο στη δημιουργία των μετάλλων.

Αυτό που έκανε αρχικά μεγάλη εντύπωση στους ειδικούς ήταν ότι στον πυθμένα του ηφαιστείου, μέχρι και 10 μ. ψηλότερα από αυτόν, δεν υπήρχε ίχνος ζωής. «Οι αναλύσεις μας έδειξαν την ύπαρξη χρυσού σε περιεκτικότητα που εντυπωσιάζει. Η ανώτατη τιμή που μετρήσαμε ήταν 32 γραμμάρια στον τόνο και η μέση τιμή 9 - 10 γραμμάρια στον τόνο», είπε στα Νέα ο επικεφαλής της ερευνητικής ομάδας Στέφανος Κίλιας.

«Η μέγιστη περιεκτικότητα του δείγματος σε άργυρο ήταν 1.910 γραμμάρια στον τόνο. Ακόμα πιο εντυπωσιακή ήταν η συγκέντρωση του αντιμονίου, αυτού του στρατηγικής σημασίας μετάλλου. Το βρήκαμε σε μέγιστη περιεκτικότητα 22.400 γραμμάρια στον τόνο (πάνω από 2,2% κατά βάρος!) Πρόκειται για ποσότητα που ενδεχομένως να μην έχει καταγραφεί ποτέ άλλοτε στη διεθνή επιστημονική βιβλιογραφία», πρόσθεσε.

(kathimerini.gr, 2 Σεπτεμβρίου 2013, http://www.kathimerini.gr/4dcgi/_w_articles_kathremote_1_02/09/2013_516596)

Lost river guided early humans out of Africa

Ancient rivers, their remains now lying beneath the Sahara desert, once formed green corridors at the surface which our ancestors followed on their great trek out of Africa.

A climate model has given us an image of what the landscape would have looked like around 100,000 years ago, suggesting that early humans went west out of sub-Saharan Africa and followed a vast and fertile river system to the Mediterranean.

For decades, there has been speculation that three now-dry North African rivers once served as green pathways for our early ancestors (http://www.newscientist.com/article/dn14935-did-ancient-river-channels-guide-humans-out-of-africa.html#.UkbTldK8BYg). The waterways would have supported lush flora and fauna to supply early humans with food as they trekked across the continent to the Mediterranean and on to Eurasia.

"But no one has been able to work out how much water was in these rivers, when and where exactly they flowed, and how far they reached across the desert," says hydrologist Tom Coulthard of the University of Hull, UK.

Coulthard and his colleagues modelled the climate of the last interglacial period to see how the monsoon rains would have run down the trans-Saharan mountains' north face and flowed across the landscape. Even after accounting for ground absorption and evaporation, the model indicated that there was enough water to have carved green corridors through the desert.

The most promising of the three reconstructed rivers, says Coulthard's colleague Michael Rogerson, is the Irharhar, which flowed 800 kilometres due north to humid regions along the Algeria-Tunisia border.

Route to the coast

Intriguingly, it is the westernmost of the three systems, yet we know that humans eventually walked east out of Africa. Rogerson suggests that after reaching the end of the Irharhar, early humans may have taken advantage of marine resources and walked eastward along the North African coast, traversing the Nile delta before migrating into the Middle East.

"As they walked down the river, early humans would have had resources they could use immediately at the Irharhar's far end," he says. Any humans who followed the other two rivers would have been left stranded in inhospitable surroundings. "The other two rivers deliver you to the central parts of Libya, which we think were quite arid then."

Archaeological evidence is more concentrated to the west, says Rogerson, tallying with the idea that most humans would have followed the Irharhar. Classic stone tools like spearheads have been found in the surrounding area, raising the possibility that early humans settled along the river's banks.

Elena Garcea, an archaeologist at the University of Cassino, in Italy, who was not part of the study, told *New Scientist* she thought the model offered a new and clever way of distinguishing between existing theories of how our ancestors spread across the African conti-nent and eventually migrated beyond.

Journal reference: "Were Rivers Flowing across the Sahara During the Last Interglacial? Implications for Human Migration through Africa", Tom J. Coulthard, Jorge A. Ramirez, Nick Barton, Mike Rogerson and Tim Brücher, *PLoS One*, DOI:10.1371/journal.pone.0074834, http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0074834

(Alyssa A. Botelho / New Scientist, 16 September 2013, http://world.einnews.com/article/167942063/dzR5WT-XWCUS42DF?afid=777&utm_source=MailingList&utm_medium=email&utm_campaign=Breaking+News%3A+world476-Tuesday)

Το Μυστήριο του Κτιρίου 7 του Παγκόσμιου Κέντρου Εμπορίου

http://www.youtube.com/watch?v=aWLDiVGBk-c

Πρωτότυπο βίντεο: http://youtu.be/39OUJXR-mD0

http://www.youtube.com/watch?v=F6STybtscMk

Πρωτότυπο βίντεο: http://youtu.be/ZckAIjALPeY

Ορατές Εκρήξεις στους Δίδυμους Πύργους του Παγκόσμιου Κέντρου Εμπορίου

http://www.youtube.com/watch?feature=player_detailpage&v=_iGHO13vQEg

Πρωτότυπο βίντεο: http://youtu.be/cjfoXbyffso

http://www.prisonplanet.gr/conspiracy/24906-%CF%84%CE%BF-%CE%BC%CF%85%CF%83%CF%84%CE%AE%CF%81%CE%B9%CE%BF-%CF%84%CE%BF%CF%85-%CE%BA%CF%84%CE%B9%CF%81%CE%AF%CE%BF%CF%85-7-%CF%84%CE%BF%CF%85-%CF%80%CE%B1%CE%B3%CE%BA%CF%8C%CF%83%CE%BC%CE%B9%CE%BF%CF%85-%CE%BA%CE%AD%CE%BD%CF%84%CF%81%CE%BF%CF%85-%CE%B5%CE%BC%CF%80%CE%BF%CF%81%CE%AF%CE%BF%CF%85

Meet the world in Greece

Στην Ελλάδα μπορείτε να βρείτε όλον τον πλανήτη σε ένα μικρό πακέτο. Αυτό είναι το μήνυμα που περνάει η ευφάνταστη καμπάνια που ξεκίνησε ο φωτογράφος Άρης Καλογερόπουλος, χρησιμοποιώντας φωτογραφίες πολλών φωτογράφων από όλον τον κόσμο.

"Δεν χρειάζεται να πάτε στις Μπαχάμες για να βρείτε αυτές τις θάλασσες, ελάτε απλώς στην Ελλάδα" λέει στην λεζάντα και το αποδεικνύει με εικόνες.

Η καμπάνια ξεκίνησε στο Facebook με τον τίτλο Meet the world in Greece

https://www.facebook.com/MeetTheWorldInGreece

Παρθέτουμε, ενδεικτικά, κάποιες από αυτές:

Meet the World... in Greece!

National Geographic Rio-Antirrio Bridge in Greece

The Rio-Antirrio bridge, officially the Charilaos Trikoupis bridge after the statesman who first envisaged it, is the world's longest multi-span cable-stayed bridge. It crosses the Gulf of Corinth near Patras, linking the town of Rio on the Peloponnese to Antirrio on mainland Greece.

The 2,880 m (9,449 ft) long bridge (approximately 1.8 miles) dramatically improves access to and from the Peloponnese, which could previously be reached only by ferry or via the isthmus of Corinth in the east. Its width is 28 m (92 ft) — it has two vehicle lanes per direction, an emergency lane and a pedestrian walkway. Its five-span four-pylon cable-stayed portion of length 2,252 m (7,388 ft) is the world's second longest cable-stayed deck; only the deck of the Millau Viaduct in southern France is longer at 2,460 m (8,071 ft). However, as the latter is also supported by bearings at the pylons apart from cable stays, the Rio-Antirrio bridge deck might be considered the longest cable-stayed "suspended" deck.

http://www.youtube.com/watch?v=yBDjHARCu64

ΝΟΜΙΚΑ ΘΕΜΑΤΑ

Δεδομένου ότι πολλές εταιρείες και συνάδελφοι εργάζονται ήδη στο εξωτερικό, θεωρούμε χρήσιμη την παράθεση νομικών απόψεων της AGS σχετικά με ευθύνες των εταιρειών γεωμηχανικής στην άσκηση της δραστηριότητάς τους.

AGS Association of Geotechnical & Geoenvironmental Specialists

Need-to-know Legal Terms

Here are some brief definitions of common legal expressions that all ground engineering professionals need to know and understand. Please note that this list is by no means designed to be exhaustive:-

"Contract" or "Agreement"

This is a binding agreement with specific terms between two or more persons or entities in which there is a promise to do something in return for a valuable benefit (often payment). Contracts can be in writing or verbal.

"Subject to Contract"

Parties use this term in negotiations to avoid unintentionally creating a contract. Unless negotiations are clearly expressed to be "subject to contract", a contract may be formed at the point at which all the key terms are agreed.

"Without Prejudice"

This phrase is used to enable parties to make offers or concessions when attempting to settle disputes without dismissing or detracting from an existing right or claim. The communications cannot be relied on in court provided that they are, or form part of, genuine settlement negotiations.

NB: The phrase "Commercial In confidence" does not offer the same protection from disclosure. This phrase simply denotes that the document contains commercially sensitive information but such documents would still be disclosable in the event of litigation arising.

"Subject to Legal Privilege"

Legal professional privilege ("privilege") entitles a party to refuse to disclose certain confidential legal communications to third parties, including the courts, regulators and opponents in litigation. There are two main types of privilege:

(a) legal advice privilege which protects confidential communications between lawyers (including in-house lawyers) and their clients; and

(b) litigation privilege which protects confidential communications between a client and a third party (such as a witness for example) provided that communication was for the dominant purpose of obtaining legal advice, evidence or information in preparation for actual or prospective litigation.

"Reasonable Skill and Care"

Reasonable skill and care means that the services being provided must be carried out with the same level of professionalism that a reasonably competent provider of those services would have used.

"Best or Reasonable Endeavours"

These phrases are used in commercial contracts to describe the length that parties must go to achieve their contractual obligations. Endeavours (of any level) are less than an absolute obligation, such as "ensure" (see below). What is "reasonable" will depend on the circumstances of each situation, but unlike "best endeavours", reasonable endeavours will not require a party to act contrary to its own commercial interests.

"Ensure"

This word is given its ordinary dictionary meaning, i.e. to make certain that (something) will occur, or to make certain of obtaining or providing (something). The use of this word in commercial contracts is likely to give rise to an absolute obligation to achieve a particular outcome. Therefore if a party uses reasonable, or even its best endeavours but cannot achieve the required result, it will be in breach of contract. Liabilities arising out of such absolute contractual obligations are unlikely to be covered by professional indemnity insurance.

"To Indemnify"/"Provide an Indemnity"

A party to a contract can agree to indemnify another by promising to be responsible for any losses they may incur and/or to pay any claims that may arise against them under or in connection with the contract. Insurance companies indemnify their policyholders when making compensation to them for damage, loss or injury suffered.

"To Novate"/ "Novation"

Novation means replacing a party to a contact with a new party. If a contract between A and B is novated to C, the original contract is extinguished and is replaced by a new contract between A and C. All three parties have to consent in order for B's rights and obligations to be transferred to C. Novation is often used in design and build projects where the consultants' appointments will be novated from the developer to the main contractor.

"Time is of the essence"

Stating that time is of the essence in a commercial contract requires that relevant deadlines are strictly complied with. The party relying on that clause can terminate the agreement and, if appropriate, claim damages if the other party fails to perform the obligation in accordance with the date or time specified in the agreement.

"Limit of Liability"

A limit of liability clause permits contracting parties to reduce or eliminate the potential for damages should they be held liable for loss or damage arising out of a breach of contract. Such clauses often set a maximum sum for which that party may be held liable and/or limit liability to certain types of losses. Such clauses are subject to the test of reasonableness set out in the Unfair Contract Terms Act 1977.

Liabilities arising from Checking or Reviewing Third Party Designs and/or Information

Introduction

Geotechnical engineers are often commissioned to review and check the reports and designs of others including designs of investigations. In doing so they can find themselves liable or jointly liable for losses arising from any con-

struction defects arising from the implementation of those reports and designs. This document highlights some issues which Members should be aware of when taking on such commissions.

Definitions of "Check" and "Review"

How these words will be construed will depend upon the context in which they are used and/or the proper construction of the contract/appointment in which they are being used. No 'one size fits all' definition can be given.

It will always be necessary to understand what obligation the consultant's appointment imposes e.g. does it mean to examine in detail or check the assumptions upon which a design has been prepared, or merely to use reasonable skill and care to ensure that an existing design can be integrated with the consultant's designs? There may be wider issues such as whether the consultant is entitled to rely on documents obtained by the original designer or to what extent is the consultant required to reconsider steps already taken. Is the consultant obliged to verify any assumptions made by the original designer?

Examples of scenarios where professional liability may arise in respect of designs undertaken by a third party

1. Taking over work on a project (i.e. where the original designer has been dismissed).

   The consultant's appointment should make it clear as to what extent the consultant is required to check work already completed (as stated above). If possible, liability for work carried out by others should be excluded.

2. Relying on reports produced by others when preparing geotechnical design.

3. Integrating third party design with your design.

   In scenarios 2 and 3 the appointment should ideally contain an express exclusion of any responsibility for work carried out by others, as well as any liability for their errors or omission in that work.

4. An 'overview' responsibility e.g. to review a design produced by a third party to ensure its compliance with the Employer's Requirements. This includes reviewing and/ /or checking the designs, calculations, reports, advice or recommendations of a third party.

   The appointment should specify the services to be provided unambiguously and accurately.

5. A quantitative check to validate a design produced by a third party, which may be required on a 'sampling' basis (i.e.: only checking an agreed percentage when there is a repetitive nature to the calculations) or on a full check basis. Such quantitative checks may extend to a full redesign of the scheme using different methodologies/ /software than those used by the original design team in order to validate the design by comparison.

   Once again the precise scope of services must be specified unambiguously in the contract documents (see also the 'General Points' at the end of this document.)

6. Internal audit process

   This will not affect the apportionment of liability between designers but a strong audit process will help in the defence of allegations of negligence. The process should be robust enough to identify and correct issues. In larger client organisations the requirements and processes for reviews and checks are laid out in their standards. Consultants' own Quality Assurance systems should also define their checking and reviewing processes.

Apportionment of liability between original designer and "checker/reviewer"

In each case where errors in the original design have given rise to loss, and that design was checked or reviewed by another party, both the original designer and the checker/ /reviewer may be held responsible for the loss, depending upon what obligations each of them owed, and to whom.

The apportionment of liability will depend on the facts of each individual case. The court will first assess what services were to be provided and whether the checker/reviewer carried out his/her services with reasonable skill and care and/or to any higher standard of care required by their contract. If it considers there has been a breach, the court will assess whether the particular breach of duty in question was causative of the loss, or any part of the loss complained of. If the breaches by the designer and the checker/ /reviewer were causative of the same loss, generally the court will not carry out a precise mathematical apportionment in respect of the contribution of each but instead will make a percentage assessment, taking into account all the circumstances. The defendant primarily liable will bear the brunt of the contribution and the other defendant will bear the balance. If both breaches have been of equal efficacy, then a 50/50 contribution will be ordered.

The process of how a court assesses the relative liabilities of the parties is indicated in the case of *Parkman Consulting Engineers v Cumbrian Industrials Ltd, Nukem Nuclear Ltd* (heard in February 2000). In that case Nukem were employed:

- to evaluate from the documents supplied to Nukem the extent of the clean-up and containment problem within the landfill tip, then to review the proposed scheme for dealing with this problem (designed by Parkman) and determine whether it fully addressed the problems that were identified in those documents. In particular, Nukem was to advise whether the scheme had a reasonable chance of long term success in returning PCBs to the tip and containing them there;
- to report back as a matter of urgency – in days not weeks;
- to rely on documents supplied by Parkman; and
- not to retrace steps already taken.

It was accepted that these instructions required Nukem to check the principles on which the design of the scheme was based and whether Parkman had overlooked any fundamental principle in that design.

The judge found that Nukem breached its duties in a number of respects. It failed to consider a number of key assumptions made by Parkman and to notice some weaknesses in the scheme design. In assessing liability, the judge took into account the speed with which Nukem was asked to work and the pressure they were under, the warnings included in Nukem's report (regarding the need for careful supervision of contractors in relation to certain aspects of the work) and of the relatively limited information provided to Nukem.

The final apportionment of the loss was as follows:

- Original designers 40%
- Contractor 50%
- Nukem 10%

General Points

- The checking/reviewing services must be set out in detail in writing, preferably in a signed appointment document. What does the client want? What service will be provided for the fee charged? What assumptions are to be made regarding reliance on documents and information supplied? Ensure the limits of the services and of the liability are fully described. The terms 'review', 'check', 'overview' are not sufficient in themselves to adequately specify what is required.

- Ensure that the scope of the services provided and any assumptions made are clearly set out in the letters, reports or documents produced as part of the services. Be aware that you may need to verify those assumptions before construction, as demonstrated the *Mirant Asia v Ove Arup* case, described in AGS LPA 36).

- Appropriate limitations of liability in the consultant's appointment should be considered. Professional services fees for checker/reviewer roles are frequently lower than the designer's fees (with corresponding reduced timescales for given tasks). It is therefore entirely appropriate to reject back-to-back terms & conditions and, if possible, to limit liabilities to a multiplier of the fee. A net contribution clause can provide additional protection (particularly when checking/review tasks are undertaken on the basis of a narrow scope of work or check/review philosophy). For more information on limitations of liability, please refer to AGS Client Guide- Limitations of Liability in Contracts for Geotechnical Advice and Design 2012 (www.ags.org.uk/publications)

Client Guide to the use of Limitation of Liability Clauses in Consultants' Appointments

Introduction

When Clients appoint Consultants on a project they are entitled to expect that the Consultant will undertake their services to a particular standard of care. Further, if the Consultant falls below the requisite standard in the provision of the services and this causes the Client to suffer a loss, the Client may look to recover its losses from the Consultant.

As a result, many Clients are suspicious of requests by Consultants to cap or limit the level of their liability to the Client through an express clause in the appointment document. This Client Guide:

- clarifies some of the issues surrounding limit of liability clauses ("LL clauses");

- demonstrates that their inclusion in Consultants' appointments is fair and reasonable: and

- explains why these clauses are not a cause of detriment to a Client's position.

The Requisite Standard of Care

At common law, Consultants owe their Clients a duty to exercise reasonable skill and care in the provision of their services. They do not usually have any fitness for purpose obligations.

In most cases Consultants will seek to mirror this standard of care in their contractual obligations to the Client (albeit with confirmation that they have the expertise required for the project in question). Therefore the appointment will often include an express clause similar to the following,

"The Consultant shall exercise the skill, care and diligence to be expected of a properly qualified consultant engineer experienced in carrying out the work of a similar size, scope and complexity to the project".

One of the major reasons Consultants are very reluctant to agree to a more onerous standard is because their Professional Indemnity ("PI") insurance usually only indemnifies them for claims arising from a failure to exercise reasonable skill and care. For example, PI insurance will not respond to a claim that the Consultant has breached a fitness for purpose obligation.

Therefore, regardless of whether they are pursuing the Consultant for breach of contract and/or negligence, a Client will usually be alleging that the Consultant has failed by act or omission to exercise reasonable skill and care. The Consultant will then rely upon their PI insurance to respond to the claim.

Limit of Liability ("LL") clauses

LL clauses are intended to ensure that Consultants do not face unlimited financial exposure to claims by Clients. It is both reasonable and appropriate to include them in appointments for the following reasons:

1. LL clauses can, and should, be set at a reasonable level, which is reached through a consideration of a number of factors. These include: the nature of the risks of the project in question; the likely losses should things go wrong; the Consultant's role on the project; the fees charged for the Consultant's services; and the resources available to the Consultant to meet any liability to the Client.

   For example, if a Consultant is appointed to undertake a limited design role for a small fee even on a large project, it would be disproportionate to expose that consultant to unlimited liability. Agreeing a reasonable LL clause, which considers all the factors referred to above would be more appropriate.

2. LL clauses are regulated by statute and such clauses must satisfy the test of reasonableness to be enforceable. In addition, Consultants can never exclude their liability for death or personal injury resulting from their negligence.

3. Even if a Client insists on unlimited liability in the appointment, in practice this is unlikely to be of any real benefit to them. This is because, in reality, the amount a Client can recover from a Consultant is often limited to the level of indemnity provided by the Consultant's PI insurance. Many Consultants will simply not have the financial resources to meet a claim above their PI insurance. The Client's only recourse would be to institute insolvency proceedings against the Consultant, with no guarantee there will be sufficient assets on the winding up to satisfy the balance of the losses. Consequently, requiring the Consultant to accept unlimited liability provides only an illusion of security.

4. It is not possible to obtain PI cover for unlimited liability. In the event that a Client insists on a very high level of liability the Consultant will seek to procure increased PI insurance. If this is available the premium payable will be significantly higher, and this cost will ultimately have to be passed on to the Client in the form of increased costs for the Consultant's services.

5. Standard form appointments for Consultants commonly either contain an express LL clause requiring a figure to be agreed as discussed at paragraph (1) above, or capping liability at a multiple of the fees payable to the Consultant (for example, the ACE Agreement 1:2009 Edition uses a multiplier of ten).

Conclusion

For all these reasons, LL clauses are an appropriate contractual mechanism for ensuring a reasonable allocation of risk between Clients and Consultants. The AGS considers that this balanced approach is vital to the health and long term viability of the construction industry.

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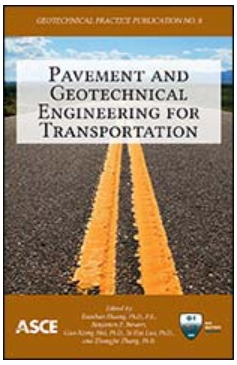
ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Pavement and Geotechnical Engineering for Transportation

Edited by B. Huang, B. Bowers, G.-X. Mei, S.-H. Luo and Z. Zhang

Geotechnical Practice Publications (GPP) GPP 8

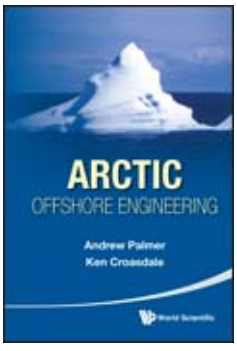
Selected papers from the First International Symposium on Pavement and Geotechnical Engineering for Transportation Infrastructure held in Nanchang, China, June 5-7, 2011. Sponsored by the Nanchang Hangkong University and the International Association of Chinese Infrastructure Professionals (IACIP) in cooperation with the Geo-Institute of ASCE.

Pavement and Geotechnical Engineering for Transportation contains 20 papers that represent the latest developments in the application of soil, rock, and paving materials to the study and application of geomechanics and transportation geotechnology.

Topics include pavement structure and subgrade preparation such as: the use of chemical additives and geogrid reinforcement; performance assessment of concrete and asphalt mixtures; mathematical models for the simulation of geotechnical problems; and evaluation of soil types in relation to slope failure, consolidation, and embankment behavior.

This Geotechnical Practice Publication focuses on the application of geomechanics in transportation and will be of interest to both geotechnical engineers and transportation professionals.

(ASCE, 2013)



Arctic Offshore Engineering

Andrew Palmer and Ken Croasdale

There is an increasing need to construct engineering structures in the Arctic seas. The requirement is principally generated by the oil and gas industry, because of the substantial reserves that are known to exist offshore in the Beaufort Sea, the Caspian Sea, the Barents Sea, the Pacific Ocean off the coast of Sakhalin, the Canadian Arctic, and almost certainly elsewhere. Structures have to withstand the severe environmental forces generated by sea ice, a subject that is developing rapidly but is still far from completely understood. Underwater pipelines have to be safe against ice gouging and strudel scour, but also have to be constructed safely and economically. The social and human environment has to be understood and respected.

This important book intentionally takes a broad view, and vividly accounts for the many and often subtle interactions between the different factors. It is illustrated by case studies of actual projects.

(World Scientific, December 2012)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ ΜΕ ΑΝΟΙΚΤΟ ΠΕΡΙΕΧΟΜΕΝΟ

το μέλος της ΕΕΕΕΓΜ Παύλος Τυρολόγου μας ενημέρωσε για τα παρακάτω ηλεκτρονικά περιοδικά με ανοικτό περιεχόμενο:

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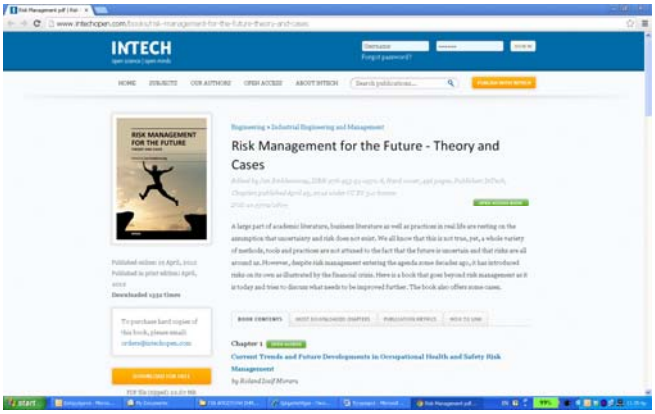

Novel Approaches and Their Applications in Risk Assessment

http://www.intechopen.com/books/novel-approaches-and-their-applications-in-risk-assessment

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

No. 23 - September 2013
http://www.isrm.net/adm/newsletter/ver_html.php?id_newsletter=89&ver=1#newsrelease

Κυκλοφόρησε το Τεύχος 23 / Σεπτέμβριος 2013 του Newsletter της International Society for Rock Mechanics. Περιεχόμενα:

- Dr. Eda Quadros elected as ISRM President for the term 2015-2019
- News Release of the Council Meeting at Wroklaw, Poland
- The second group of Fellows of the ISRM was inducted in Wroclaw, Poland
- The 4th ISRM Online Lecture will be given by Prof. Eduardo Alonso on 12 December 2013
- Dr. Samintha Perera won the 2014 Rocha Medal
- Eurock 2014 - Vigo, Spain: an update
- Hungary, Tunisia and Vietnam joined the ISRM
- ARMS8 2014 ISRM International Symposium, Sapporo, Japan, 14-16 October 2014
- Don Banks passed away
- ISRM Rocha Medal 2015 - nominations to be received by 31 December 2013
- ISRM sponsored meetings

www.geoengineer.org

Κυκλοφόρησε το εορταστικό Τεύχος #104 του **Newsletter του Geoengineer.org** (Σεπτέμβριος 2013) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωμηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).

Geotextiles & Geomembranes

www.geosyntheticssociety.org/journals.htm

Κυκλοφόρησαν οι τόμοι 39, 40 και 41 (Σεπτεμβρίου, Οκτωβρίου και Νοεμβρίου 2013) με τα παρακάτω περιεχόμενα:

Σεπτεμβρίου 2013

Editorial Board/Aims & Scope

"Thermal conductivity of geosynthetics", Rao Martand Singh, Abdelmalek Bouazza, Pages 1-8

"Behaviour of a geogrid reinforced wall built with recycled construction and demolition waste backfill on a collapsible foundation", Eder C.G. Santos, Ennio M. Palmeira, Richard J. Bathurst, Pages 9-19

"The lateral displacement response of geogrid-reinforced ballast under cyclic loading", Buddhima Indraratna, Syed Khaja Karimullah Hussaini, J.S. Vinod, Pages 20-29

"Performance evaluation of two silt fence geotextiles using a tilting test-bed with simulated rainfall", Ikiensinma Gogo-Abite, Manoj Chopra, Pages 30-38

"Experimental and numerical investigation of the response of geocell-reinforced walls to horizontal localized impact", Maxime Soudé, Bastien Chevalier, Michel Grédiac, Aurélie Talon, Roland Gourvès, Pages 39-50

"Numerical analysis of geocell-reinforced retaining structures", Rong-Her Chen, Chang-Ping Wu, Feng-Chi Huang, Che-Wei Shen, Pages 51-62

"Laboratory investigation of GCL performance for covering arsenic contaminated mine wastes", R. Kerry Rowe, M.S. Hosney, Pages 63-77

"An analytical model for arching in piled embankments", S.J.M. van Eekelen, A. Bezuijen, A.F. van Tol, Pages 78-102

Οκτωβρίου 2013

"Permeation of two GCLs with an acidic metal-rich synthetic leachate", Francesco Mazzieri, Gemmina Di Emidio, Evelina Fratalocchi, Marta Di Sante, Erio Pasqualini, Pages 1-11

"Physical modelling of nonwoven/nonwoven GCL shrinkage under simulated field conditions", R. Kerry Rowe, M.T. Rayhani, W.A. Take, G. Siemens, R.W.I. Brachman, Pages 12-19

"A data base, statistics and recommendations regarding 171 failed geosynthetic reinforced mechanically stabilized earth (MSE) walls", Robert M. Koerner, George R. Koerner, Pages 20-27

"Evaluation of the effects of facing stiffness and toe resistance on the behavior of GRS walls", M. Ehrlich, S.H. Mirmoradi, Pages 28-36

"Effect of underliner on geomembrane strains in heap leach applications", R. Kerry Rowe, R.W.I. Brachman, H. Irfan, M.E. Smith, R. Thiel, Pages 37-47

"Analysis of soil-welded steel mesh reinforcement interface interaction by pull-out tests", S.H. Lajevardi, D. Dias, J. Racinais, Pages 48-57

"Calculating local geomembrane indentation strains from measured radial and vertical displacements", R.W.I. Brachman, M.K. Eastman, Pages 58-68

"Buried high-density polyethylene pipe deflections at elevated temperatures", R.P. Krushelnitzky, R.W.I. Brachman, Pages 69-77

Νοεμβρίου 2013 (σε εξέλιξη)

"Limit equilibrium analyses of geosynthetic-reinforced two-tiered walls: Calibration from centrifuge tests", Suliman B.A. Mohamed, Kuo-Hsin Yang, Wen-Yi Hung, Pages 1-16

"Comparison of the adhesion and shear tensile strength of needle-punched GCLs", Belén M. Bacas, Elena Blanco-Fernandez, Jorge Cañizal, Pages 17-25

"Improved performance of soft clay foundations using stone columns and geocell-sand mattress", Sujit Kumar Dash, Mukul Chandra Bora, Pages 26-35.

Πρόσβαση μέσω τις ιστοσελίδας:
http://www.sciencedirect.com/science/journal/02661144

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2012 – 2015)

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