ΛΙΒΥΗ

ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

30

Αρ. 30 – ΙΟΥΝΙΟΣ 2010

SIMSG ISSMGE

ΠΡΩΤΟΦΑΝΕΣ!!!

Σεισμολόγοι κατηγορούνται για ανθρωποκτονία για την μη ενημέρωση του πληθυσμού λίγο πριν από τον σεισμό της l'Aquila

Το Istituto Nazionale di Geofisica e Vulcanologia - *Sezione di Milano-Pavia* κυκλοφόρησε την παρακάτω ανακοίνωση – πρόσκληση:

Dear colleagues and friends,

Two weeks ago the L'Aquila Prosecutor's office indicted of manslaughter the members of the National High Risk Committee that met in L'Aquila one week before the Mw6.3 earthquake.

The charges are for failing to provide a short term alarm to the population before the earthquake struck, killing more than 300 people.

The president of INGV, Enzo Boschi (member of the High Risk Committee), and the director of the National Earthquake Center, Giulio Selvaggi (just accompanying Boschi to the meeting as technical specialist), are among the scientists in seismology and earthquake engineering now under investigation together with some civil protection officials.

We think that the allegations against the scientists are completely unfounded and we look for support on this from the international scientific community working on earthquakes and in the Earth sciences in general.

We invite you to sign the letter addressed to the President of the Italian Republic, published at the web page www.mi.ingv.it/open_letter/.

(συνέχεια στην σελίδα 4)

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

Η γεωτεχνική οικογένεια αυξάνεται… Στον Δημήτρη Ζέκκο, Assistant Professor στο University of Michigan, Ann Arbor και Managing Director του Geoengineer.org και στην Άντα Αθανασοπούλου, επίσης Assistant Professor στο University of Michigan, Ann Arbor και κόρη του Καθηγητού Εδαφομηχανικής της Πολυτεχνικής Σχολής του Πανεπιστημίου Πα-

τρών Γιώργου Αθανασόπουλου, προστέθηκε στις 25 Μαΐου ο μικρός Παύλος. Να τους ζήση!

6ο Πανελλήνιο Συνέδριο Γεωτεχνικής και Γεωπεριβαλλοντικής Μηχανικής
29 Σεπτεμβρίου – 1 Οκτωβρίου 2010, Βόλος
http://portal.tee.gr/portal/page/portal/INTER_RELATIONS/INT_REL_P/SYNEDRIA_EKDHLWSEIS/2010/6thGeotechnic

Το Τεχνικό Επιμελητήριο Ελλάδας και η Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής διοργανώνουν το 6ο Πανελλήνιο Συνέδριο Γεωτεχνικής και Γεωπεριβαλλοντικής Μηχανικής.

Στόχος του Συνεδρίου είναι να καταγράψη τις προόδους της γεωτεχνικής και γεωπεριβαλλοντικής μηχανικής στην Ελλάδα του 21ου αιώνα κυρίως όπως αντικατοπτρίζονται στα σημαντικά γεωτεχνικά έργα που έχουν μελετηθή και κατασκευασθή ή κατασκευάζονται, όπως επίσης και σε άλλα έργα (σιδηροδρομικά, οδικά, λιμενικά, υδραυλικά, κτιριακά, περιβαλλοντικά) με σημαντικό γεωτεχνικό αντικείμενο.

Επιδίωξη είναι οι εργασίες του Συνεδρίου να αναδείξουν πρωτότυπα στοιχεία συμβολής της γεωτεχνικής και γεωπεριβαλλοντικής μηχανικής αλλά και να προβάλουν θεωρητικές και πειραματικές έρευνες σε εδαφικά, βραχώδη και ημιβραχώδη υλικά που βρήκαν ή μπορούν να βρουν εφαρμογή στην πράξη.

Χρόνος και Τόπος διεξαγωγής

Το 6ο Πανελλήνιο Συνέδριο θα διεξαχθή στο Βόλο από 29 Σεπτεμβρίου έως 1 Οκτωβρίου του 2010 στο συνεδριακό κέντρο «PALAIA- Πολυχώρος Τσαλαπάτα».

Θέματα του Συνεδρίου

Οι εργασίες του Συνεδρίου θα αρθρωθούν γύρω από τρεις βασικούς κύκλους θεμάτων. Ο ένας κύκλος θα περιλαμβάνη θέματα θεωρίας, έρευνας και πειράματος, ως προς τη συμπεριφορά των γεωυλικών, εδαφικών, ημιβραχωδών και βραχωδών (συμπεριφορά γεωυλικών, έρευνες υπαίθρου και εργαστηρίου, εδαφοδυναμική, γεωτεχνική σεισμική μηχανική, έδαφος και περιβάλλον). Ο δεύτερος κύκλος θα περιλαμβάνη θέματα που αφορούν θεωρητικά ή πρακτικά στα γεωτεχνικά έργα, δηλαδή έργα της αποκλειστικής ή κύριας αρμοδιότητας του γεωτεχνικού μηχανικού όπως πρανή, κατολισθήσεις, βελτιώσεις, ενισχύσεις, ειδικές γεωτεχνικές κατασκευές. Τέλος ο τρίτος κύκλος θα περιλαμβάνη γεωτεχνικά θέματα που αφορούν θεωρητικά ή πρακτικά σε έργα στα οποία συμβάλλουν περισσότερες ειδικότητες μηχανικών όπως θεμελιώσεις, βαθιές εκσκαφές και αντιστηρίξεις, σήραγγες και υπόγεια έργα, οδοστρώματα, επιχώματα, φράγματα, λιμνοδεξαμενές, περιβαλλοντικά έργα, μικροζωνικές. Επίσης θα εξετασθούν γεωτεχνικά προβλήματα της Μαγνησίας. Πιο συγκεκριμένα, τα επί μέρους θέματα του συνεδρίου θα είναι τα ακόλουθα:

- Βαθειές Εκσκαφές - Αντιστηρίξεις
- Βαθειές - Επιφανειακές θεμελιώσεις
- Βελτιώσεις Εδαφών
- Βραχομηχανική
- Γεωπεριβαλλοντικά Θέματα
- Γεωτεχνικά Προβλήματα Μαγνησίας
- Εδαφοδυναμική - Αλληλεπίδραση
- Εδαφοδυναμική - Ιδιότητες
- Εδαφοδυναμική - Σεισμικότητα
- Ενισχύσεις - Γεωσυνθετικά
- Επιχώματα (άοπλα και οπλισμένα)
- Θεμελίωση Γεφυρών
- Κατολισθήσεις
- Πολιτιστική Κληρονομιά και Γεωτεχνικά
- Πρανή
- Σήραγγες
- Συμπεριφορά Εδαφών
- Συμπεριφορά Εδαφών - Έρευνα Υπαίθρου και Εργαστηρίου
- Συμπεριφορά Εδαφών - Προσομοιώματα
- Φράγματα - Λιμνοδεξαμενές

ΠΡΩΤΟΦΑΝΕΣ!!!

(συνέχεια από την πρώτη σελίδα)

We also would be glad if you could extend this invitation to other seismologists that can possibly share our initiative.

We hope that by this action we can increase the awareness of people on earthquake risk reduction through education, preparedness, and a long term program of building reinforcement.

Thank you in advance for your support

Daniela Pantosti
Alberto Michelini
Alessandro Amato
Massimo Cocco
Ingrid Hunstad
Warner Marzocchi
Claudio Chiarabba
Massimiliano Stucchi

Open letter to the President of the Republic of Italy

Two weeks ago in Italy, the L'Aquila Prosecutor's office indicted scientists, some of them members of the "Commissione Grandi Rischi" (Commission for High Risks), and civil protection officials for manslaughter. The basis for the indictment is that these people did not provide a short-term alarm to the population after a meeting of the Commission held in L'Aquila six days before the Mw 6.3 earthquake that struck that city and the surrounding area.

The allegations against the scientists are completely unfounded. Years of research worldwide have shown that there is currently no scientifically accepted method for short-term earthquake prediction that can reliably be used by Civil Protection authorities for rapid and effective emergency actions.

The international seismological community has long recognized that the best approach to defending populations from catastrophic earthquakes is not through earthquake prediction, but through risk mitigation and the application of appropriate safety measures to prevent buildings from collapsing. In this regard, the development of seismic hazard maps, which provide estimates of the probability of occurrence of predefined values of peak ground motion in a given time period, provide the specifications required by building codes to avoid collapse of buildings and the resulting fatalities.

Italy is an earthquake-prone country. An improved seismic hazard map that summarizes decades of research on earthquake occurrence and effects was completed in 2004 (see http://zonesismiche.mi.ingv.it/). It is the result of the work of many scientists, it is considered to be one of the best seismic hazard maps in Europe, and it has been used as a basis for the Italian building code beginning in 2008 ("Norme Tecniche per le Costruzioni", GU n.29 del 04/02/2008). It should be viewed as the primary contribution of the Italian earthquake scientists to their Country.

Seismic hazard maps must also be used for conveying to the population the basic concepts of earthquake hazard, awareness, preparedness, and response. Increased consciousness of the earthquake hazard and associated risk should also foster further prevention actions by national and local authorities. Overall, earthquake preparedness and damage prevention in the form of retrofitting are not only possible but mandatory in a country affected for the most by moderate size earthquakes that often result in catastrophes for the society because of the large percentage of seismically unreinforced buildings.

Education, awareness, preparedness and retrofitting are the best tools for mitigating the impact of the catastrophic earthquakes that will inevitably affect Italy in the future.

The scientific community involved in earthquake science urges the Italian government, local authorities and decision makers in general, to be proactive in establishing and carrying out local and national programs to support earthquake preparedness and risk mitigation rather than prosecuting scientists for failing to do something they cannot do yet - predict earthquakes.

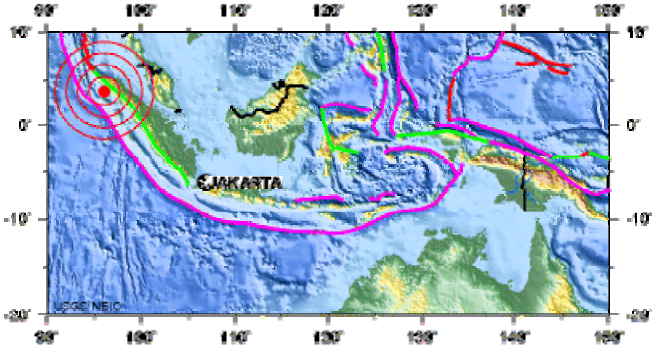
The damaged Santa Maria Church in the town of Paganica

ΟΙ ΙΣΧΥΡΟΙ ΣΕΙΣΜΟΙ ΣΥΝΕΧΙΖΟΝΤΑΙ

Ο σεισμός στην Βόρεια Sumatra, Ινδονησία της 9ης Μαΐου 2010

Earthquake Details (από USGS)

Magnitude	**7.2**
Date-Time	• **Sunday, May 09, 2010 at 05:59:42 UTC** • Sunday, May 09, 2010 at 12:59:42 PM at epicenter
Location	3.747°N, 96.013°E
Depth	45 km (28.0 miles) set by location program
Region	NORTHERN SUMATRA, INDONESIA
Distances	200 km (125 miles) SW of **Lhokseumawe, Sumatra, Indonesia** 215 km (135 miles) SSE of **Banda Aceh, Sumatra, Indonesia** 630 km (395 miles) W of **KUALA LUMPUR, Malaysia** 1620 km (1010 miles) NW of **JAKARTA, Java, Indonesia**
Source	USGS NEIC (WDCS-D)



Felt Reports

Reports of slight damage and a power outage on Simeulue island. Felt (V) at Banda Aceh and Meulaboh; (IV) at Medan, Nias and Padang and (III) at Riau and Sibolga. Felt (III) at Alor Setar, Ayer Itam and Tanjong Bunga; (II) at Bukit Mertajam, Butterworth, Gelugor, Georgetown, Kuala Lumpur, Nibong Tebal and Tanjong Tokong, Malaysia. Felt (II) in Singapore. Felt (III) at Phuket, Thailand.

Tectonic Summary

The northern Sumatra earthquake of May 9, 2010 occurred as a result of thrust faulting on or near the subduction interface plate boundary between the Australia-India and Sunda plates. At the location of this earthquake, the Australia and India Plates move north-northeast with respect to the Sunda plate at a velocity of approximately 60-65 mm/yr. On the basis of the currently available fault mechanism information and earthquake depth, it is likely that this earthquake occurred along the plate interface.

The subduction zone surrounding the immediate region of this event slipped during the devastating Mw 9.1 earthquake of December 2004, and today's event appears to have occurred within the rupture zone of that earthquake. Today's earthquake is the latest in a sequence of large ruptures along the Sunda megathrust, including a M 7.8 in April of this year, approximately 200 km to the south of today's event; two M 7.4 earthquakes beneath Simeulue approximately 100 km to the south in 2002 and 2008; a M 8.6 210 km to the south in 2005; a M 7.5 650 km to the south near Padang in 2009; and two events of M8.5 and M7.9 approximately 1000 km to the south in 2007.

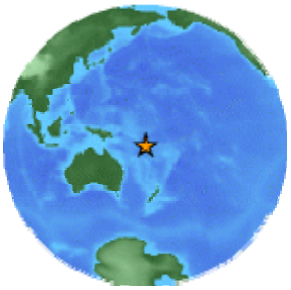
Σεισμός στο Vanuatu (Νέες Εβρίδες) στον Ειρηνικό Ωκεανό στις 27 Μαΐου 2010

Earthquake Details (από USGS)

Magnitude	**7.1**
Date-Time	• **Thursday, May 27, 2010 at 17:14:48 UTC** • Friday, May 28, 2010 at 04:14:48 AM at epicenter
Location	13.710°S, 166.507°E
Depth	36.1 km (22.4 miles)
Region	VANUATU
Distances	215 km (135 miles) NNW of **Luganville, Espiritu Santo, Vanuatu** 335 km (210 miles) SSE of **Lata, Santa Cruz Islands, Solomon Isl.** 485 km (300 miles) NNW of **PORT-VILA, Efate, Vanuatu** 2085 km (1290 miles) NE of **BRISBANE, Queensland, Australia**
Source	USGS NEIC (WDCS-D)

Tectonic Summary

The Vanuatu earthquake of May 27, 2010 occurred on or near the plate boundary between the Australia and Pacific plates in the Coral Sea region of the southwest Pacific. In the region of the earthquake, the Australia plate moves to the east-northeast with respect to the Pacific plate at a velocity of approximately 91 mm/year. The Australia plate thrusts under the Pacific plate at the New Hebrides trench and dips to the east-northeast. The May 27 earthquake's location, depth, and focal mechanism are consistent with the earthquake having occurred as thrust faulting associated with subduction along the Australia-Pacific plate boundary.



This earthquake occurred between 70-130 km to the north of a sequence of large subduction thrust earthquakes in October of 2009. On October 7th, two earthquakes of M 7.7 and M 7.8 occurred 15 minutes apart. After these events, an M 7.4 aftershock struck approximately one hour later, and two M 6.6 and M 6.8 aftershocks occurred on the following day.

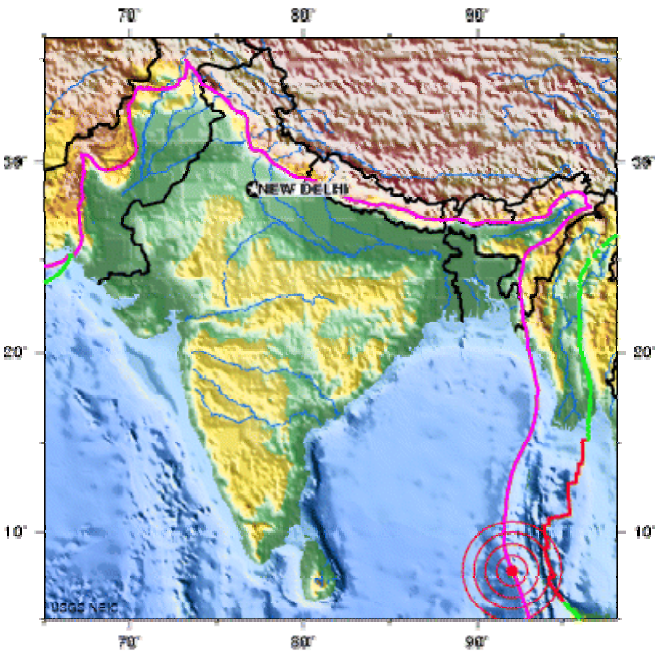
The Vanuatu region experiences a very high level of earthquake activity, with almost 50 events of magnitude 7 and larger having been recorded since 1973. The sub-ducting

Australia plate is seismically active to depths of about 350 km beneath the islands.

Νησιά NICOBAR, Ινδία, 12 Ιουνίου 2010

Earthquake Details (από USGS)

Magnitude	**7.5**
Date-Time	• **Saturday, June 12, 2010 at 19:26:50 UTC** • Sunday, June 13, 2010 at 01:26:50 AM at epicenter
Location	7.748°N, 91.938°E
Depth	35 km (21.7 miles) set by location program
Region	NICOBAR ISLANDS, INDIA REGION
Distances	155 km (95 miles) W of **Mohean, Nicobar Islands, India** 440 km (275 miles) SSW of **Port Blair, Andaman Islands, India** 1155 km (710 miles) SW of **BANGKOK, Thailand** 2775 km (1720 miles) SE of **NEW DELHI, Delhi, India**
Source	USGS NEIC (WDCS-D)



NICOBAR ISLANDS, INDIA REGION

2010 06 12 19:26:50 UTC 7.75N 91.84E Depth: 35.0 km, Magnitude: 7.5

Earthquake Location

Tectonic Summary

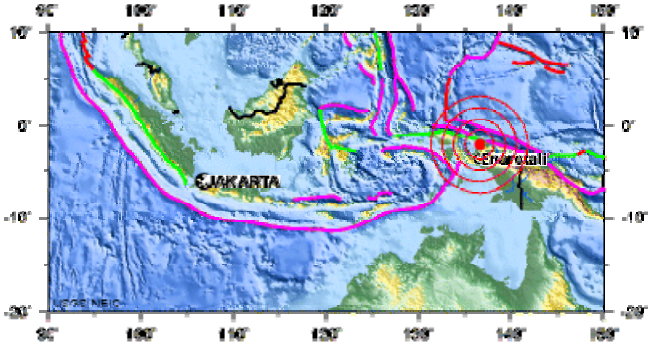
The Nicobar Islands region earthquake of June 12, 2010 occurred as a result of oblique-reverse faulting in close proximity to the oceanic trench defining the bathymetric expression of the plate boundary between the Australia-India and Sunda plates. At the location of this earthquake, the Australia and India Plates move northwards with respect to the Sunda plate at a velocity of approximately 45-50 mm/yr. On the basis of the currently available fault mechanism information, earthquake location and depth, it is likely that this earthquake occurred within the Australia-India oceanic plate, rather than on the interplate thrust boundary.

Today's earthquake was located adjacent to the 1300 km long rupture area of the devastating Mw 9.1 earthquake of December 2004, approximately 650 km to the north west of the hypocenter of that event, in a region of the Australia-India plate that has experienced a broad variety of faulting mechanisms in the past.

Σεισμός στην Βόρεια Ακτή της Papua, Ινδονησία της 16ης Ιουνίου 2010

Earthquake Details (από USGS)

Magnitude	**7.0**
Date-Time	• **Wednesday, June 16, 2010 at 03:16:29 UTC** • Wednesday, June 16, 2010 at 12:16:29 PM at epicenter
Location	2.141°S, 136.460°E
Depth	28.8 km (17.9 miles)
Region	NEAR THE NORTH COAST OF PAPUA, INDONESIA
Distances	195 km (125 miles) N of **Enarotali, Papua, Indonesia** 300 km (185 miles) ESE of **Manokwari, Papua, Indonesia** 1305 km (810 miles) NNE of **DARWIN, Northern Territory, Australia** 3315 km (2060 miles) E of **JAKARTA, Java, Indonesia**
Source	USGS NEIC (WDCS-D)



NEAR N COAST OF PAPUA, INDONESIA

2010 06 16 03:16:29 UTC 2.14S 136.46E Depth: 28.8 km, Magnitude: 7.0

Earthquake Location

Felt Reports

Seventeen people killed, at least 4,600 displaced, 2,556 buildings damaged or destroyed (VI), landslides and utilities disrupted on Yapen. Several buildings damaged or destroyed (VI) on Biak. Felt (V) at Nabire and (IV) at Manokwari, Papua. Also felt at Aberpura.

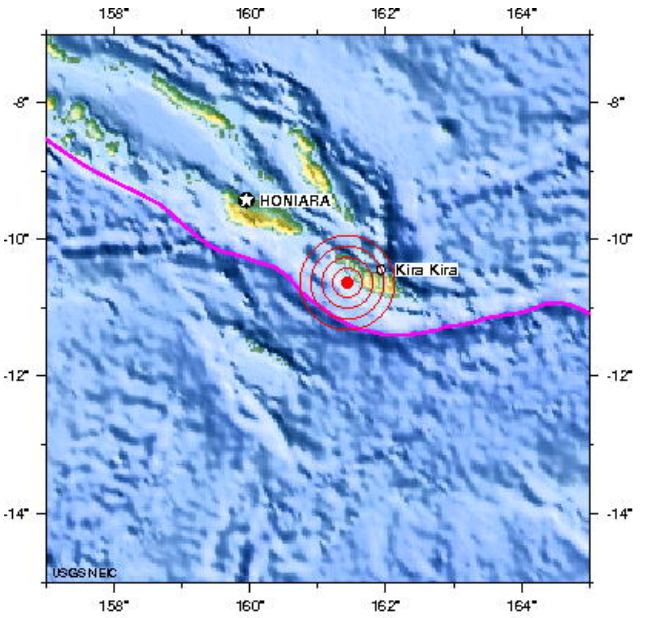
Tectonic Summary

The magnitude 7.0 Papua, Indonesia earthquake of June 16, 2010, 03:16 UTC, occurred as a result of strike-slip faulting. The causative fault has not yet been identified, though the radiation pattern of seismic waves generated by the earthquake is consistent with either left-lateral faulting

on an east-northeast striking fault or right-lateral faulting on a north-northwest striking fault.

Eastern Indonesia is characterized by complex tectonics in which motions of numerous small plates are accommodating large-scale convergence between the Australia, Pacific, and Eurasia plates. The earthquake lies near the boundary between what some workers term the Birds Head microplate and the Maoke microplate. This microplate boundary has been modeled as an east-northeast trending boundary that accommodates approximately 80 mm/year left-lateral motion. The focal mechanism of today's earthquake is consistent with it occurring within the proposed microplate boundary, either as left-lateral slip on a boundary-parallel fault or as right-lateral slip on a conjugate fault that is tectonically related to the microplate boundary. In light of large uncertainty in tectonic modeling of eastern Indonesia, however, any particular hypothesis for the causative fault of the earthquake must be regarded as tentative pending further study.

Eastern Indonesia experiences many strong earthquakes. Since 1979, the region within 300 km of the main-shock of June 16, 2010, has experienced eight other earthquakes with magnitude larger than 7, the largest of which had magnitude 8.2.



SOLOMON ISLANDS
2010 06 26 05:30:19 UTC 10.64S 161.44E Depth: 35.0 km, Magnitude: 6.7
Earthquake Location

Σεισμός στα Νησιά Σολομώντος της 26ης Ιουνίου 2010

Earthquake Details (από USGS)

Magnitude	**6.7**
Date-Time	• **Saturday, June 26, 2010 at 05:30:19 UTC** • Saturday, June 26, 2010 at 04:30:19 PM at epicenter
Location	10.636°S, 161.443°E
Depth	35 km (21.7 miles) set by location program
Region	SOLOMON ISLANDS
Distances	55 km (35 miles) WSW of **Kira Kira, San Cristobal, Solomon Isl.** 210 km (130 miles) SE of **HONIARA, Guadalcanal, Solomon Islands** 220 km (140 miles) SSE of **Auki, Malaita, Solomon Islands** 2070 km (1280 miles) NNE of **BRISBANE, Queensland, Australia**
Source	USGS NEIC (WDCS-D)

ΘΕΣΕΙΣ

Απαιτούμενα μέτρα αντισεισμικής προστασίας

Του Β. Κ. Παπαζάχου*

Κατά τις τελευταίες τρεις δεκαετίες ελήφθησαν μέτρα, τα οποία βελτίωσαν σημαντικά την αντισεισμική προστασία της χώρας μας. Το πιο σημαντικό από τα μέτρα αυτά είναι η θεσμοθέτηση νέων αποτελεσματικότερων αντισεισμικών κανονισμών, ο πρώτος από τους οποίους άρχισε να εφαρμόζεται το 1984. Συμβαίνει, όμως, οι κατοικούμενες παλαιότερες οικοδομές, δηλαδή αυτές των οποίων η κατασκευή δεν σχεδιάσθηκε με σύγχρονο αντισεισμικό κανονισμό, να αποτελούν την πλειονότητα (80%) του συνολικού αριθμού των οικοδομών που κατοικούνται. Για τον λόγο αυτό, ο έλεγχος και η προσεισμική ενίσχυση των παλαιότερων οικοδομών και τεχνικών έργων αποτελεί το σημαντικότερο πρόβλημα αντισεισμικής προστασίας. Η λύση του προβλήματος και η ενίσχυση εκείνων των οικοδομών και τεχνικών έργων των οποίων η σεισμική τρωτότητα είναι υψηλή εξαρτάται από τις επιστημονικές και τεχνικές δυνατότητες. Οι δυνατότητες αυτές πρέπει να συμβάλουν αποτελεσματικά στη λύση του προβλήματος, με εφικτό κόστος. Προτείνω εδώ συγκεκριμένη διαδικασία για την αποτελεσματική αντιμετώπιση του προβλήματος αυτού, αλλά και του επίσης υπαρκτού προβλήματος του γρήγορου εντοπισμού της πλειόσειστης περιοχής κάθε καταστρεπτικού σεισμού, ώστε να παρέχονται, το ταχύτερο δυνατό, οι πρώτες βοήθειες από τις αρμόδιες υπηρεσίες.

Η μέχρι τώρα προσπάθεια προσεισμικού ελέγχου των κτιρίων με ευθύνη των Νομαρχιών δεν απέδωσε τα επιθυμητά αποτελέσματα. Γι' αυτό πρέπει (με κατάλληλη νομοθετική ρύθμιση κ.λπ.) να ανατεθεί το σημαντικό αυτό έργο στις Περιφέρειες που ιδρύθηκαν πρόσφατα. Κάθε περιφερειάρχης να αξιοποιήσει τους μηχανικούς που υπηρετούν στην περιοχή του (στην περιφέρεια, στους αντίστοιχους δήμους), αφού πρώτα αυτοί εκπαιδευτούν κατάλληλα (από τους αρμόδιους πανεπιστημιακούς, το ΤΕΕ κ.λπ). Ο έλεγχος αυτός μπορεί να περιλαμβάνει και άλλες εργασίες που αφορούν την οικοδομή (εξοικονόμηση θερμικής ενέργειας κ.λπ.), αφού έχουν ήδη γίνει σχετικές σύνθετες μελέτες και προτάσεις από ειδικούς. Τέτοιοι έλεγχοι των οικοδομών από τις Περιφέρειες θα έχουν, μεταξύ των άλλων, ως συνέπεια την ενίσχυση της εμπιστοσύνης των πολιτών προς τον νέο αυτό θεσμό.

Ο ισχύων σήμερα αντισεισμικός μας κανονισμός βασίζεται μόνο στη χωρική κατανομή της σεισμικότητας στον ελλαδικό χώρο και της αντίστοιχης σεισμικής επικινδυνότητας. Ετσι, ο χάρτης σεισμικής επικινδυνότητας που χρησιμοποιείται στον αντισεισμικό κανονισμό περιλαμβάνει τρεις γεωγραφικές περιοχές (ζώνες) αντίστοιχων επιπέδων σεισμικής επικινδυνότητας (III, II, I). Δηλαδή γίνεται δεκτό στον αντισεισμικό κανονισμό ότι το επίπεδο σεισμικής επικινδυνότητας κάθε ζώνης είναι αμετάβλητο με τον χρόνο. Όμως, από πρόσφατες έρευνες προκύπτει σημαντική μεταβολή της σεισμικότητας με τον χρόνο. Πραγματοποιήθηκαν, μάλιστα, αξιόλογες μελέτες χωροχρονικής μεταβολής της σεισμικότητας, που οδήγησαν στη μεσοπρόθεσμη πρόγνωση ισχυρών σεισμών. Δηλαδή, υπάρχει δυνατότητα εκτίμησης (προκαθορισμού) των περιοχών όπου αναμένονται με υψηλή πιθανότητα ισχυροί σεισμοί, κατά τα προσεχή έτη (π.χ. κατά την επόμενη πενταετία). Έτσι, η ελληνική πολιτεία οφείλει να ενθαρρύνει τα σεισμολογικά κέντρα της χώρας για την παραγωγή επιστημονικά έγκυρης τέτοιας γνώσης. Να ζητηθεί επίσης από τα σεισμολογικά κέντρα που παράγουν τέτοια γνώση, η υποβολή στον αρμόδιο κεντρικό φορέα των πρακτικώς εφαρμόσιμων αποτελεσμάτων της έγκυρης επιστημονικής έρευνας (π.χ. με την υποβολή ετησίων εκθέσεων). Έτσι, ο κεντρικός φορέας, έχοντας αυτές τις επιστημονικές πληροφορίες από τα αρμόδια σεισμολογικά κέντρα, τις εκθέσεις των Περιφερειών που αφορούν τους προσεισμικούς ελέγχους, άλλες σχετικές πληροφορίες και γνωρίζοντας τις διατιθέμενες πιστώσεις, ιεραρχεί τις υποψήφιες περιοχές και εστιάζει στις ενισχύσεις των κτιρίων, ώστε αυτές να είναι αποδοτικές και οικονομικώς εφικτές.

Σήμερα, ο χρόνος μεταξύ της γένεσης ενός καταστρεπτικού σεισμού και του ακριβούς εντοπισμού ολόκληρης της πλειόσειστης περιοχής του είναι της τάξης των μερικών ωρών. Ο μόνος τρόπος μείωσης του χρόνου αυτού είναι ο αυτόματος σχεδιασμός ενός χάρτη κατανομής της εδαφικής επιτάχυνσης. Το μόνο επιστημονικό κέντρο στη χώρα μας που έχει τον κατάλληλο εξοπλισμό και την κατάλληλη γνώση είναι το Ινστιτούτο Τεχνικής Σεισμολογίας και Αντισεισμικών Κατασκευών (ΙΤΣΑΚ). Συνεπώς, πρέπει η ελληνική πολιτεία να βοηθήσει το Ινστιτούτο αυτό για να συμπληρώσει τον εξοπλισμό του.

Η αντίληψη ότι τέτοια προσεισμικά μέτρα μπορεί να έχουν αρνητικές κοινωνικές συνέπειες δεν είναι αβάσιμη. Όμως, οι συνέπειες αυτές μπορούν να περιοριστούν δραστικά, όταν ενημερωθούν κατάλληλα οι πολίτες και πειστούν ότι τα μέτρα αυτά είναι προς όφελός τους.

Δεν ισχυρίζομαι, βέβαια, ότι η προτεινόμενη στο παρόν άρθρο διαδικασία εφαρμογής των πρόσθετων μέτρων είναι μοναδική, ούτε ότι τα προτεινόμενα εδώ μέτρα είναι τα μόνα απαιτούμενα. Επιμένω, όμως, ότι τέτοια πρόσθετα μέτρα είναι προς τη σωστή κατεύθυνση και εφικτά. Πιστεύω, μάλιστα, ότι αν δεν ληφθούν και μέτρα προστασίας των παλαιότερων κατασκευών και εξακολουθήσουμε να βασιζόμαστε μόνο στα ήδη θεσμοθετημένα μέτρα, οι σεισμικές καταστροφές θα συνεχισθούν με παρόμοιο ρυθμό με αυτόν που έγιναν κατά την τελευταία εικοσαετία, κατά την οποία ίσχυαν τα εφαρμοζόμενα και σήμερα θεσμοθετημένα μέτρα.

* Ομότιμος καθηγητής Γεωφυσικής ΑΠΘ.

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ΑΡΘΡΑ ΕΚΠΡΟΣΩΠΩΝ ΕΕΕΕΓΜ ΣΤΟ 20TH EUROPEAN YOUNG GEOTECHNICAL ENGINEERS CONFERENCE

Το εφετεινό 20th European Young Geotechnical Engineers Conference διοργανώθηκε από την Τσεχική και Σλοβακική Εθνική Επιτροπή της ISSMGE στο Brno της Τσεχίας από την 30η Μαΐου έως την 1η Ιουνίου. Στο συνέδριο η ΕΕΕΕΓΜ εκπροσωπήθηκε από τους συναδέλφους Δημήτρη Καραμήτρο και Όλγα-Joan Κτενίδου, ενώ συμμετείχαν συνολικά 49 νέοι γεωτεχνικοί μηχανικοί. Στη συνέχεια παραθέτουμε τα άρθρα, με τα οποία συμμετείχαν στο συνέδριο οι εκπρόσωποί μας.

SIMPLIFIED METHODOLOGY FOR THE PERFORMANCE-BASED DESIGN OF SHALLOW FOUNDATIONS ON LIQUEFIABLE SOIL WITH A CLAY CRUST

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ABSTRACT

A simplified analytical methodology is presented herein, for the estimation of the post-shaking degraded bearing capacity and the accumulated settlements of strip foundations resting on liquefiable soil with a clay crust. The methodology was based on the results of fully coupled parametric numerical analyses, performed with a sophisticated constitutive model developed at NTUA. The analytical predictions are evaluated against experimental data.

Key words: Liquefaction, shallow foundations, numerical analyses, performance-based design

1 INTRODUCTION

Liquefiable soils are currently considered by all seismic codes as extreme ground conditions, where, following a positive identification of this hazard, the construction of shallow footings is essentially allowed only after proper soil treatment. This practice was actually imposed after numerous case studies (e.g. [7], [12]), as well as centrifuge and large scale experiments (e.g. [1], [2], [6], [9], [10]), which indicated that liquefaction-induced shear strength degradation of the foundation subsoil may result in post-shaking static bearing capacity failure, while excessive seismic settlements may also accumulate.

Still, the presence of a sufficiently thick and shear resistant non-liquefiable soil crust (e.g. clay, dense or dry sand and gravel, improved soil), between the foundation and the liquefiable subsoil, could potentially ensure a viable performance-based design of shallow footings. Thus, the question posed herein regards the minimum thickness of the crust, which would allow the design of surface foundations without any previous ground improvement. In order to answer this question, a valid methodology should be established, for the computation of:

a) the post-shaking bearing capacity of the foundation, and the respective degraded factor of safety FSdeg, as well as

b) the accumulating dynamic settlement ρ_{dyn}.

2 NUMERICAL ANALYSIS OUTLINE

In order to address the above questions, fully-coupled effective-stress dynamic analyses were performed, using the numerical methodology developed by Andrianopoulos [3]. This methodology is based on the implementation of a modified version of the bounding surface critical state constitutive model proposed by Papadimitriou & Bouckovalas [11], to the commercial finite difference code FLAC. The accuracy of the numerical algorithm of Andrianopoulos [3] has been verified against the results of centrifuge experiments, such as Model #12 of the research program VELACS ([4]), which refers to the seismic behavior of a surface foundation in a liquefaction regime.

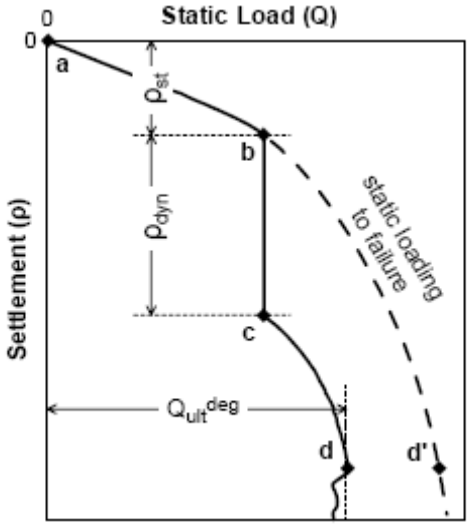

Fig. 1 Load-settlement curve.

The above described algorithm was consequently used to perform seventy-three (73) parametric analyses: a strip foundation was considered, resting on a clay layer of thickness H and undrained shear strength c_u. Below the clay crust a liquefiable sand layer with thickness Z_{liq} and relative density D_r existed. The foundation width is denoted as B, while the corresponding applied pressure is denoted as q. Each numerical analysis was performed in three (3) steps:

a) Initial static loading, performed under drained conditions (part a-b of the load-settlement curve in Figure 1).

b) Dynamic loading consisting of N sinusoidal cycles of amplitude a_{max} and a period equal to T, applied at the model's base, under partially drained conditions (part b-c of the load-settlement curve).

c) Post-seismic static loading to failure, considering that pore pressures remain constant and equal to the values attained at the end of shaking (part c-d of the load-settlement curve).

The basic geometry of the model, the static and seismic loads, the basic soil characteristics, as well as the assumed discretization and boundary conditions are shown in Figure 2.

3 BEARING CAPACITY DEGRADATION

A simplified methodology that may be adopted for the computation of the post-shaking degraded bearing capacity is that proposed by Cascone & Bouckovalas [5], which is based on the analytical solution of Meyerhof & Hanna (1978). According to this method, a composite failure mechanism is formed, consisting of punching shear failure within the clay crust and wedge-type failure in the underlying liquefied soil layer. The shear strength of the liquefied sand layer is expressed in terms of a degraded friction angle φ, as follows:

$$\varphi = \tan^{-1}\left[(1-U)\tan\varphi_o\right] \qquad (1)$$

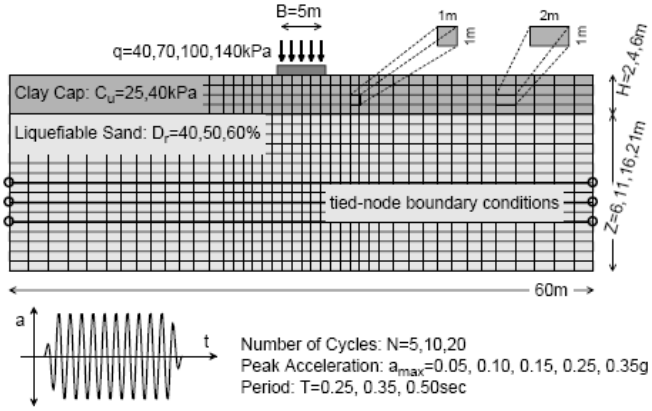

Fig. 2 Numerical model used for the parametric analyses and range of input parameters.

where φ_o is the nominal friction angle of the sand, while $U=\Delta u/\sigma'_{vo}$ is the excess pore pressure ratio, which is considered as uniform over the entire liquefied sand layer. Thus, the degraded bearing capacity is given from the bearing capacity equation:

$$q_{ult,deg} = 2c_u\,(H/B) - \gamma' H + \tfrac{1}{2}\gamma' B N_\gamma + \gamma' H N_q \qquad (2)$$

The analytical predictions derived with the methodology of Cascone & Bouckovalas [5] are compared to the corresponding numerical results in Figure 3, in terms of the capacity degradation factor ζ, defined as:

$$\zeta = \frac{q_{ult,deg}}{(\pi+2)c_u} \qquad (3)$$

The first thing to observe is that the numerical predictions are in close agreement with the analytical ζ–U relationships. Furthermore, it may be observed that the numerical analyses predict reasonably well the relative effect of the aforementioned independent problem parameters H/B, c_u and D_r on the bearing capacity degradation factor ζ.

The accurate estimation of the degraded bearing capacity $q_{ult,deg}$ requires the determination of the excess pore pressure ratio U within the sand layer. As indicated by numerous centrifuge and large-scale experiments ([1], [2], [6], [9], [10], excess pore pressure ratios in the region underneath the footing are lower than the ones developing in the free field. In accordance with the experimental data, typical excess pore pressure ratios predicted by the numerical analyses performed herein, are presented in Figure 4.

According to Terzaghi's bearing capacity theory (1943), which is adopted in the analytical methodology of Paragraph 2.2, an active failure zone forms underneath the foundation, forcing the soil in the free-field into passive failure. Following this logic, both the conditions underneath the footing and in the free field should be taken into account. Therefore, the excess pore pressure ratio U is taken as the average of the excess pore pressure ratio U_{ff} in the free-field and the excess pore pressure ratio U_{foot}, computed over an 1.5Bx1.5B region in the liquefied layer underneath the footing.

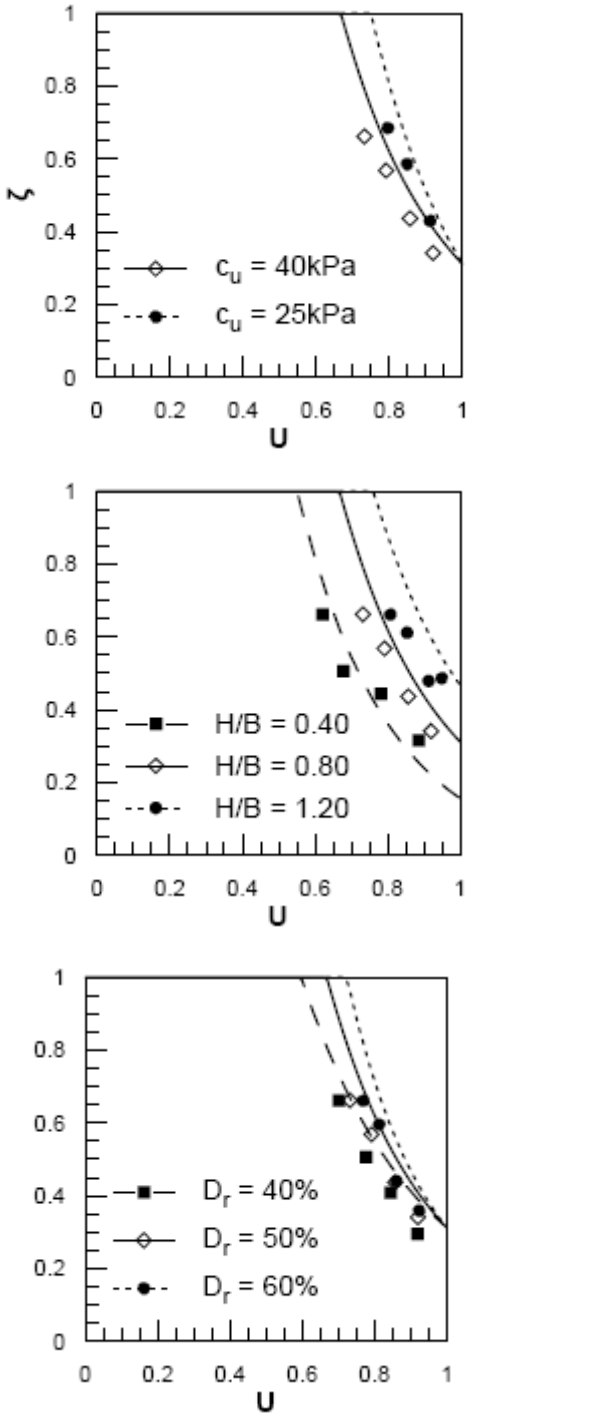

Fig. 3 Comparison between analytically predicted and numerically evaluated bearing capacity degradation factors ζ.

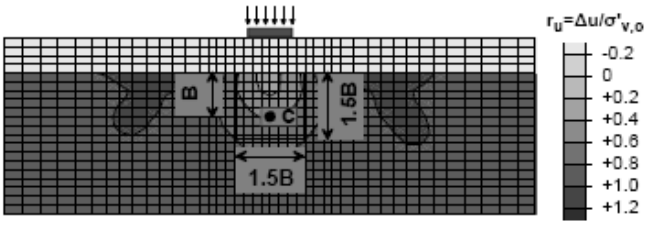

Fig. 4 Excess pore pressure ratio contours.

For simplification reasons, liquefaction may be considered to have occured in the free field, so that $U_{ff}=1$. As far as the

computation of U_{foot} is considered, there is no question that it would not be practical to always calculate the excess pore pressure ratio in an area 1.5Bx1.5B underneath the foundation. It was therefore attempted to define a characteristic point, on the footing's axis, where the excess pore pressure ratio U_c is equal to the corresponding average value U_{foot}. Karamitros [8], using a trial-and-error procedure, found that this point is located at a depth of z_c=H+B on the footing's axis.

In order to devise a simplified procedure for the computation of U_c at the characteristic point, it was observed that although the spatial variation of the excess pore pressure ratio U is considerably non-uniform, the respective variation of excess pore pressures themselves (Δu) varies mostly with depth and is considerably more uniform in the horizontal direction (Figure 5). Based on this observation, excess pore pressures in the characteristic point $\Delta u_{foot,c}$ were correlated to the corresponding excess pore pressures Δ_{uff}, at the same depth, in the free field:

$$\Delta u_{foot,c} = a\Delta u_{ff} \qquad (4)$$

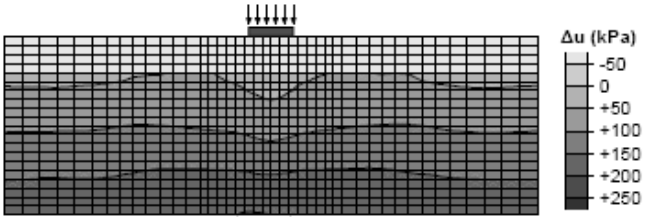

Fig. 5 Excess pore pressure contours.

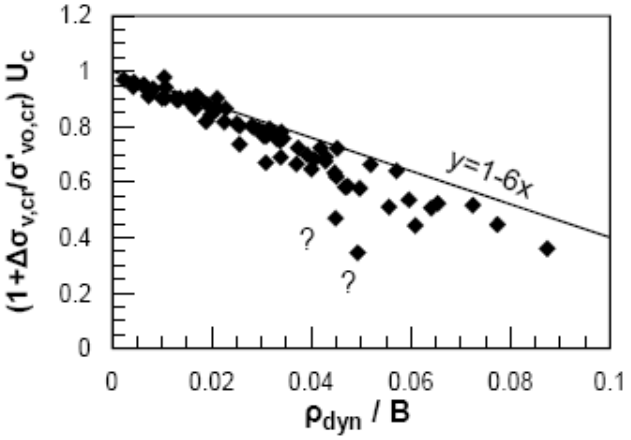

Fig. 6 Variation of coefficient a with normalized dynamic settlements ρ_{dyn}/B.

Assuming that the free field soil is at a liquefied state, Δu_{ff} is approximately equal to the geostatic vertical effective stress at the depth of the characteristic point (σ'_{vo}). Consistently with experimental observations (e.g. [2], [10]) regarding the shear-induced dilative behaviour of the foundation soil, caused by dynamic settlement accumulation, coefficient a was correlated to seismic settlements ρ_{dyn}, normalized with the footing's width B. Consequently, the excess pore pressure ratio U_c of the characteristic point may be finally computed as:

$$U_c = \frac{1 - 6.0\,\rho_{dyn}/B}{1 + \Delta\sigma_{v,c}/\sigma'_{v,o}} \qquad (5)$$

where $\Delta\sigma_{v,c}$ is the additional vertical stress caused by the foundation load at the characteristic point.

4 DYNAMIC SETTLEMENT ACCUMULATION

Except from the degraded bearing capacity, the performance-based design process requires the estimation of liquefaction-induced settlements, as these settlements may become excessive even for values of the degraded factor of safety larger than 1.0. The effect of the independent problem parameters q, D_r, c_u and H/B on the dynamic settlements ρ_{dyn} is presented in Figure 7. Using the same format, this figure is also used to show the effect of the above parameters on the static loading ratio $q/q_{ult,deg}=1/FS_{deg}$. This parallel evaluation is driven by the perception that the overall effects of liquefaction on ρ_{dyn} and $1/FS_{deg}$ are similar in qualitative terms. In that case, these two quantities could be inter-related, leading to a simpler expression for the computation of settlements. Statistical analysis of the effect of the remaining parameters (a_{max}, T, N and Z_{liq}) on the dynamic settlements ρ_{dyn} resulted in the following approximate relation (Figure 8):

$$\rho_{dyn} = 0.035 a_{max} T^2 N \left(\frac{Z_{liq}}{B}\right)^{1.5} \left(\frac{1}{FS_{deg}}\right)^3 \qquad (7)$$

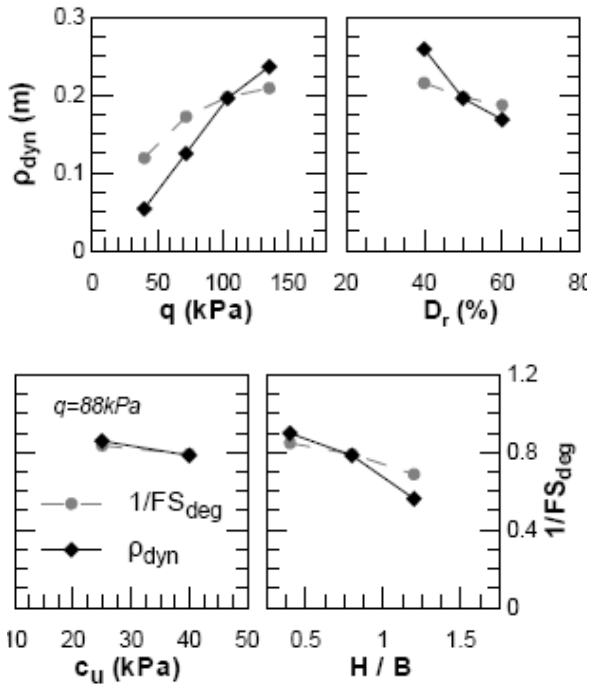

Fig. 7 Effect of parameters q, D_r, c_u and H/B on ρ_{dyn} and $1/FS_{deg}$.

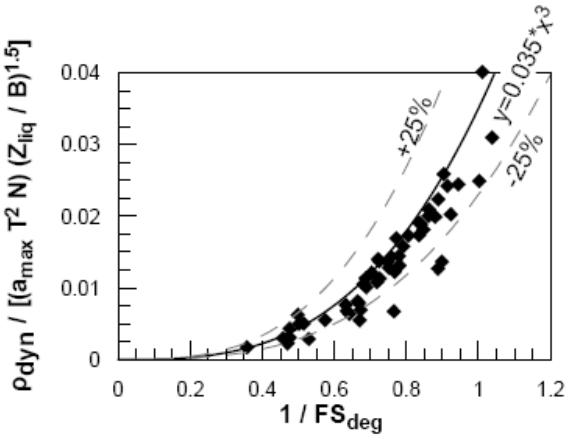

Fig. 8 Correlation of normalized settlements ρ_{dyn}/ρ_o to the degraded factor of safety FS_{deg}.

The accuracy of the proposed analytical methodology was evaluated, in terms of liquefaction-induced settlements, against the results from 38 centrifuge and large-scale experiments ([1], [2], [6], [9], [10]). In the majority of these tests, the foundation rested directly upon the surface of the liquefied sand, i.e. without interference of any soil crust. Hence, the use of Equation 9 to predict the corresponding settlements is at the limits of its application range. The comparison between analytical predictions and experimental data is shown in Figure 9, where a consistent agreement may be observed.

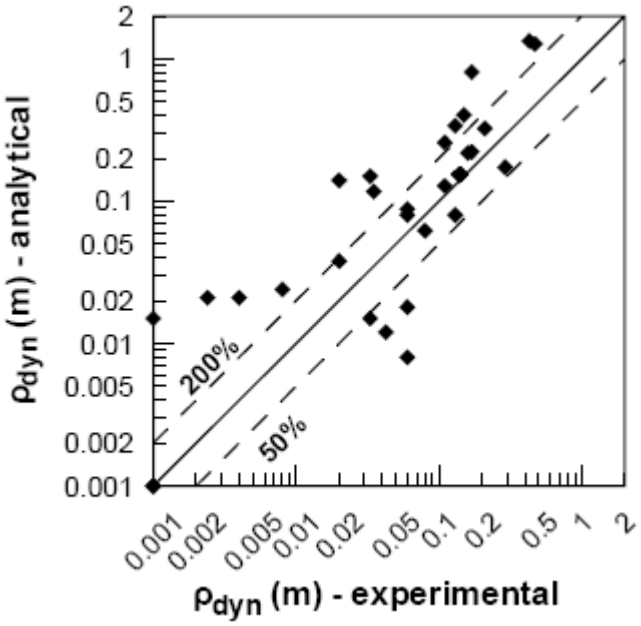

Fig. 9 Comparison between analytical predictions and experimental results.

5 CONCLUDING REMARKS

As it may be deduced from the above, the presence of a sufficiently thick and shear resistant non-liquefiable clay cap above the liquefiable sand layer may drastically reduce dynamic settlements and post-shaking static bearing capacity degradation, so that the use of a shallow foundation may be found adequate. In case that such a crust does not exist, the proposed methodology may be applied in order to guide the selection of the optimal depth of application of various liquefaction mitigation measures.

It should be finally stressed that, in its present form, the proposed methodology refers to strip foundations, subjected to a sinusoidal input motion. In other words, it does not take into account the effects of the footing's shape or the excitation's waveform. These effects are currently investigated as part of the Author's Doctoral research.

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7 REFERENCES

[1] Acacio, A.A., Kobayashi, Y., Towhata, I., Bautista, R.T., Ishihara, K. (2001): "Subsidence of building foundation resting upon liquefied subsoil case studies and assessment", Soils and Found., 41(6), pp.111-128.

[2] Adalier, K., Elgamal, A., Meneses, J., Baez, J.I. (2003): "Stone columns as liquefaction countermeasure in non-plastic silty soils", Soil Dynamics and Earthquake Engineering, 23 (7), pp. 571-584.

[3] Andrianopoulos, K. (2006): "Numerical simulation of static and dynamic loading on elastoplastic soils", PhD Thesis, National Technical University of Athens, School of Civil Engineering, Geotechnical Division.

[4] Arulmoli, K., Muraleetharan, K.K., Hossain, M.M., Fruth, L.S. (1992): "VELACS: Verification of Liquefaction Analyses by Centrifuge Studies; Laboratory Testing – Soil Data Report", Research Report, The Earth Technology Corporation

[5] Cascone, E., Bouckovalas, D. (1998): "Seismic bearing capacity of footings on saturated sand with a clay cap", Proc. of the 11th Eur. Conf. on Earthquake Eng., Paris, France.

[6] Coelho, P.A.L.F., Haigh, S.K., Madabhushi, S.P.G. (2004): "Centrifuge modelling of the effects of earthquake-induced liquefaction on bridge foundations", Proc. of the 11th ICSDEE, University of California, Berkeley.

[7] Ishihara, K., Acacio, A., Towhata, I. (1993): "Liquefaction-induced ground damage in Dagupan in the July 16, 1990 Luzon earthquake", Soils and Found,33(1),pp.133-154.

[8] Karamitros D. (2010): "Development of a numerical algorithm for the dynamic elastoplastic analysis of geotechnical structures in two (2) and three (3) dimensions", PhD Thesis, National Technical University of Athens, School of Civil Engineering, Geotechnical Division.

[9] Kawasaki, K., Sakai, T., Yasuda, S., Satoh, M. (1998): "Earthquake-induced settlement of an isolated footing for power transmission tower", Centrifuge 98, pp. 271-276.

[10] Liu, L., Dobry, R. (1997): "Seismic response of shallow foundation on liquefiable sand", Journal of Geotechnical and Geoenvironmental Engineering, 123 (6), pp. 557-566.

[11] Meyerhof, G.G., Hanna, A.M. (1978): "Ultimate bearing capacity of foundations on layered soils under inclined load", Canadian Geotechnical Journal, 15 (4), pp. 565-572.

[12] Papadimitriou, A.G., Bouckovalas, G.D. (2002): "Plasticity model for sand under small and large cyclic strains: a multiaxial formulation", Soil Dynamics and Earthquake Engineering, 22 (3), pp. 191-204.

[13] Sancio, R.B., Bray, J.D., Stewart, J.P., Youd, T.L., Durgunoglu, H.T., Onalp, A., Seed, R.B., Christensen, C., Baturay, M.B., Karadayilar, T. (2002): "Correlation between ground failure and soil conditions in Adapazari, Turkey", Soil Dyn. and Earthquake Eng., 22 (9-12), pp. 1093-1102.

NUMERICAL INVESTIGATION OF SITE EFFECTS AT AEGION, GREECE

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ABSTRACT

This paper studies site effects through 2D finite difference analysis. We focus on the effects of surface and subsurface topography on the radial and transverse component of seismic response of the city of Aegion, Greece, and highlight them using a simpler homogeneous model for comparison. It is rarely the case that a site presents such a complex yet well-documented geomorphology to allow the study of both relief and basin-edge effects. It is also not the typical procedure to carry out numerical analyses in both horizontal directions, comparing results for SV and SH incident motion. Finally, here we have the unusual opportunity to compare numerical results with instrumental results from stations on site.

Key words : 2D dynamic numerical analysis, basin, topography, seismic amplification

1 INTRODUCTION

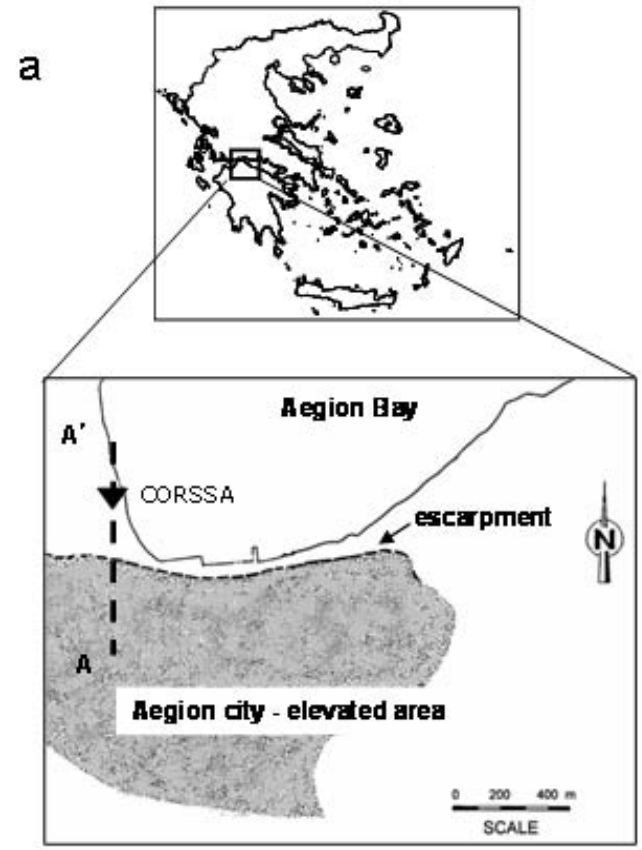
Local site conditions can influence the characteristics of strong ground motion (amplitude, frequency content and duration) in various ways collectively referred to as site effects. These are related to the thickness and impedance contrast between soil layers, the surface topography in terms of relief, and the 'subsurface topography' in terms of lateral discontinuities, basin edges, and inclined interfaces. In this study, a site is chosen which combines several of these geomorphological features. It is modelled based on existing knowledge of the geometry and properties of the geological structures present. The numerical results are used together with the results of a simple homogeneous model to interpret and highlight the influence of the site's features.

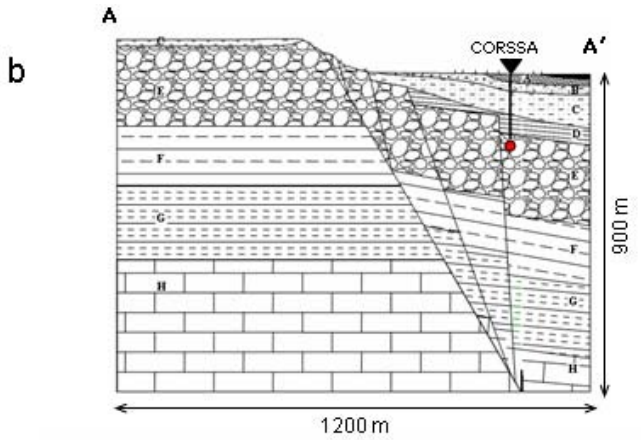
2 AREA STUDIED

The area studied was the city of Aegion, on the southern part of the Gulf of Corinth, Greece (Fig. 1a), one of the most highly seismic areas in Europe. The city has been struck by significant earthquakes in the past, the strongest recent one being that of June 15, 1995 (Ms 6.2). The chosen region is marked on the one hand by its characteristic surface topography (an escarpment of roughly 90 m divides the city into two levels, see Fig. 1a) and on the other hand by the soft deposits present downhill, which form an open basin whose depth increases with sea depth. After an extensive campaign, [1] proposed a model that reflects the complex geology of the site in detail and estimated the geotechnical and dynamic soil properties of the materials (Fig. 1b). Fig. 1b also shows the location of a vertical accelerometric array (CORSSA - http://geo.civil.auth.gr/Staff/dep/pitilakis/CORSSA/), whose deepest accelerometer lies in the conglomerate and can be used as a reference station when estimating surface response.

3 NUMERICAL SIMULATION AND PARAMETRIC ANALYSIS

The 2D numerical modelling was based on the geotechnical model of Fig. 1b with a few simplifications in the interfaces to avoid artificial complications. The geometry and soil properties of the model used are shown in Fig. 2a. In order to decouple surface and subsurface topography effects, a homogeneous model was also analysed that consisted entirely of the conglomerate (Fig. 2b) and hence included purely surface effects.





Formation	Description	Vs (m/sec)
A	Soft marine deposits consisting of sandy silt, silt, silt and clay (SM-ML-CL)	150-200
B	Soft sediments consisting of clayey silt, sandy clay, silty clay with few gravels (SC-ML-CL)	220-310
C	Hard deposits consisting of clayey silt, sandy clay, silty clay, with few gravels (SC-ML-CL)	370-490
D	Very hard deposits consisting of sandy gravels, sandy clay with few gravels (GW-GP-CL), NSPT	490-590
E	Stiff conglomerate with RQD 20% - 30%	800-1200
F	Marine clay	>800
G	Radiolarits and limestones	>1000
H	Limestone	>1200

Fig. 1 a. Location of Aegion in Greece and map of the city, indicating the fault, elevation differences and cross-section studied. b. Geotechnical model along the cross-section [1].

Two 2D finite difference (2DFD) schemes were implemented for the dynamic analysis, one using vertically incident SV motion and allowing for P-SV interaction and one using plane SH vertically incident waves. The first code was FLAC 2D v. 4 [3] and the second one was the scheme in-

troduced by [7] and [8]. For both schemes the discretisation allows frequencies up to 10 Hz to propagate without distortion through the grids and the lateral boundaries were placed so as to avoid artificial reflection. The linear elastic model was used and material damping based on available G-γ-D curves was introduced into the calculations to account for small-strain energy dissipation.

The input motion time-history was a unit-amplitude displacement pulse given by the Gabor wavelet, which has been used by [7] and [6]. Its Fourier amplitude spectrum is almost flat over most of the frequency range of interest (0.1-10 Hz). Thus we only need to run one analysis where in the past others have used several analyses with monochromatic pulses such as Ricker wavelets of varying frequencies to capture the site's broadband response.

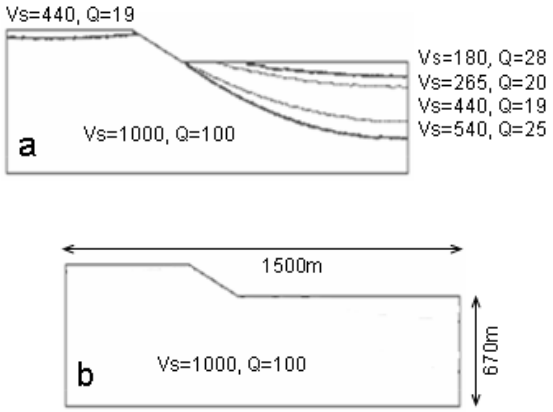


Fig. 2 The two models analysed: a. actual, b. homogeneous.

4 NUMERICAL RESULTS

4.1 Time domain

One of the techniques usually implemented for visualising results in the time domain is to plot synthetics from densely-spaced receivers along the surface of the model in the style of seismic sections. Here, the results are displacement time-histories every 12 m calculated by the SH code for both models (Fig. 3). The difference is striking. Following arrival of all direct S waves, whose amplitude does not differ dramatically for the two models, and comparing the results of model (a) with those of homogeneous model (b), it is evident that the effect of the relief in the overall response of the actual site is very weak. The existence of layering both uphill and downhill gives rise to reflected S waves and -in later phases- diffracted surface waves that increase the duration of shaking significantly. The most remarkable feature of the site's response is noted for model (a): it is the Love wave generated near the edge of the basin and propagating outwards at roughly 180 m/s, which is the shear wave velocity of the topmost layer, meaning the wave is guided by it. In the interest of brevity, seismic sections are not shown for the SV analysis; results in the horizontal component are similar though the Rayleigh waves generated are weaker. However, they do -of course- have a vertical component as well, which is similar in amplitude to the horizontal.

Peak ground motion is of interest when considering site effects from an engineering point of view, because in design it is often a single value prescribed by codes that is used to account for site amplification. Even though a single value corresponding to zero-period cannot reflect the complex, frequency-dependent phenomena that take place, it is interesting to observe the variation of this peak value across our profile. So, based on Fig. 3, we plot the maximum value of each trace in the time domain along the cross-section.

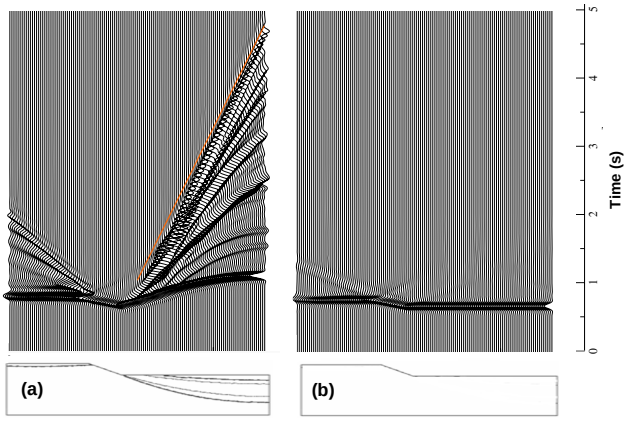


Fig. 3 Horizontal displacement time-histories along the model surface, as calculated for models (a) and (b) with the SH numerical scheme [6].

This yields Fig. 4, in which all values are dimensionless because they refer to unit input. The plot also includes the so-called 'parasitic' vertical component generated in the P-SV scheme through S-P conversion and generation of Rayleigh waves due to the non-horizontal boundaries. Comparing results for the two models, it is obvious how little of the seismic motion variation is due to pure surface topography. Near the crest, motion is amplified in a rather simple pattern and even more due to the soft top layer present in model (a). However, in the basin, the amplification pattern becomes much more complex due to the presence of the basin and actually one can observe a step-like increase in amplitude as the basin deepens, with the steps relating to

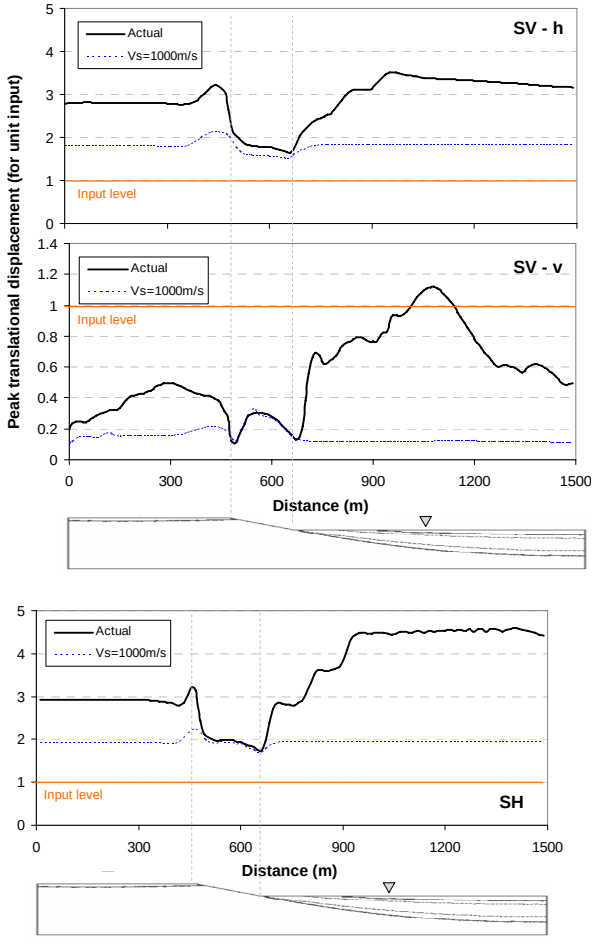


Fig. 4 Peak values of displacement along the model surface (for unit input), as calculated for models (a) and (b) through SV and SH analyses [6].

the location of outcropping surface layers. One last observation we will come back to is that SH motion (out-of-plane motion corresponding to the transverse component which is parallel to the slope and basin boundary) is stronger than SV motion (in-plane motion, corresponding to the radial component that is perpendicular to these features): this again implies stronger Love waves than Rayleigh waves.

4.2 Frequency domain

The synthetic traces were divided in the frequency domain by the input motion so as to form theoretical transfer functions. These are plotted in Fig. 5 along the profile surface for the SV and SH analysis of model (a). The complex pattern indicates the complex nature of the 2D phenomena taking place, particularly in the basin. The large peak around the basin's fundamental frequency of 1 Hz (to which both body and diffracted surface waves contribute) is very clear, while uphill the resonant peak is seen at around 6-7 Hz. In Fig. 6 we plot the maxima of the transfer function along the surface for both models and both numerical codes. As happened in the time domain, in the frequency domain we see again that the presence of the uphill surface layer and -even more- of the basin plays the decisive part in the 2D response of Aegion, rather than the relief. Once more we note than amplification is stronger in the SH direction.

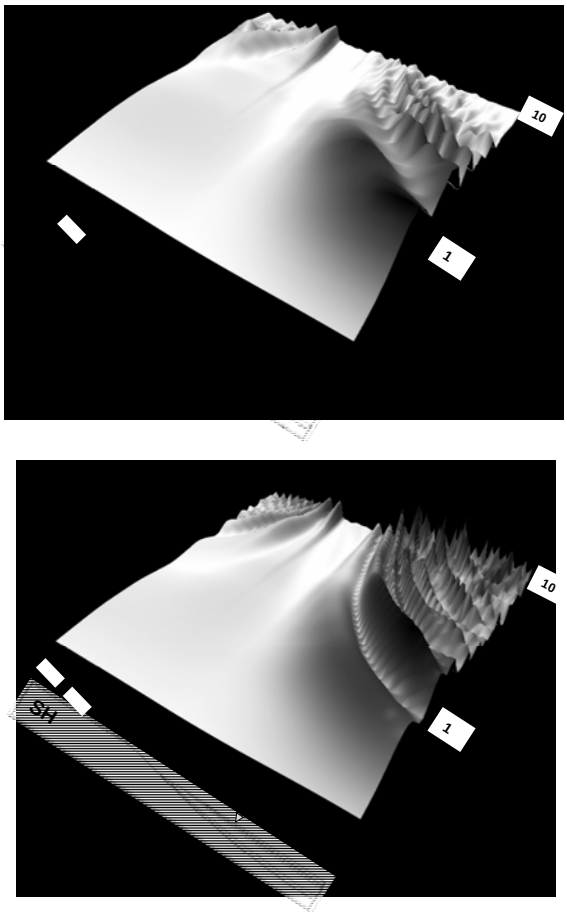


Fig. 5 Transfer functions along the surface of model (a) calculated by SV and SH analyses [6].

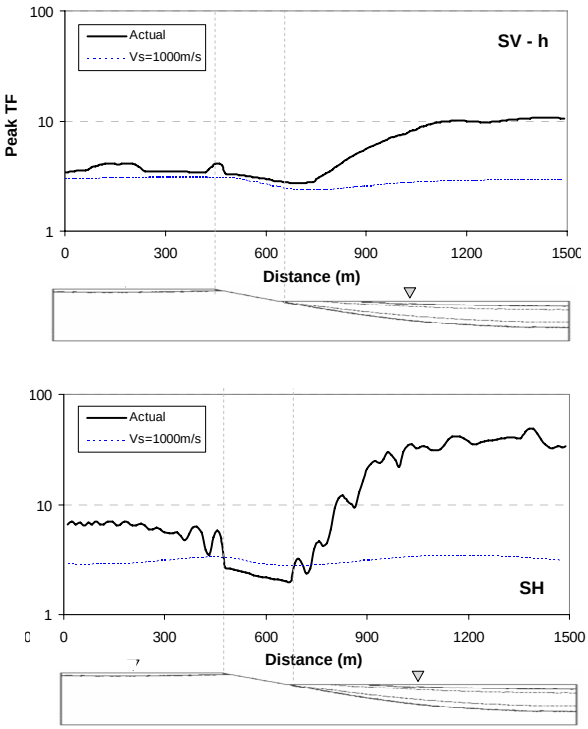


Fig. 6 Peak values of the transfer function along the model surface, as calculated for models (a) and (b) through SV and SH analyses [6].

5 COMPARISON WITH NUMERICAL & INSTRUMENTAL DATA AND CODES

We briefly compare our 2D results with some 1D results calculated at various locations across the model. Fig. 7 shows the spectral amplification at the resonant frequency at each location. Clearly, 2D amplification is much higher and even more so for the SH case. This can be related to some instrumental results of [5] from the location where CORSSA lies. Standard spectral ratios (SSR) were calculated from 19 recorded earthquakes by dividing the spectrum at the surface with the spectrum at depth (see Fig. 1b) for both components. This tendency of the transverse component being higher than the radial is confirmed in Fig. 8 through SSR and has been mentioned in literature for instrumental and numerical data ([4], [9]).

Finally, we make a brief mention to design codes. Although in very generic terms, topography effects are taken into account in the French AFPS90 and in Eurocode 8. For the case of Aegion they prescribe amplifications of around 10%-20%. From Fig. 4a we see that this is comparable with the level of time-domain peak amplification we calculated. However, spectral amplification near the crest exceeds prescriptions, as it can reach 100% over specific frequencies, e.g. for wavelengths corresponding to the slope width (for more details see [6]).

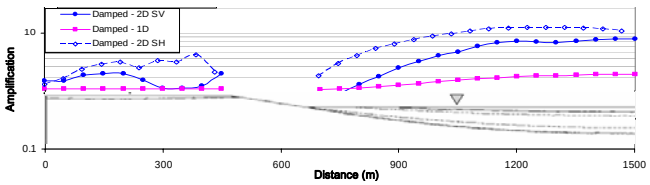


Fig. 7 Comparison of 2D (SV and SH) and 1D amplification at the resonant frequency [6].

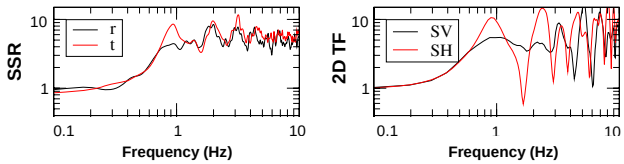


Fig. 8 Comparison of 2DFD transfer functions with empirical standard spectral ratios [5].

6 CONCLUSIONS

We have compared results in the time and frequency domain for models (a) and (b) -the actual and homogeneous- from SH and SV analyses (i.e., in the transverse and radial sense). We found that the effect of the relief in the overall response of the site is weak. The existence of layering uphill and especially of the basin downhill gives rise to complex 2D phenomena and amplification patterns due to reflected body waves and diffracted surface waves. These increase the duration of shaking significantly; they also amplify peak time-domain amplitude as well as resonant spectral amplification. While SV analysis also generates vertical motion, it is SH analysis that systematically causes higher amplification. This observation implies stronger Love waves than Rayleigh waves and is confirmed by instrumental data (SSR ratios). Finally, topographic amplification near the crest agrees with code prescriptions in the time domain but exceeds them in the frequency domain.

ACKNOWLEDGEMENTS

Signal processing benefited from SAC2008 ([2]; http://www.iris.edu/software/sac). This research was partly conducted during my stay at UNAM, Mexico. I wish to thank K. Pitilakis, F.J. Chávez-García and D. Raptakis for support and supervision. Finally, I extend my thanks to 20EYGEC and the Hellenic SSMGE for supporting my nomination to participate.

REFERENCES

[1] Apostolidis P., Raptakis D, Pandi K., Manakou M., and Pitilakis K. (2006). Definition of subsoil structure and preliminary ground response in Aigion city (Greece) using microtremor and earthquakes, Soil Dyn. Earthq. Eng. **26**: 922 - 940.

[2] Goldstein, P., D. Dodge, M. Firpo, and L. Minner (2003). SAC2000: Signal processing and analysis tools for seismologists and engineers, Invited contribution to The IASPEI International Handbook of Earthquake and Engineering Seismology, W.H.K. Lee, H. Kanamori, P.C. Jennings, and C. Kisslinger (Editors), Academic Press, London.

[3] ITASCA Consultants (2002). FLAC: Fast Lagrangian Analysis of Continua, S.A. v. 4.0.

[4] Jongmans D., and Campillo M. (1993). The response of the Ubaye Valley (France) for incident SH and SV waves: Comparison between measurements and modelling, Bull. Seismol. Soc. Am. **83**: 907-924.

[5] Ktenidou O.-J., Arnaouti S., Chávez-García F.-J.,Raptakis D., Pitilakis K., Diagourtas D., Makropoulos K. (2008). Site and topography effects on ground motion - Instrumental results from Aegion. 3rd Panhellenic Conference on Earthquake Engineering & Engineering Seismology, Athens, 5–7 November.

[6] Ktenidou, O.-J. (2010). Theoretical and instrumental study of site and topographic effects on strong ground motion in Aegion. PhD thesis, AUTh, Greece (under publication).

[7] Moczo P. (1989). Finite difference technique for SH waves in 2-D media using irregular grids: application to the seismic response problem. Geophys. J. Int. **99**: 321–9.

[8] Moczo P, Bard P-Y. (1993). Wave diffraction, amplification and differential motion near strong lateral discontinuities. Bull Seism Soc Am **83**: 85–106.

[9] Raptakis D., Makra K., Anastasiadis A., and Pitilakis K. (2004). Complex site effects in Thessaloniki (Greece): I. Soil Structure and Comparison of Observations with 1D Analysis. Bull. Earthq. Eng. **2**: 271-300.

ΑΝΑΣΚΟΠΗΣΗ ΓΕΓΟΝΟΤΩΝ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Διάλεξη ΓΙΩΡΓΟΥ ΜΠΟΥΚΟΒΑΛΑ

Την Δευτέρα 3 Μαΐου 2010 πραγματοποιήθηκε στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών του ΕΜΠ διάλεξη του Δρ. Γιώργου Μπουκοβάλα, Πολιτικού Μηχανικού, Καθηγητή στον Τομέα Γεωτεχνικής της Σχολής Πολιτικών Μηχανικών ΕΜΠ με τίτλο «Σύγχρονες Εξελίξεις στον Σχεδιασμό και την Κατασκευή Στραγγιστηρίων – Χαλικοπασσάλων για τον Έλεγχο Ρευστοποίησης»

Την διάλεξη παρακολούθησε πολυπληθές ακροατήριο, που συμμετέσχε ενεργά στην επακολουθήσασα συζήτηση. Οι διαφάνειες της διάλεξης έχουν αναρτηθή στην ιστοσελίδα της ΕΕΕΕΓΜ.

ASSOCIATION INTERNATIONALE DES TUNNELS ET DE L'ESPACE SOUTERRAIN
AITES
ITA
INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

Πεπραγμένα του Διεθνούς Συνεδρίου Σηράγγων WTC 2010 και της 36ης Γενικής Συνέλευσης της International Tunnelling Association στο Vancouver του Καναδά 14-20 Μαΐου 2010

Η Διεθνής Ένωση Σηράγγων και Υπογείων Έργων ITA – AITES διοργανώνει ετησίως ένα παγκόσμιο συνέδριο. Το συνέδριο προσελκύει τεράστιο ενδιαφέρον από τους κατασκευαστές, τους προμηθευτές, τους μελετητές αλλά και την Πανεπιστημιακή Κοινότητα. Στο παγκόσμιο συνέδριο του Vancouver, WTC 2010, συμμετείχαν 1000 άτομα περίπου από 48 χώρες. Πληροφορίες για την ITA, τα συνέδρια, τις ομάδες εργασίας κ.τ.λ. μπορείτε να βρείτε στο www.ita-aites.org.

36η Γενική Συνέλευση της ITA

Την Ελληνική Επιτροπή Σηράγγων και Υπογείων Έργων εκπροσώπησε ο Γιώργος Ντουνιάς, πρόεδρος της ΕΕΣΥΕ. Επίσης παρέστησαν ο Νίκος Καζίλης και ο καθηγητής Παύλος Μαρίνος. Παρόντες στην Γ.Σ. ήταν εκπρόσωποι από 42 εθνικές επιτροπές, ενώ 6 επιτροπές είχαν δώσει εξουσιοδότηση ή είχαν ψηφίσει με επιστολή.

Η ΕΕΣΥΕ υπέβαλε υποψηφιότητα για την οργάνωση του Διεθνούς Συνεδρίου Σηράγγων το 2013. Στην σχετική ψηφοφορία η Ελληνική υποψηφιότητα μειοψήφησε με ψήφους 22 έναντι 26 της Ελβετίας η οποία και θα οργανώσει στη Γενεύη το WTC 2013. Η μεγάλη αρνητική διαφήμιση της χώρας μας με τα τρία θύματα του εμπρησμού την εβδομάδα πριν την Γ.Σ. έκανε πολύ δύσκολη την εκλογή.

Παρ' όλα αυτά όμως έγιναν επαφές με τις Εθνικές Ενώσεις και διαμορφώθηκαν συνθήκες που μας επιτρέπουν να διεκδικήσουμε ένα από τα επόμενα συνέδρια. Εάν η προετοιμασία ξεκινήσει έγκαιρα (2 έτη πριν την ημερομηνία υποστήριξης της υποψηφιότητας) η πιθανότητα επιτυχίας είναι πολύ μεγάλη.

WTC 2010

Συμμετείχαν 48 χώρες με παρουσιάσεις και άρθρα. Από την Ελλάδα υπήρχαν δυο παρουσιάσεις, πολύ λίγες αν συγκριθούν με αυτές που παρουσιάζονται στα εγχώρια συνέδριά μας.

Στο συνέδριο του Vancouver έγινε η πρώτη διάλεξη Muir Wood, από τον Einar Broch. Η σειρά των διαλέξεων προς τιμήν του Sir Alan Muir Wood, πρώτου προέδρου της ITA, που απεβίωσε το 2009 καθιερώθηκε από φέτος. Τη διάλεξη μπορείτε να βρείτε ολόκληρη στην ιστοσελίδα της ITA. Η επόμενη διάλεξη Muir Wood θα δοθεί από τον Robert Mair στο WTC 2011, τον Μάιο του 2011 στο Ελσίνκι της Φιλανδίας.

Ομάδες Εργασίας

Στα πλαίσια του συνεδρίου συνεδρίασαν και οι ομάδες εργασίας της ITA. Ο Νίκος Καζίλης συμμετείχε στις εργασίες της WG19 ''Conventional Tunnelling'' και ο Γιώργος Ντουνιάς στην WG9 "Seismic effects". Σύνοψη των συνεδριάσεων όλων των ομάδων εργασίας θα βρείτε στα πεπραγμένα του συνεδρίου (Press–release–2010.pdf, στην ιστοσελίδα της ITA: www.ita-aites.org)

Γιώργος Ντουνιάς

Διάλεξη Shunsuke S. SAKURAI

Την Τρίτη 18 Μαΐου 2010 πραγματοποιήθηκε στο Αμφιθέατρο Πολυμέσων της Κεντρικής Βιβλιοθήκης ΕΜΠ διάλεξη του Ομότιμου Καθηγητή του Πανεπιστημίου του Kobe και Προέδρου του CERIF S. S. Sakurai με θέμα «Επιτόπου μετρήσεις για την εκτίμηση της ευστάθειας σηράγγων και πρανών». Η διάλεξη διοργανώθηκε από το Εργαστήριο Τεχνολογίας Διάνοιξης Σηράγγων του ΕΜΠ.

Η παρουσίαση τις διάλεξης έχει αναρτηθή στην ιστοσελίδα του Εργαστηρίου http://www.tunnelling.metal.ntua.gr.

ΒΙΟΓΡΑΦΙΚΑ ΣΤΟΙΧΕΙΑ

Born in 1935, studied Civil Engineering, first at Kobe University (B.E., 1958), then at Kyoto University (M.E., 1960), and finally at Michigan State University USA (Ph.D., 1966),

having received his Dr Eng. from Nagoya University in 1975.

Prof. Sakurai worked at Kobe University, where he held the position of Associate Professor (1966-73) and Professor in the Division of Rock Mechanics, Dept of Civil Engineering (1973-1999), and then worked at the Hiroshima Institute of Technology as President (1999-2003). He is now Professor Emeritus of Kobe University, and also Professor Emeritus of Hiroshima Institute of Technology. Prof. Sakurai is currently President of the Construction Engineering Research Institute Foundation (CERIF) (2003-present).

In 1978-79 he was Guest Professor at the Federal Institute of Technology Zurich ETHZ, Switzerland, and in 1984 Visiting Professor at the University of Queensland, Australia. He was also Visiting Professor at Graz University of Technology in 1998.

He has given lectures in Brazil, Canada, China, Czech Republic, Germany, Greece, India, Indonesia, Italy, Kazakhstan, Korea, Poland, Taiwan, Thailand, Russia, and many other countries.

In the ISRM, Prof. Sakurai was Vice-President at Large (1988-91), President of the Commission on Communications (1987-91), and Member of the Commissions on Computer Programs (1978-87), on Rock Failure Mechanisms in Underground Openings (1981-91), and on Testing Methods (1983-91). He was also Vice-President of the Japanese Committee for ISRM (the ISRM NG JAPAN) (1995-1999).

Professionally, Prof. Sakurai has been involved in various kinds of Rock Mechanics projects (hydropower, nuclear power, pumped storage, and compressed air energy storage schemes; highway and railway tunnels; slopes; etc.), in Japan and abroad.

His research activities have been principally connected to numerical and analytical methods, back analysis, and field measurements, the aim of these activities being mainly concerned with making a bridge between the theory and practice. Prof. Shunsuke Sakurai is the author or co-author of over 100 publications and the editor of "Field Measurements in Geomechanics" (Proceedings of the 2nd International Symposium, Kobe, 1987).

Prof. Sakurai received the IUE Award (1974), the JSCE Prize for the Best Paper (1990), and the ICMAG Award for Significant Paper (1994). He also received the Science Award of Hyogo Prefecture (1997).

78th ICOLD ANNUAL MEETING & INTERNATIONAL SYMPOSIUM "DAMS AND SUSTAINABLE WATER RESOURCES DEVELOPMENT"
23 – 26 May 2010, Hanoi, Vietnam
www.vncold.vn/icold2010

78η ΕΤΗΣΙΑ ΣΥΝΟΔΟΣ ICOLD – HANOI 2010

Στο διάστημα 23 – 26 Μαΐου 2010 διεξήχθη στην πρωτεύουσα του Βιετνάμ Hanoi η 78η Ετήσια Σύνοδος της Διεθνούς Επιτροπής Μεγάλων Φραγμάτων (ICOLD).

Στη Σύνοδο συμμετείχαν οι συνάδελφοι και μέλη της ΕΕ-ΕΕΓΜ Κώστας Αναστασόπουλος, Πρόεδρος της Ελληνικής Επιτροπής Μεγάλων Φραγμάτων (Ελληνικού τμήματος της ICOLD) (συμμετείχε, ως μέλος της, και στις εργασίες της Επιτροπής Καταγραφής του Παγκόσμιου Καταλόγου Φραγμάτων (World Register of Dams and Documentation – WRDD), Γιάννης Θανόπουλος, Διευθυντής του ΚΕΨΕ Θεσσαλίας ΔΕΗ και Πάνος Ντακούλας, καθηγητής του Τμήματος Πολιτικών Μηχανικών της Πολυτεχνικής Σχολής του Πανεπιστημίου Θεσσαλίας (συμμετείχε, ως μέλος της, και στις συνεδριάσεις της Τεχνικής Επιτροπής της ICOLD "Computational Aspects of Analysis and Design of Dams").

Ανά ημέρα οι εργασίες της Συνόδου, με ιδιαίτερη αναφορά σε θέματα ιδιαίτερου Ελληνικού ενδιαφέροντος που συζητήθηκαν, είχαν ως ακολούθως:

23 Μαΐου : Εγγραφή στο Συνέδριο – Παραλαβή έντυπου υλικού - Συσκέψεις Προέδρων Τεχνικών Επιτροπών.

24 Μαΐου : Συσκέψεις των 24 Τεχνικών Επιτροπών της ICOLD

25 - 26 Μαΐου : Διεθνές Συμπόσιο : Dams and Sustainable Water Resources Development

26 Μαΐου : Εκτελεστική Σύνοδος (Executive meeting). Στην Εκτελεστική Συνάντηση (Executive Meeting) παρευρέθηκαν αντιπρόσωποι από 53 από τις συνολικά 90 χώρες μέλη της ICOLD. Έγινε αποδεκτή η υποψηφιότητα του κ. Αχ. Παπαδημητρίου στην Τεχνική Επιτροπή "Seismic Aspects on Dam Design", την οποία είχε προτείνει η ΕΕΜΦ.

Κώστας Αναστασόπουλος

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Διάλεξη JEAN-PIERRE MAGNAN

Την Πέμπτη 27 Μαΐου 2010 πραγματοποιήθηκε στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών του ΕΜΠ η διάλεξη του Dr. Jean-Pierre Magnan, Καθηγητή Soil and Rock Mechanics της École Nationale des Ponts et Chaussées και της École Nationale des Travaux Publics de l'État με τίτλο «Liquefaction criteria for marine soils».

Την διάλεξη παρακολούθησε μεγάλος αριθμός μελών και φίλων της ΕΕΕΕΓΜ, ακολούθησε δε εκτενής συζήτηση. Οι διαφάνειες της διάλεξης έχουν αναρτηθή στην ιστοσελίδα της ΕΕΕΕΓΜ. Ακολουθεί σύντομη περίληψη της διάλεξης. Και στη συνέχεια σύντομο βιογραφικό σημείωμα του ομιλητή.

ΠΕΡΙΛΗΨΗ

Extensive studies have been performed over the last five years to determine the potential for liquefaction of some marine soils from the Nice region, on the Mediterranean coast of France. The site investigations included CPTu and SPT tests and laboratory studies on intact samples taken at various depths.

The soils, which can be best described as silts, clayey silts and sandy silts, all lie in a zone of the soil classification where the risk of liquefaction under seismic or static loads may be evaluated in contradictory ways, depending on the approach followed.

The lecture describes the soil properties and the way they were used to come to contradictory conclusions by different geotechnical engineers. A new method of interpretation of CPTu data for soil classification suggested by Jean-François Serratrice (LRPC Aix-en-Provence) will then be presented and applied to the test results obtained at this site. The results of laboratory static and cyclic triaxial tests confirmed that the soils were dilating when loaded and therefore could not experience liquefaction.

As a conclusion, needs for further research on liquefaction criteria will be discussed.

ΒΙΟΓΡΑΦΙΚΑ ΣΤΟΙΧΕΙΑ

- Born in 1949.
- Ingénieur École Polytechnique (1971), Ingénieur École Nationale des Ponts et Chaussées (1973), Docteur ès sciences physiques (Université Pierre et Marie Curie, Paris, 1984)
- Ingénieur général des Ponts, des Eaux et des Forêts
- Professor of Soil and Rock Mechanics at the École Nationale des Ponts et Chaussées and at the École Nationale des Travaux Publics de l'État
- Technical Director for geotechnical engineering at LCPC (until May 3, 2010)
- Head of the Department of Geotechnical, water and risk engineering at LCPC (after May 3, 2010)

Fields of research and expertise

Construction of roads on soft soils (geotechnical site investtigations, design and justification, construction methods, soil improvement, in particular using vertical drains, lightweight embankments), geotechnical engineering and natural risks, general problems of geotechnical engineering (soils, rocks, earthworks; numerical modelling of geotechnical structures, application of statistics and probability in geotechnical engineering, design standards for geotechnical structures).

Research activities

- Publications: 90 journal papers; 120 conference papers; 32 research reports, 26 books and 3 books translated from Russian.
- Direction of theses (55) and participation in jurys (90)

Expertise and consultancy activities

- Site investigations and construction of new infrastructures (17)
- Embankments on soft soils (17)
- Natural hazards: slope stability, soil liquefaction (19)
- Ultralightweight embankments (expanded polystyrene) (3)
- Construction on loessial soils (1)
- Foundations of buildings (12)
- Foundations of bridges (7)
- Retaining structures (3)
- Environmental geotechnical engineering (1)
- Expertise of construction works (1)

Other activities

- Consultant, organiser and lecturer for continuing education courses in geotechnical engineering at the Ecole Nationale des Ponts et Chaussées (Ponts-Formation-Édition)
- Chairman of the Coordination Committee for Standardisation in Geotechnical Engineering (AFNOR/BNSR)
- Chairman of the French Geosynthetics Society (CFG)
- Organisation of international symposiums in geotechnical engineering.
- Participation in CEN standardisation (CEN)

FAST SIMSG ISSMGE

20EYGEC2010
20th European Young Geotechnical Engineers Conference
May 30 to June 1 2010, Brno, Czech Republic

Το 20ο Ευρωπαϊκό Συνέδριο Νέων Γεωτεχνικών Μηχανικών (20EYGEC) πραγματοποιήθηκε από τις 30 Μαΐου έως τις 1 Ιουνίου στο Μπρνό της Τσεχίας. Το 20EYGEC διοργανώθηκε από τη Διεθνή Ένωση Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ISSMGE), την τοπική επιτροπή της για την Τσεχία και τη Σλοβακία (Czech and Slovak Committee of the ISSMGE), και το Τμήμα Πολιτικών Μηχανικών του Brno University of Technology, όπου και έλαβε χώρα.

Στο συνέδριο έλαβαν μέρος 47 νέοι γεωτεχνικοί μηχανικοί ηλικίας έως 35 ετών, προερχόμενοι από 29 Ευρωπαϊκά κράτη. Την Ελλάδα εκπροσώπησαν οι Δρ Δημήτρης Καραμήτρος από το ΕΜΠ, που παρουσίασε την εργασία "Simplified methodology for the performance-based design of shallow foundations on liquefiable soil with a clay crust" και η Όλγα-Τζόαν Κτενίδου από το ΑΠΘ, που παρουσίασε την εργασία "Numerical investigation of site effects at Aegion, Greece".

Τις εργασίες του συνεδρίου άνοιξαν οι κκ. Ivan Vaníček, αντιπρόεδρος της ISSMGE για την Ευρώπη, και ο Rostislav Drochytka, Κοσμήτορας της Σχολής Πολιτικών Μηχανικών στο Μπρνό. Οι προσκεκλημένοι ομιλητές από το χώρο της ακαδημίας ήταν οι κκ. John Atkinson, ομότιμος καθηγητής του City University London ('How to do research'), και Jean-Louis Briaud, καθηγητής του Texas A&M University και πρόεδρος της ISSMGE ('ISSMGE, research, and education'). Έγιναν επίσης ομιλίες κατόπιν πρόσκλησης από τον μελετητικό και κατασκευαστικό τομέα και συγκεκριμένα από τις εταιρείες Foundation Engineering, Inc. ('Modern foundation technologies') και GEOtest Brno, Inc. ('The removal of rocky environment and groundwater contamination').Οι εργασίες που παρουσιάσθηκαν ομαδοποιήθηκαν σε τρεις συνεδρίες που ακολούθησαν τις εξής γενικές θεματικές ενότητες: 'Ground Investigation' (3 εργασίες), 'Geomechanics' (14 εργασίες) και 'Geotechnics' (29 εργασίες). Η τελευταία διακρίθηκε σε τέσσερις επιμέρους θεματικές ενότητες: 'Foundation Engineering', 'Earth Structures', 'Environmental Geotechnics', και 'Underground Structures'. Τα πρακτικά του συνεδρίου συντάχθηκαν από τους Věra Glisníková και Jiří Boštík και διανεμήθηκαν στους συνέδρους με τη μορφή βιβλίου υπό τον τίτλο 'Geotechnical Engineering 20 - View of Young European Geotechnical Engineers' (ISBN: 978-80-7204-686-7).

Πέραν των συνεδριών έγινε επίσης ξενάγηση στο χώρο του Πανεπιστημίου του Μπρνό και επίδειξη της εκτενέστατης συλλογής πετρωμάτων και ορυκτών που κατέχει το Τμήμα Πολιτικών Μηχανικών. Το συνέδριο έκλεισε με επίσκεψη σε παρακείμενο εργοτάξιο κατασκευής οδικής σήραγγας.

Όλγα Κτενίδου και Δημήτρης Καραμήτρος

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

International Conference on Slope Thailand 2010 *Geotechnique and Geosynthetics for Slopes*, July 28-30, 2010, Chiang Mai, Thailand www.slopeconference2010.com

ER2010 Earth Retention Conference 3, August 1 – 4 2010, Bellevue, Washington, USA, content.asce.org/conferences/er2010

Isap Nagoya 2010 - The 11th International Conference on Asphalt Pavements, August 1 to 6, 2010, Nagoya, Japan, www.isap-nagoya2010.jp

ISRS V The 5th International Symposium on In-Situ Rock Stress, August 25-27, 2010 Beijing, China, www.rockstress2010.org

Pipelines Conference 2010, August 28 - September 1, 2010, Keystone Resort & Conference Center, Keystone, (Dillon) Colorado, content.asce.org/conferences/pipelines2010/call.html

14th European Conference on Earthquake Engineering, Ohrid, FYROM, August 30 – September 3 2010, www.14ecee.mk

Geologically Active 11th IAEG Congress, 5 – 10 September 2010, Auckland, New Zealand, www.iaeg2010.com

Tunnels and Underground Construction India
13 - 16 September, 2010, The LaLiT, New Delhi, India
www.tunnelsindia.com

Tunnels and Underground Construction India, has been initiated as a major platform for tunnel professionals from all over the world to engage in a variety of discussions focusing on overcoming the challenges of tunneling in India, specifically tunneling in difficult ground conditions, implementation of modern techniques and effective project management including planning, designing, integrating and constructing tunnel projects in the region.

The agenda for **Tunnels and Underground Construction India** has been designed by the industry with the aim of providing insight into the many complex issues surrounding major tunnel projects and understanding the benefits and challenges associated with the various different types of technologies, machineries and contracts available.

Key topics include:

- Overcoming technical challenges by employing best practices in tunneling
- Ensuring optimum pretunneling feasibility studies
- Carrying out cost-effective geotechnical site investigation and analysis
- Overcoming the challenges of tunneling in difficult conditions
- Exploring the most suitable tunneling methods for Indian projects
- Achieving best practice for delivering projects within time frame and budget
- Mitigating risk through effective risk management

Through detailed presentations, unique case studies, interactive panel discussions and comprehensive workshops, this event will address the critical challenges that must be overcome if sustainable, environmentally sound and cost-effective tunnel structures are to be delivered.

GBR-C 2k10 - 3rd International Symposium on Geosynthetic Clay Liners, 15 - 16 September 2010, Würzburg, Germany, gbr-c2k10@skz.de

1st International Conference on Information Technology in Geo-Engineering 16-17 September 2010, Tongji Univeristy, Shanghai geotec.tongji.edu.cn/ICITG2010

Workshop of the ISSMGE TC40 (Forensic Geotechnical Engineering) Failures, Disputes, Causes and Solutions in Geotechnics, 24-25 September 2010, Budapest, Hungary http://issmge-tc40-hungary.net/main.php

Meeting Demands for a Changing World
Lisbon, Portugal, 27-29 September 2010
www.hydropower-dams.com

In the wake of a global financial crisis, with the additional concerns of environmental protection and anticipated effects of climate change, and power shortages hampering socio-economic development in some parts of the world, hydropower development has many solutions to offer. The hydro profession is responding to the needs of a changing

world, with innovations in planning methods, environmental assessments, technological innovation, approaches to financing strategies, and optimized use of existing assets.

HYDRO 2010 will review progress and achievements, as well as needs and future challenges.

As usual, the Conference will focus strongly on the needs, priorities and plans of the developing countries of Africa, Asia and Latin America, and discussions will cover technical, economic, commercial and environmental/social aspects.

HYDRO 2010 MISSION

As hydropower development begins a new wave of development, with greater universal recognition of its multiple benefits and its vital role in sustainable development, there are still many parts of the world with vast hydropower potential, where large proportions of the population still lack a reliable electricity supply.

Our regional sessions in Lisbon will focus on Africa, Asia and Latin America. There will also be a session on current schemes in Europe, with a particular focus on repowering schemes in Portugal. The format of 2010 will comprise not only valuable technical presentations on a wide range of current topics, but also high-level panel debates and interactive workshops. Some special topics will be:

- Lessons learned from the accident at Sayano Shushensk in Russia, with a panel debate to follow about powerplant safety
- A debate on various models and approaches to water rights and hydropower concessions
- A workshop on current research on carbon emissions from reservoirs
- A discussion on dam safety
- A workshop on flow measurement

The programme aims to address practical issues, and to help turn positive policies into concrete actions.

Tunnels & Tunnelling 2010 Conference, 28 September 2010, London, United Kingdom, conference@tunnelsonline.info

II International Congress on Dam Maintenance and Rehabilitation, 28th-30th September 2010, Zaragoza, Spain www.damrehabilitationcongress2010.com

6ο Πανελλήνιο Συνέδριο Γεωτεχνικής και Γεωπεριβαλλοντικής Μηχανικής, 29 Σεπτεμβρίου – 1 Οκτωβρίου 2010, Βόλος http://portal.tee.gr/portal/page/portal/INTER_RELATIONS/INT_REL_P/SYNEDRIA_EKDHLWSEIS/2010/6thGeotechnic

International Symposium on Geomechanics and Geotechnics: From Micro to Macro 10 – 12 October 2010, Shanghai, China, geotec.tongji.edu.cn/is-shanghai2010

11th International Symposium on Concrete Roads, Seville (Spain) 13th - 15th October 2010, www.2010pavimentosdehormigon.org

TAILINGS AND MINE WASTE '10, October 17-20, 2010, Vail, Colorado, www.tailingsandminewaste.org

Sir Alan Muir Wood Symposium, 21 October 2010, London, United Kingdom, www.britishtunnelling.org.uk/meetings-2010.php

ARMS – 6 ISRM International Symposium 2010 and 6th Asian Rock Mechanics Symposium "Advances in Rock Engineering", New Delhi, India, 23 – 27 October 2010, www.cbip.org, www.arms2010.org

2nd International Conference on Geotechnical Engineering - ICGE 2010 Innovative Geotechnical Engineering, 25 – 27 October 2010, Hammamet, Tunisia, www.enit.rnu.tn/fr/manifestations/icge2010/index.html

Piling & Deep Foundations India 2010

25 - 27 October, 2010, Mumbai, India
www.pilingfoundationindia.com

The event will ensure best practice in design, construction and implementation of the latest piling and deep foundation techniques. Piling & Deep Foundations India 2010 will bring together leading industry professionals and experts from geotechnology, construction and academia to discuss the latest trends and overcome challenges in piling and deep foundations.

Benefits of attending:

- **Networking** with premier institutions, academic researchers, leading design firms and industry specialists
- **Showcasing** latest economical techniques and methodolgies
- **Driving** innovation in geotechnical design
- **Assessing** and **improving** health and safety in deep foundations
- **Outlining** new design methods
- **Exploring** the future of piling

4th International Conference in Geotechnical Engineering and Soil Mechanics, November 2nd & 3rd 2010, Tehran, Iran, www.icgesm2010.ir

31. BAUGRUNDTAGUNG mit Fachausstellung Geotechnik, 3 – 6 November 2010, ICM München, www.baugrundtagung.com

SECED YOUNG ENGINEERS CONFERENCE, 4 November 2010, University College of London, www.cege.ucl.ac.uk/events/yec

BANGLADESH GEOTECHNICAL CONFERENCE 2010
Natural Hazards and Countermeasures
in Geotechnical Engineering
4-5 November, 2010, Dhaka, Bangladesh

Conference Themes

- Scouring
- Landslide
- Embankment and Dam
- Problematic soils
- River/Bank erosion
- Geo-Environmental problems
- Earthquake and Liquefaction
- Landfill
- Ground improvement
- Earthen structures

Contact

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ICSE-5 5th International Conference on Scour and Erosion, 7 – 10 November 2010, San Francisco, USA, www.icse-5.org

ISFOG 2010 2nd International Symposium on Frontiers in Offshore Geotechnics, 8 – 10 November 2010, Perth, Western Australia, w3.cofs.uwa.edu.au/ISFOG2010

ICSE-5 5th International Conference on Scour and Erosion, 8 – 10 November 2010, San Fransisco, USA, www.icse-5.org

6ICEG 2010 - Sixth International Congress on Environmental Geotechnics, November 8 - 12, 2010, New Delhi, India www.6iceg.org

Tunnel Design & Construction Northeast Asia
24 & 25 November, 2010, Hong Kong
www.tunneldesignconstruction.com

Tunnel Design & Construction Northeast Asia is a comprehensive event on trends and technologies for the cost effective tunnel design, construction and maintenance for tunnels.

The event will cover design codes for tunnels, various construction methods employed, cost benefit analysis, recent advancements in M&E, fire/safety/evacuation procedures, ventilation/pollution control and trends in geotechnical investigations for subsurface infrastructure construction.

Tunnel Design & Construction Northeast Asia will cover current projects under planning/design/construction in: P R China, Hong Kong, S. Korea, Taiwan, Vietnam and Japan.

Tunnels are now an integral part of Asian transportation scene, environment concerns and urban utility needs.

Developing sustainable tunnel infrastructure is the theme of this two day conference, **Tunnel Design & Construction Asia**. By outlining various new technologies and trends in TBM bored tunnels, NATM tunnels, cut & cover tunnels and immersed tube tunnels at a single sitting, the conference presents a unique opportunity for any tunnel engineering stakeholder in Asia.

Major tunnel engineering concerns such as:

- optimising tunnel design and construction processes
- implementing proper geotechnical investigation methods
- integrating higher safety and ventilation standards and
- improving the service life cycle of tunnel

are addressed by the 20 experts speaking at the conference, who through their path breaking design and construction best practices, have revolutionised tunnel projects around the world!

More importantly, case studies on 8+ ongoing projects covering the above concerns are being presented for the first time in Tunnel Design & Construction Asia!

Learn from the experts, interact and network with the industry leaders and incorporate the collective tunnel engineering expertise gathered – into your tunnel projects, making them sustainable, safer and last longer!

Key Topics of Discussion at Tunnel Design & Construction Asia Include:

Tunnel Design & Construction Asia will provide you with a fuller understanding and dissemination of best practices in sustainable design and construction of subsurface infrastructure. It will aid Asian asset owners and EPC/AEC stakeholders with:

- NATM and bored tunnelling
- Immersed tube tunnelling
- Cut & Cover tunnelling Hydraulic design for wastewater tunnels
- Tunnel durability design
- Fire, evacuation and ventilation design and construction

For more information, please call (65) 6722 9388, email enquiry@iqpc.com.sg or visit www.tunneldesignconstruction.com

Geotechnical and Transportation Engineering, GEOTROPIKA 2010 "Sustainability in Geotechnical and Transportation Engineering", 1–3 December 2010, Sutera Barbour, Sabah, Malaysia seminar.spaceutm.edu.my/geotropika2010

VII Congresso Suramericano de Mecánica de Rocas - ISRM South American Regional Symposium 2010, 2 – 4 December 2010, Lima, Peru, eventos@iimp.org, asamaniego@svs.com.pe

Italian Geotechnical Journal – Special Issue on Seismic geotechnical design and retrofitting, agiroma.rig@iol.it

ISSMGE TC40 Forensic Geotechnical Engineering An International Symposium on FORENSIC GEOTECHNICS OF VIBRATORY AND NATURAL HAZARDS, December 14-15, 2010, Mumbai, India, http://www.geoengineer.org/events/FGEBrochure2010.pdf

5th International Conference on Earthquake Geotechnical Engineering, Santiago, Chile, 10 – 13 January 2011, www.5icege.cl

International Conference on Tunnelling and Trenchless Technology, 1-3 March 2011, Kuala Lumpur (Malaysia), www.iem.org.my/external/tunnel/index.htm

Geo-Frontiers 2011 - Advances in Geotechnical Engineering, 13-16 March, Dallas, Texas, USA, www.geofrontiers11.com

International Conference on Vulnerability and Risk Analysis and Management (ICVRAM) and ISUMA 2011 Fifth International Symposium on Uncertainty Modeling and Analysis, April 11-13, 2011 in Hyattsville, Maryland, USA, www.asce.org/instfound/cdrm/icvram

7th International Symposium on "Geotechnical Aspects of Underground Construction in Soft Ground", 16-18 May 2011, Roma, Italy, www.tc28-roma.org

GEDMAR2011 Geotechnical and Highway Engineering - Practical Applications – Challenges and Opportunities at the Future 3rd International Conference on Geotechnical Engineering for Disaster Mitigation and Rehabilitation 2011 combined with 5th International Conference on Geotechnical and Highway Engineering 18 - 20 May 2011, Semarang, Central Java, Indonesia, reliability.geoengineer.org/GEDMAR2011

WTC2011 Helsinki, AITES-ITA 2011 World Tunnel Congress and 37th General Assembly, 21-25 May 2011, Helsinki, Finland, www.ril.fi/web/index.php?id=641

XIV Asian Regional Conference Soil Mechanics and Geotechnical Engineering, Hong Kong, China, 23 - 28 May 2011

Dams and Reservoirs under Changing Challenges
June 1 - 2, 2011, Lucerne, Switzerland

The Swiss Committee on Dams is pleased to invite professionals and researchers in the field of dam design and construction as well as dam owners to the International Symposium «Dams and Reservoirs under Changing Challenges». The symposium will be held during the 79th Annual Meeting of ICOLD from May 29 to June 3, 2011 in Lucerne, Switzerland.

The Symposium will serve as a perfect venue for practitioners, engineers, researchers, scientists, managers and decision makers from all over the world to exchange ideas about the latest developments dealing with dams and reservoirs under changing environmental and socioeconomic conditions.

With a surface area of approx. 40 000 km2 and 205 large dams in operation, Switzerland is the country with the highest density of dams in the world. 48 dams exceed 60 m in height, and 25 are more than 100 m high. With a height of 285 m, the almost 50 years old Grande Dixence dam is still the highest concrete dam in the world. All dams are well integrated in the environment and contribute to the economic prosperity of the country.

Beside international best practice the participants will not only learn from this Swiss dam knowledge and competence during the Symposium on June 1, but will also have the occasion to visit existing dams and several hydropower projects under construction during a technical tour on June 2.

Symposium Themes

The changing challenges for dams and reservoirs in this century will be discussed under the following topics:

A. Long-term behavior of dams

- Maintenance and surveillance
- Safety concepts
- Emergency action plans
- Alkali aggregate reaction (AAR) of dam concrete
- Rehabilitation and uprating

B. Dams and climate change

- Long-term operation of dams
- Sedimentation of reservoirs
- Water resources management of reservoirs
- Flood passage and management
- Water transfer over long distances
- Water supply and irrigation
- Energy production

C. Dams and natural hazards

- Earthquakes
- Floods and related release structures
- Landslides and avalanches into reservoirs
- Extreme climate conditions

D. Dams in a sound environment

- Tourism and recreation
- Contribution to renewable energy production
- Ecological mitigation measures
- Navigation
- Irrigation and food production

The above list is not exhaustive and other themes related to these topics are welcome to the Symposium.

Organization Contact

Swiss Committee on Dams
c/o Laboratory of Hydraulic Constructions (LCH)
Ecole Polytechnique Fédérale de Lausanne (EPFL)
Station 18
CH-1015 Lausanne, Switzerland
Tel : +41 (0)21 693 23 85
Fax : +41 (0)21 693 22 64
e-mail : swissdams@stucky.ch
www.swissdams.ch

XV African Regional Conference on Soil Mechanics and Geotechnical Engineering Maputo, Mozambique, 13 - 16 June 2011.

IS – SEOUL 2011 Fifth International Symposium on Deformation Characteristics of Geomaterials, Wednesday-Friday, Aug. 31 – Sep. 3, 2011, Seoul, Korea, www.isseoul2011.org

6th International Symposium on Sprayed Concrete, 12-15 September 2011, Tromsø, Norway, www.sprayedconcrete.no

XV European Conference on Soil Mechanics and Geotechnical Engineering, 12 – 15 September 2011, Athens, Greece, www.athens2011ecsmge.org

24th World Road Congress "Mobility, Sustainability and Development", 26 – 30 September 2011, Mexico City, Mexico, www.piarcmexico2011.org

XIV Panamerican Conference on Soil Mechanics and Geotechnical Engineering (October) & V PanAmerican Conference on Learning and Teaching of Geotechnical Engineering & 64th Canadian Geotechnical Conference, Toronto, Ontario, Canada, 2 - 6 October 2011

Tirana, Albania

A lot of landslides are activated in the last years, in the Balkan Region and the near countries. This landslides, had great consequences in economic fields, infrastructure, people's life and in the environment. The objective of this symposium is the exchange of our experience regarding the list of topics, learning from each other and make possible that we could find more effective ways regarding the prevention of the problem and finding engineering solution, or by other means to stabilize landslides and to protect the environment.

Symposium topics:

- Geological and environmental issues
- Field and laboratory investigations
- Landslide modelling
- Analyzing landslide causes
- Landslides and Infrastructure
- Landslide and Landscape Architecture
- Seismic influence in landslides
- Erosion influence
- Engineering precautions
- Case Studies
- Academics-practitioner coordination

Event Contacts:

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Beijing 2011, 12th International Congress on Rock Mechanics, 16 – 21 October 2011, Beijing, China, www.isrm2011.com

2011 AFTES Congress "Espaces Souterrains de Demain", Lyon, France, 17 – 19 October 2011, www.aftes.asso.fr/congres_presentation-organisation.html

4th International Conference on Grouting and Deep Mixing
February 15-18, 2012, New Orleans, Louisiana, USA
www.grout2012.org

This conference, organized by the International Conference Organization for Grouting, Inc. (ICOG) and the Deep Foundations Institute, will update the state-of-practice and state-of-the-art in grouting technology, continuing the series of successful grouting conferences initiated in 1982 and its ten-year updates in 1992 and 2003. The proceedings of this conference will follow the precedent of prior conference proceedings that have become staples on the bookshelves of grouting practitioners, designers and researchers worldwide.

An outline of topics is included below. Related topics for soil and rock grouting will also be considered.

Proposed Session Topics:

- Sustainability in Grouts and Grouting Applications
- New and Emerging Technologies in Grouting
- Properties of Grout Materials:

  Calcium Aluminate
  Portland cement
  Silicate Cements
  Slag cements
  Sodium Silicate
  Colloidal Silica
  Hot Melts
  Silica Fume
  Foams Microfine cements
  Polyurethanes Low mobility grouts
  Acrylates Admixtures
  Ultrafines
  New Grouting Materials

- Verification of Grouting and Deep Mixing:

  Geophysical Methods of Verification

Demonstration Sites - summary and findings
Innovations and Developments in Verification Techniques Equipment
Drilling for Grouting and Ground Treatment

- Properties of Grouted Materials:

  Chemically Grouted Soils and Rock
  Compaction Grouted Soils
  Soil-cement/soilcrete - jet grouted and deep mixed soils
  Strength and Permeability of Grouted Rock
  Strength and Permeability of Grouted Soil

- Grouting and Deep Mixing for Seismic Retrofit and Remediation

- Design methods and models for grouting

- Design methods and models for deep mixing

- Case Studies in Applications of Grouting and Deep Mixing:

  Dams
  Grouting of major civil structures
  Mines
  Environmental applications
  Sealing pipes
  Grouting for deep foundations
  Tunnels
  Grouting for tiebacks
  Containment
  Grouting for micropiles
  Grouting in Rock
  Temporary and permanent earth support
  Karst mitigation
  Hydraulic barriers
  Ground treatment (permeability reduction, settlement control, seismic retrofit, structural support)

- Innovations and Developments in Ground Treatment Technology

  Deep Mixing
  Compensation Grouting
  Jet Grouting
  Pumping and injection equipment and methods
  Permeation Grouting
  Automated monitoring and control
  Compaction Grouting

- Pipeline Grouting

  Internal pipeline repair
  Pipeline stabilization

Deep Foundations Institute
326 Lafayette Avenue - Hawthorne, NJ 07506, USA
tel: 973.423.4030 - fax: 973.423.4031 –
email: staff@dfi.org

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

EUROCK 2012 - ISRM European Regional Symposium - Rock Engineering and Technology, 27 – 30 May 2012, Stockholm, Sweden, eva.friedman@svebefo.se

12th Baltic Sea Geotechnical Conference, 31 May – 02 June 2012, Rostock, Germany

11th Australia - New Zealand Conference on Geomechanics, Melbourne, Australia, 15-18 July 2012

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

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

ITA-AITES WTC 2013
"Underground – the way to the future"
Geneva, Switzerland, 10 to 17 May 2013

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

The first International Congress of FedIGS in Hong Kong – China June 2012 in this respect will be a milestone. The conference aims at bringing together for the first time the Geo-engineering linked industry and its academics' support through the learned Societies and the Joint Technical Committees to set up plenary discussion sessions on geo-engineering risk management, near- and offshore engineering issues, underground spaces and transportation systems, geo-engineering earthquake issues, geo-environmental discussion topics, dams and levees engineering, natural and engineering slopes etc…. It's my great pleasure as FedIGS President to cordially invite you to attend this starting key event of FedIGS, so well developed by the organising committee and conference advisory committee of this important region in China

Themes and sub-themes

1. Underground spaces and transportation systems
2. Ground improvement and ground reinforcement
3. Geo-engineering and earthquakes
4. Geo-engineering and the environment
5. Geo-engineering education
6. Natural and excavated slopes
7. Near shore geo-engineering issues
8. Risk(geo-engineering) management

ΝΕΑ ΑΠΟ ΤΙΣ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

Prof. Ralph Peck's Legacy Website
http://www.geoengineer.org

Geoengineer.org is pleased to announce the launch of "Professor Ralph Peck's Legacy Website". The Website has been developed to celebrate the life and legacy of one of the Heroes of the geotechnical engineering field and honor a distinguished geotechnical engineer for his dedication and contributions to the society as a teacher, author, and engineer. The Website includes a lot of resources such as biographical data, quotes, photos, powerpoints, and even videos of lectures by Professor Peck.

The Shamsher Prakash Foundation has generously sponsored this activity. The website has been developed in collaboration with Mrs. Nancy Peck-Young, Prof. Peck's daughter and was supervised by an international Advisory Committee of distinguished members of our community that had the luxury of knowing Prof. Peck and consists of Prof. Dobry, Prof. Cording, Prof. Prakash and Dr. Lacasse. The content of the website is divided in three parts: "About his life", "Publications" and "Resources". Read below for more information.

We hope that this resource will be a source of inspiration for the future generations of geotechnical engineers. We also encourage you to provide us with any additional resources/content and we will be glad to include it in the website's content.

On behalf of Geoengineer.org

Dimitrios Zekkos, Ph.D., P.E.

Managing Director of Geoengineer.org
Assistant Professor, Geotechnical Group.
Department of Civil and Environmental Engineering
The University of Michigan, Ann Arbor

In-Mo Lee becomes new ITA president

Professor In-Mo Lee has been voted President of the International Tunnelling Association. The Korean saw off French candidate Yann Leblais and Norwegian Professor Eivind Grov in the second round of voting after not gaining a majority in the first. The election was held in Vancouver at the ITA General Assembly.

The Korean School of Civil, Environmental and Architectural Engineering in Seoul professor will take over from the UK's Martin Knights, who is stepping down after three years in the position.

Message from In-Mo Lee

Dear ITA Colleagues

This is In-Mo Lee from Korea. I was elected to be the President of ITA for the coming three years' term in the Vancouver General Assembly. I am the first Asian to become the ITA president in 36 years' ITA history.

Let me introduce myself to you. I was born in 1954 and grown up at the countryside of the Korean peninsula until I went to Seoul for my undergraduate studies. I received a B.S. degree in Seoul, and M.S. and Ph.D. degrees in the United States. Talking about family, Yun-Shik is my wife, and we have one son, Yohan.

During my campaign for the presidential election, I always insisted that it is really important for ITA to be functioning in harmony. As the newly elected president, I will try my best to lead the ITA in harmony, well-balanced harmony. My role as the ITA president is the "pipeline": the pipeline connecting the western with the eastern; the pipeline connecting active member nations with emerging member nations; and the pipeline connecting experienced tunnel engineers with young engineers.

Thank you very much for your support and good luck to each and every member nation.

In-Mo Lee
President of ITA 2010-2013

INTERNATIONAL GEOSYNTHETICS SOCIETY

At the recent 9th International Conference on Geosynthetics (9th ICG) held in Guarujá Brazil the IGS Council marked the beginning of a new Council term. At the General Assembly

the officers and council members elected to serve for the 2010-2014 term were announced and officially took office. The elected officers are: **Dr. Jorge G. Zornberg - President, Dr. Russell Jones – Vice President** and **Prof. Fumio Tatsuoka Immediate Past President.** As per the IGS by-laws the new council elected a Treasurer and Secretary from amongst the council membership. **John Cowland**, the incumbent Treasurer was reappointed by the council to serve as the IGS Treasurer. **Elizabeth Peggs**, a 6 year member of the Council was appointed to the position of IGS Secretary. In addition to these appointments the IGS Council co-opted members in order to better represent the diversity of the IGS membership within the council. **Gerhard Bräu** continues as the Editor of IGS News and in that position has a permanent invitation to participate in council meetings. The resulting IGS Council Roster is as follows:

J.G. Zornberg (U.S.A.)	**President**
F. Tatsuoka (Japan)	**Immediate Past-President**
R. Jones (U.K.)	**Vice President**
J. Cowland (Hong Kong)	**Treasurer**
E. Peggs (U.S.A.)	**Secretary**
G. Bräu (Germany)	**IGS News Editor**
P. Abad (Spain)	Council Member
S. Allen (U.S.A.)	Council Member
D. Bergado (Thailand)	Council Member
E. Blond (Canada)	Council Member
M. Bouazza (Australia)	Council Member
N. Dixon (U.K)	Council Member
P. Fantini (Italy)	Council Member
H. Jeon (Korea)	Council Member
J. Kuwano (Japan)	Council Member
P. Legg (South Africa)	Council Member
J. Otani (Japan)	Council Member
V. Pimentel (Brazil)	Council Member
K. Rajagopal (India)	Council Member
M. Sadlier (Australia)	Council Member
X. Tang (China)	Council Member
N. Touze-Foltz (France)	Council Member
G. Vivar (Peru)	Council Member
C. Yoo (Korea)	Council Member
M. Ziegler (Germany)	Council Member

The International Geosynthetics Society (IGS) has launched a new and much-improved web site! As a privilege of IGS Membership, the web site includes a number of features that are only accessible to you--as an IGS Member--when you log in. Also, the new site has enhanced content, including a photo gallery, news and even a translation function (for non-technical text).

IGS members have exclusive access to items such as: the membership directory, IGS Journals, training lectures, and much more. In fact, when logged in, you may enjoy **direct access** to the IGS Journal "***Geosynthetics International***." IGS Members will no longer need to log-in on the Journal's web page if they access the journal via IGS site. You may also gain access to ***Geotextiles & Geomembranes*** via the IGS web site; however, you will still need the required log-in information from the publisher. We are working with the publisher to provide automatic log-in to ***G&G*** in the future.

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FedIGS developments

As many of you will know, a Federation of International Geo-engineering Societies (FedIGS) was established recently, the three constituent Societies being the ISRM, the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), and the International Association for Engineering Geology and the Environment (IAEG). The intention of FedIGS is to enhance communication between the three Societies in areas of mutual interest. However, the configuration and style of the originally formed FedIGS turned out to be inherently cumbersome and functionally inflexible.

Accordingly, the three current Society Presidents, John Hudson of the ISRM, Jean-Louis Briaud of the ISSMGE, and Fred Baynes of the IAEG made a series of agreed recommendations for re-configuring FedIGS to a leaner more effective Federation. These included the elimination of fees, a reduction in the number of Joint Technical Committees (JTCs), and a reduction in Liaison Committee members. These recommendations were adopted by the FedIGS Board at a meeting in London, UK, on 28 May 2010. The intention is that, while retaining the basic thrust of FedIGS in enhancing communication between the constituent Societies, it will now be a sleeker and more informal organisation.

To take us forward with this new FedIGS configuration, I am pleased to report that our previous ISRM President, Nielen van der Merwe, is now the Chairman of FedIGS. He has invaluable related experience, both with the ISRM and with the development of FedIGS. Thus, I am now confident, given the FedIGS reconfiguration, that the ISRM membership of FedIGS is indeed 'a good thing' and will enable us to follow up any required inter-Societal initiatives rapidly and effectively.

John A Hudson
ISRM President

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Pacifica orders evacuation of apartments on crumbling cliff

Pacifica officials have ordered the remaining tenants of an apartment building that sits on the edge of a crumbling cliff to evacuate because of safety concerns.

Residents at 320 Esplanade Ave. in Pacifica, Calif., were told to evacuate their apartments by Sunday night, photographed Friday, April 30, 2010. A massive piece of concrete restraining wall has broken loose from below the cliff side apartment complex forcing the new evacuation order and putting the structure in danger. The erosion of the cliffs began in December and has forced dozens of residents to find a new place to live. (John Green/Staff)

Pacifica building official Doug Rider said that based on engineering analyses reviewed this week, residents' safety could not be guaranteed in the event of a major earthquake.

Six units at that apartment house were already red-tagged in January when a massive hunk of the cliff tumbled into the Pacific Ocean. Residents who lived next door at 330 Esplanade Ave. were also ordered out of their homes in December when officials decided too much of the bluff was gone for that building to be safe.

The project to build a retaining wall behind 320 and 330 Esplanade is on hold. Disagreements over a long-term strategy to deal with the bluff erosion and difficulty coming up with the millions of dollars to pay for the work mean any kind of a fix could be far off.

There also is the possibility of a legal action hanging in the air. A source with extensive knowledge of the situation but who requested anonymity said one or more of the owners may file a lawsuit against Pacifica for its handling of the situation. The lawsuit would allege that the city didn't take proper remediation steps against erosion and had given the original approval to build the structure on a sandy bluff, the source said. It could be filed in the coming weeks.

(Joshua Melvin, San Mateo County Times, 01.05.2010)

Rock fall protection in Gibraltar

In Gibraltar, where the entire population lives on or close to the huge limestone rock that gives the nation its name, the issue of rock fall protection is taken very seriously.

Here, a scheme to install a network of rock fall catchment fences has just been completed, which will allow the re-opening of a critically important road at the south-eastern end of the Rock, which was closed following a significant rock fall occurrence in 2002.

Dave Crowther technical manager for rock fall protection specialists, Maccaferri explains.

The potential dangers of rock fall in this and other areas of the Rock were already known and the Gibraltar government had previously commissioned consultants Golder Associates to advise them on rock fall protection.

The rock fall protection system comprises a network of continuous, high-strength steel wire, ring-panels suspended at 10m intervals from 5m high steel posts. The fence posts are positioned down-slope with steel cables fixed to back-stay anchors, securely fixed in a reversed v-formation, up-slope of the fence run.

Consequently, Golder Associates proposed a combination of mitigation measures to provide protection for the 500m long stretch of road leading up to the Dudley Ward Tunnel entrance, site of the previous rock fall incident. These included an extended rock fall canopy over the tunnel entrance, passive rock fall catch ditches cut into the lower slope immediately above the road, and a network of high resistance catch fences.

The catch fence scheme, valued at some £1 million (E1.1 million) was undertaken by contractor CAN Geotechnical. Three fences were installed; firstly a 200m long section split into three lengths, plus a second 70m long and a third 90m long run.

The element design and supply of the catch fences was put to Oxford, UK-based rock fall protection specialists Maccaferri, who proposed a network of the company's 5m high, CTR 30-04-A Barriers, capable of withstanding 3,000kJ (kilojoules) impacts. This is one of the company's highest capacity barriers, the highest being capable of containing impacts of up to 5,000kJ, the equivalent of stopping a 16.5tonne truck travelling at over 90km/hour.

Catch fence design is now a sophisticated, high-tech process with the development of ever-more efficient systems, capable of absorbing huge amounts of kinetic energy caused by falling debris, [measured in kilojoules/kJ]. Much of the development work is European lead and has resulted in the adoption of a new European testing methodology, ETAG 027 (the European Technical Approval Guideline 027), which sets out the minimum standards for the manufacture, performance and testing of rock fall protection barrier systems used throughout the EU. It also forms the basis of the CE approval process so only rock fall protection systems which pass ETAG 27 can gain CE approval. Compliance will become a legal requirement across Europe.

The Maccaferri system, which is ETAG 027 compliant, comprises a network of continuous, high-strength steel wire, ring panels suspended at 10m intervals from 5m high steel posts. The posts are an integral part of the system but also act as independent components so if one is struck and damaged, adjacent posts accommodate the additional loadings.

The fence panels are positioned down-slope with steel cables fixed to back-stay anchors, securely fixed in a reversed v-formation, up-slope of the fence run. The 5m high fence posts are fixed to articulating brackets which are attached to substantial concrete head-blocks.

During an impact, the system ensures that the energy of the falling rock is dissipated and the rock is prevented from moving any further down the slope. Impact forces are shared among spans so that the stresses on the individual system components are minimised.

Energy dissipaters fitted to the post heads, help absorb impact shock loads. These dissipaters work by absorbing the applied energy by deformation and not by friction. The catch fence components were supplied to site in pre-fabricated kits These kits come with the majority of connections, cables and related components factory-fitted to minimise installation variations.

(World Highways, 6 May 2010)

Using sonic methods to drill in an embankment dam

During installation of a double-line grout curtain at Wolf Creek Dam, the U.S. Army Corps of Engineers used sonic drilling to install the holes through the embankment. This method of drilling provides several benefits over drilling using fluids, says Michael F. Zoccola, chief of the civil design branch of the Corps.

Sonic drilling involves the use of high-frequency resonant vibration to advance a core barrel into a structure, Zoccola explains. The drill loosens soil and allows the core barrel to advance. Personnel can then install an outer casing and remove the core barrel.

Zoccola says the Corps chose sonic drilling for several reasons. First, it poses the least risk to embankments because it does not use water or air, which have the potential to hydrofracture the embankment. Second, it allows collection of continuous soil samples while drilling, which can be used to identify subsurface conditions. Third, sonic drilling can be accomplished relatively quickly, reducing time in the field.

Wolf Creek Dam, on the Cumberland River in Kentucky, impounds water for a 270-MW powerhouse. The dam, a combination of rolled earthfill and concrete gravity construction, was completed in 1952. The dam is 5,736 feet long, and the distance from the crest to the foundation is as much as 250 feet.

Over the years, the dam has experienced problems, such as sinkholes in the downstream face of the dam, due to erosion and piping of material through the karst limestone foundation. To remedy the situation, the Corps is building a permanent cutoff wall that extends through the embankment and up to 100 feet into the limestone foundation, Zoccola says. To support this effort, the Corps installed a double-line grout curtain in the bedrock foundation across the entire length of the dam. This grouting program filled any voids that would pose problems during installation of the wall and provided a method to investigate conditions in the dam, which is aiding in design of the wall.

Work performed to install the grout curtain consisted of:

- Sonic drilling through the embankment dam and natural alluvial material, to allow for installation of casings into bedrock;

- Collection of continuous core samples during drilling;

– Drilling through the casings into the underlying bedrock, using water hammer-type rigs; and

– Remedial grouting of the bedrock foundation.

Boart Longyear Environment & Infrastructure of South Jordan, Utah, performed the sonic drilling work at Wolf Creek Dam as subcontractor to Advanced Construction Techniques Ltd. of Kettleby, Ontario. Advanced Construction Techniques is building the grout curtain under a $50.9 million contract.

Treviicos Soletanche JV of Boston is installing the cutoff wall under a $341.4 million contract. Work on the wall began in the fall of 2008.

(HydroWorld Weekly, May 25, 2010)

Terrifying Sinkhole Opens in Guatemala, Swallows Three-Story Building

Huge Sinkhole This 200-foot-deep sinkhole opened Sunday in Guatemala City, Guatemala. It swallowed a three-story building and at least one person is missing.

The Guatemalan government posted this picture Monday (σ.σ. 31.05.2010) of a massive 200-foot-deep sinkhole in the capital of Guatemala City, which opened after a weekend of heavy rain from tropical storm Agatha.

A three-story building and at least one man were swallowed by its gaping maw, which officials estimate to be 100 feet in diameter.

Sinkholes are pretty common in Guatemala, Florida and other spots; just last month, a farmhouse with four people inside collapsed into a sinkhole in St. Jude, Quebec.

Sinkholes form in places where the underlying ground layer consists of limestone, salt beds or other soluble rock, which dissolves in water. Groundwater coursing beneath the surface eats away at the rock, slowly eroding and destabilizing it. Often, new underground caves are created, which then collapse in catastrophic scenes like this one.

Unfortunately, not much can be done to prevent the phenomenon -- other than hope you don't get swallowed.

(Rebecca Boyle, Popular Science, June 1, 2010 στο ASCE SmartBrief, June 1, 2010)

The second massive sinkhole to appear in Guatemala City in four years may also have been caused by a combination of geological anomalies and problems with water utility pipes.

Soil mechanics experts told *NCE* that similarities between the 30m deep and 20m wide sinkhole that opened up last week and a deeper version that swallowed up houses in 2007, cannot be ignored.

Engineers are now convinced that the 2007 collapse was prompted by failures in the city sewer system.

The latest chasm appeared after a tropical storm, swallowing several buildings, although there have been no reported fatalities.

The unusual event echoes a similar incident just over three years ago in the same city when a 100m deep sinkhole pulled several houses and a truck into the ground (*NCE* 8 March 2007).

University of Leeds engineering geology course director Bill Murphy - who has worked in Central America - said that atypical geology, such as the presence of volcanic rock, was a likely factor in the appearance of sinkholes in the area.

"Sinkholes are normally formed in soluble ground such as chalk, limestone or gypsum," he said. "Soluble ground is then eaten by water creating a cavern that then migrates to the surface until there isn't enough strength left to support the land.

"In Guatemala City, it is likely the cause is due to the ground in the area being dominated by volcanic rock rather than a tectonic or other geological fault."

British Geological Survey expert Tony Cooper said that it was "very likely" the same factors were involved in both incidents, which comprised geological anomalies coupled with problem water systems.

Cooper said that much could be learned about from a 2008 report into the 2007 sinkhole by geological specialist Tony Waltham.

That report echoed other engineers who at the time said that the incident emulated karstic formations seen elsewhere that were prompted by human activity.

"With few exceptions, the ground collapses that constitute the karst geohazard in engineering activity in limestone terrains are induced by human activity," says Waltham's report.

"Subsidence sinkholes, formed entirely within the soil profile, constitute the most widespread karst geohazard, but are largely induced by engineered works, either directly or accidentally."

Cooper added that there was no doubt that a broken drainage system had a large part to play in the sinkhole of 2007. "There was a major sewer failure after a period of heavy rain and residents had heard noises from the pipes for months beforehand," he said. At the time, Guatemala City mayor Alvaro Arzu blamed only a saturated sewer main.

Cooper said the latest sinkhole was a "man-induced removal of material" meaning the cause was "largely unnatural" because of the effect of men placing drains above the ground over many years."

(Natalie Hardwick, New Civil Engineer, 9 June, 2010)

Buildings along Second Ave. subway crumbling
At least 60 structures need work so they do not become a danger to the public, the MTA says.

Scores of buildings along Second Avenue are crumbling into disrepair as construction begins on a new subway line.

The Metropolitan Transportation Authority is working to shore up two buildings near a new 96th Street station that are leaning as far as 18 inches off their center. Workers have installed internal tension wires and external trusses to keep the buildings at 1766-1768 and 1873 Second Ave. from toppling over.

Elsewhere along Second Avenue, workers are setting up scaffolding to protect passersby from falling bricks and keystones.

All told, at least 60 buildings along Second Avenue need repair or construction work to keep them from becoming a danger to the public. The MTA is evaluating more than 100 other sites between 96th and 63rd streets to determine whether they will need to be repaired. The city's Department of Buildings is overseeing the repair work.

So far the bill for repairs is between $6 million and $8 million. Authorities said the damage to the buildings was not caused by the massive construction project but noted that the buildings needed to be repaired in order for work on the new subway line to continue. Michael Horodniceanu, the president of MTA Capital Construction, said it was cheaper for the MTA to fix the buildings than to wait until the buildings' owners remedied the safety hazards.

"These problems should have been addressed long ago," he said. But, he said, "We do not have the luxury of waiting around until the buildings are fixed by the owner."

By the end of June, the MTA says it plans to temporarily relocate residents from 28 apartments while repairs are underway. The relocation will last about a month.

MTA authorities said the cost and effort to bring the buildings up to code is not delaying the first phase the Second Avenue subway's construction. The $4.45 billion first phase of the project is expected to be complete by 2016.

The first phase will be an extension of the Q line from the west side to Second Avenue at 63rd Street and northward to 103rd Street. Passengers will be able to transfer at 63rd Street and Lexington Avenue for service to Queens. New stations will be constructed along Second Avenue at 72nd, 86th and 96th streets.

(Crain's New York Business, June 21 στο ASCS SmartBrief, 22.06.2010)

ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ

Rush is on for desert solar project

Developers eager for federal funding, but lizard is an issue

A proposal to cover 10 square miles of federally owned desert with mirrored dishes to make electricity for San Diego is in a race against time and a lizard.

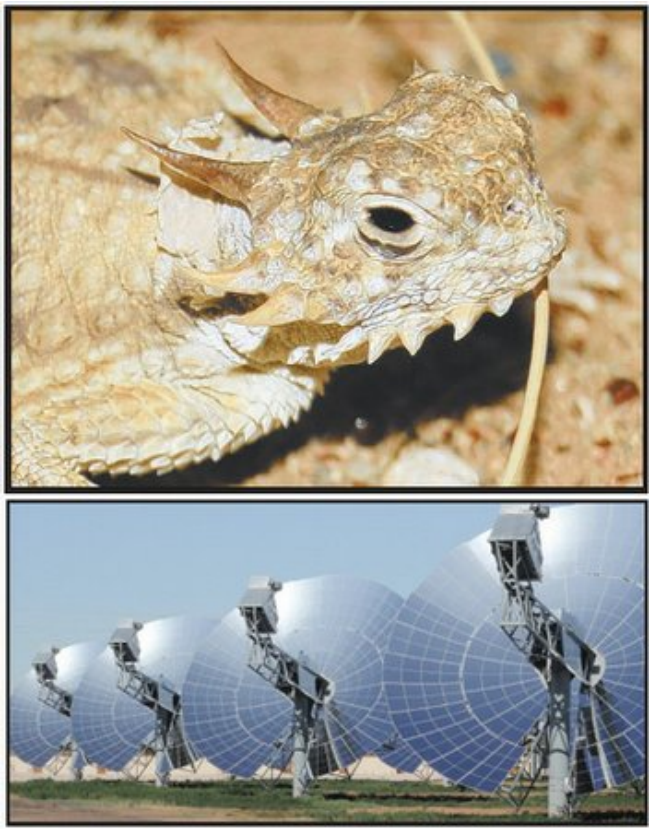
Tessera Solar and Stirling Energy Systems plan to build 30,000 dishes, each outfitted with an engine driven by the expansion of sun-heated hydrogen, to make 750 megawatts of electricity.

That's more output than from the typical new natural-gas power plant. San Diego Gas & Electric Co. is counting on the project for a big chunk of the renewable power that state law requires it to supply to its customers. The utility also says the project shows the need for the proposed Sunrise Powerlink transmission line. …

… For that, they'll have to get go-aheads from the U.S. Bureau of Land Management and the California Energy Commission. Both agencies are hearing from critics who say the project will destroy irreplaceable desert habitat — that would affect the flat-tailed horned lizard — and uses unproven technology.

"This is public land being given to a private company for an experimental process," said Donna Tisdale, a backcountry activist opposed to the project. …

… Critics are also concerned that the project will destroy land on which the flat-tailed horned lizard lives.



The flat-tailed horned lizard and the proposed solar dishes.

The lizard is being considered for federal protection as an endangered species. About 2,000 to 5,000 of the lizards live in the 6,500 acres of creosote-studded hills and washes 95 miles east of San Diego slated for the project.

The decision on whether to list them as endangered won't come until after September.

"This is exactly the wrong time to be doing this," said Terry Weiner, of the Desert Protective Council, an environmental group.

Tessera Solar plans to buy lizard habitat to make up for what it destroys and to move lizards that are in the way of the solar dishes, Gallagher said.

"The lizard is not going to prevent this project from opening," he said.

But maybe the lawyers will, said Kieran Suckling, head of the Center for Biological Diversity, which often sues government agencies over the Endangered Species Act.

"These projects are at high risk of getting caught up in litigation," he said. …

… Environmental reviews are being rushed because of the arbitrary stimulus deadline, he said. Congress could change that to allow more time to make sure habitat is protected.

…

(Onell R. Soto, San Diego Union-Tribune, May 26, from ASCE SmartBrief on Sustainability, May 26, 2010)

Levee repair plan under fire from environmentalists - Use of coal ash being questioned

Environmental groups are already lining up to protest U.S. Army Corps of Engineers plans to use coal ash to fortify flood-protection levees on both sides of the Mississippi River between Alton and Gale, located in Illinois' southern tip.

Coal ash -- also known as fly ash -- is the residue from coal combustion at power plants. It contains many types of toxins such as arsenic and mercury, and it has been closely linked to cancer, according to a wide range of studies.

Coal ash is highly unstable and degrades in the presence of water, making it a bad choice for levee construction, according to Kathy Andria, president of the American Bottoms Conservancy.

When Andria first heard of the corps' plans to rebuild levees with coal ash, "My initial impression was, 'This is really crazy,'" she said. "Why would they do that? I don't think they thought it through."

The corps, however, takes a different view regarding coal ash. In a recent environmental assessment, the corps underscored its many safe and beneficial uses, including a long track record in road construction and cement manufacture.

Both sides of the controversy will be aired when the corps holds a public hearing on the issue at 10 a.m. July 15 at the Robert Young Building in downtown St. Louis.

During the forum, the corps will discuss its plans to inject a lime-fly ash slurry into the levees to prevent the "slumps" and "slides" that tear down levee embankments, said Alan Dooley, a spokesman for the corps' district office in St. Louis.

"They've been doing this stuff for years to stabilize highly plastic clay," Dooley said.

The corps' plans for using coal ash occur against a backdrop of debate among federal agencies, including the U.S. Environmental Protection Agency, on the safety of coal ash. Last month the EPA proposed the first-ever national rules on its disposal and management.

At about the same time, the corps issued an environmental assessment of its plans to repair levees in Missouri and Illinois over the 200-mile stretch of river between Alton and Gale.

The assessment mentions four options, but recommended the use of the lime-fly ash mixture because it would achieve the same "level of repair integrity as any of the other alternatives but with less construction cost and adverse environmental impacts."

The same report also minimized the environmental impact of injecting coal ash into the levees to solidify the highly plastic clay.

"Because of the chemical reaction that takes place with lime, fly ash and water, trace heavy metals are locked into the cement matrix, no longer able to leach into the ground," according to the assessment.

According to the assessment's authors, the use of fly ash on federally funded projects is "encouraged by their classification as a 'recovered' product under the federal Resource Conservation and Recovery Act."

But Jeff Stant, director of the Environmental Integrity Project's Coal Combustion Waste Initiative, blasted the corps' depiction of coal ash as safe and consistent with federal policy.

Stant noted that the EPA has recently proposed sweeping new regulations for the storage of coal ash in the wake of a December 2008 dike collapse in Harriman, Tenn.

The breached dike, which was partially built from solidified coal ash, released 5.4 million cubic yards of coal ash sludge over 300 yards. The EPA has estimated it will cost $3 billion to clean up the resulting mess.

Yet the corps, with its plans to use coal ash in levees, is "acting like it never happened," Stant said. "They are certainly presenting a picture to the public that is false."

The corps' plans to use coal ash on the levees is "sheer recklessness," he said.

(Mike Fitzgerald, Belleville News-Democrat (Ill.) στο ASCS SmartBrief, 28 June 2010).

ΕΝΔΙΑΦΕΡΟΝΤΑ

Σύνδρομο καταπλάκωσης μια ασθένεια των σεισμών

Το "crash syndrom" ή σύνδρομο καταπλάκωσης είναι μια πάθηση που προκύπτει όταν υπάρχει καταπλάκωση από μεγάλο βάρος των άκρων του ανθρώπινου σώματος (χέρια ή πόδια). Για πρώτη φορά στην ιστορία, η πάθηση αυτή παρατηρείται στους σεισμούς της Μεσσίνας στην Ιταλία το 1909. Βέβαια, έκτοτε, η πάθηση αυτή δεν συνέδεσε τ' όνομά της μόνο με φυσικές καταστροφές, όπως οι σεισμικές δονήσεις, αλλά εμφανίστηκε εξίσου και σε εμπόλεμες περιοχές όπου οι βομβαρδισμοί άφηναν πίσω τους γκρεμισμένα κτίρια και ανθρώπους εγκλωβισμένους σε αυτά. Εμφανίζεται επίσης και σε ανθρώπους εγκλωβισμένους μετά από εργατικά και τροχαία ατυχήματα. Στους μεγάλους σεισμούς η επίπτωση του συνδρόμου καταπλάκωσης κυμαίνεται στο 2-15%.

Οι τραυματίες μένουν για μεγάλο διάστημα κάτω από τα συντρίμμια με αποτέλεσμα να διακόπτεται η κυκλοφορία του αίματος στα καταπλακωμένα άκρα. Στην περιοχή που έχει διακοπεί η κυκλοφορία υπάρχει υπέρ-συγκέντρωση τοξινών (μυοσφαιρίνης, γαλακτικού οξέος κλπ), οι οποίες, όταν απελευθερωθεί το άκρο, απελευθερώνονται ταυτόχρονα και ξαφνικά στην κεντρική κυκλοφορία του αίματος. Κάποιες φορές τα νεφρά δεν καταφέρνουν να απομακρύνουν αυτές τις τοξίνες και το αποτέλεσμα είναι η νεφρική ανεπάρκεια. Εάν η κατάσταση δεν αντιμετωπιστεί, το σύνδρομο της καταπλάκωσης μπορεί να οδηγήσει στο θάνατο.

Όταν τα άκρα απελευθερωθούν από το βάρος, διογκώνονται υπερβολικά. Η διόγκωση αυτή οφείλεται στο μεγάλο χρονικό διάστημα που οι μύες αυτοί δεν είχαν οξυγόνο. Η κλινική εικόνα μπορεί να περιλαμβάνει οίδημα των τραυματισμένων μυών με αισθητικές και κινητικές διαταραχές του μέλους, απουσία περιφερικών σφύξεων, ολιγουρία, ναυτία, εμέτους, σύγχυση και ευερεθιστότητα.

Το πιο σημαντικό πρόβλημα σε αυτές τις περιπτώσεις όμως είναι η νεφρική ανεπάρκεια, ο βαθμός της οποίας τελικά καθορίζει και την επιβίωση ή όχι του ασθενή. Περίπου το 50% των ανθρώπων με το σύνδρομο καταπλάκωσης θα εκδηλώσουν οξεία νεφρική ανεπάρκεια και από αυτούς το 50% θα χρειαστεί αιμοκάθαρση. Για την αντιμετώπιση της νεφρικής ανεπάρκειας χορηγείται μεγάλη ποσότητα υγρών και χρειάζεται να συνδεθεί ο ασθενής με τεχνητό νεφρό ώστε να γίνει αιμοδιάλυση, δηλαδή απομάκρυνση από το αίμα της μυοσφαιρίνης και των άλλων τοξινών.

«Κάποιες φορές οι ασθενείς συνέρχονται μέσα σε 24 ώρες και χρειάζονται μόνο μία αιμοκάθαρση. Κάποιες άλλες φορές χρειάζονται καθημερινά τρεις, τέσσερις, πέντε, έξι θεραπείες. Άλλες φορές παίρνει μια εβδομάδα, ενώ κάποιες άλλες οι ασθενείς δεν επανέρχονται ποτέ», λέει ο Στέφαν Μάντενς, νεφρολόγος των ΓΧΣ, ο οποίος αμέσως μετά το χτύπημα του σεισμού στην Αϊτή, Βρέθηκε στο Γενικό Νοσοκομείο του Πορτ-ο-Πρενς μαζί με την ομάδα επείγουσας παρέμβασης των ΓΧΣ και τέσσερα μηχανήματα αιμοκάθαρσης για να βοηθήσουν τους ασθενείς που χρειάζονταν εξειδικευμένη φροντίδα.

Αντίδραση του οργανισμού και ιατρική αντιμετώπιση

Στην πρώτη φάση του σοκ, γίνεται προσπάθεια από τον ίδιο τον οργανισμό για αυτορρύθμιση. Ο μηχανισμός αυτορρύθμισης στην αρχή καταφέρνει να κρατήσει την αρτηριακή πίεση σε φυσιολογικά επίπεδα αλλά τελικά, δεν μπορεί να τη διατηρήσει εξαιτίας της μεγάλης απώλειας υγρών κι έτσι, εμφανίζεται η δεύτερη φάση του σοκ, με απότομη πτώση της αρτηριακής πίεσης.

Σε αυτήν την κατάσταση, χρειάζεται άμεση παρέμβαση με χορήγηση μεγάλων ποσοτήτων υγρών ενδοφλέβια για να αποκατασταθεί η αρτηριακή πίεση. Επίσης, το προσβεβλημένο άκρο, εξακολουθεί να διογκώνεται και γίνεται πολύ σκληρό ενώ υπάρχει και έλλειψη αίσθησης σε αυτό. Συχνά, υπάρχει και έλλειψη περιφερικού σφυγμού λόγω προβλήματος της αρτηριακής κυκλοφορίας στο συγκεκριμένο άκρο.

Ακρωτηριασμός μπορεί να καταστεί απαραίτητος σε σοβαρές κακώσεις όταν το μέλος είτε δεν μπορεί να σωθεί ή οι σχετικές προσπάθειες έχουν αποτύχει. Το επίπεδο του ακρωτηριασμού επιλέγεται ανάλογα με την έκταση της κάκωσης του μέλους και πρόκειται για μια επέμβαση υψηλού κινδύνου. Συχνά, επίσης, αναπτύσσονται μολύνσεις στα νεκρωμένα άκρα με κίνδυνο σηψαιμία και θάνατο.

Πρόληψη

- Η έγκαιρη αναγνώριση και αντιμετώπιση του τραυματία σε κίνδυνο για σύνδρομο καταπλάκωσης ελαττώνει τη νοσηρότητα και τη θνητότητα.
- Η επαρκής ενυδάτωση ελαττώνει τον κίνδυνο οξείας νεφρικής ανεπαρκείας.
- Ο ακρωτηριασμός σε πρώιμο στάδιο μπορεί να αποτρέ-ψει την εκδήλωση του συνδρόμου.

Οι ΓΧΣ και το σύνδρομο καταπλάκωσης

Οι ΓΧΣ περιθάλπουμε θύματα σεισμού και τα τελευταία χρόνια αντιμετωπίζουμε το σύνδρομο καταπλάκωσης με νεφρολόγους και ειδικό εξοπλισμό αιμοκάθαρσης. Ξεκινήσαμε το 1999 παρεμβαίνοντας στο σεισμό της Τουρκίας και συνεχίσαμε το 2003 στο Μπαμ του Ιράν. Δύο χρόνια αργότερα δραστηριοποιηθήκαμε στο Βόρειο Πακιστάν ενώ το 2006 περιθάλψαμε τραυματίες με σύνδρομο καταπλάκωσης στην Ινδονησία. Το 2007 ανταποκριθήκαμε στο σεισμό του Περού, το 2008 στην Κίνα και το 2009 ξανά στην Ινδονησία. Τον Ιανουάριο του 201 Ο οι ΓΧΣ περιθάλψαμε τους επιζώντες του καταστροφικού σεισμού στην Αϊτή που διέτρεχαν κίνδυνο νεφρικής ανεπάρκειας εξαιτίας του συνδρόμου καταπλάκωσης.

(Δημήτριος Πύρρος – Απόστολος Βεΐζης, ΓΙΑΤΡΟΙ ΧΩΡΙΣ ΣΥΝΟΡΑ)

Management of Highways Maintenance Engineering

Highways maintenance is considered one of the most important topics in highways engineering. Without good maintenance, highways lose about 20-30% of design life. This also mean losing about $20-30 million from each $00 million of construction cost. Due to inflation, this value may reach $40-50 million.

This area of management is a new domain concerned with obtaining the best maintenance plan for highways using a limited budget. The first step is using an evaluation process to choose a suitable maintenance method. There are many evaluation methods some of them based on Visual rating such as the pavement condition index (PCI), pavement serviceability index (PSI) and deduct value and the rest based on using devices such as the falling weight deflectometer, Dynamic penetration cone and Benkelman beam.

Until now the idea of maintenance management was still based on visual rating methods, whereas evaluation meth-

ods based on using devices to evaluate highway surfaces do not have clear methodologies to apply highways maintenance management. Generally, the basic idea of visual rating evaluation methods is to collect highway defects from site: type, density and severity, for analysis and conversion to values for each defect. The pavement condition index "%PCI" is the method for highway surface evaluation that is widely used all over the world. This method was established by the US Air Force to serve its maintenance plan. This is based on visual rating and defects are classified into 17 categories (Egyptian code) or 19 defects (USA & KSA code). In both the concept and method is the same. The main steps when using this method are as the following:- - Collecting surface defects including many types of (cracking, surface deformation, skid surface and crumbled surface). - Determine defect density. - Determine a deduct value for each defect. - Get the Sum of these deduct values. - Get the corrected sum of deduct values. - %PCI = 100 - ‡" deduct values. However, although the PCI evaluation method is important, some specialists criticise it on some points, such as taking a sample from each km for visual rating. This may be treated by taking the whole length of the road. In some cases the final rating for any km may be illogical such as structural defects and especially edge cracking problems. Structure defects require a correction chart to modify the sum of structure defects.

Previously, it was agreed that any losses in highway efficiency would be due to defect deduction. The traditional maintenance method was based on making site visits and estimating budgets to raise %PCI to the max available (about 90%). This budget would be based on repairing all defects or excluding one or more and would be based on logic rather than a complete scientific study. Usually, highways maintenance raise highways %PCI to the max available. So, this may be costly. So, the new technique has to take into consideration the financial angle. The objective of this study is not how to reach max available %PCI, but how to reach the most efficient %PCI, as shown in figure (2). Reserve money may then be kept for another road or another public authority that may be in need of the resources.

The difference between the Traditional random method and proposed technique curve appears due to the "management of highways maintenance". Whereas, the general steps for this method is: arranging PCI for each km, starting from the smaller. Getting the benefit for each defect by comparing deduct value for each defect with its maintenance cost. Arranging defects benefit starting from the greater (for each Kilometer separately). Rearranging these defects as the following (Choose the smallest PCI/km, choose the greatest benefit in this km then get the new PCI for this kmcc repeat this cycle till the end of the limited budget). Draw a curve for overall PCI that represents the sum of PCI and determine the cost at turning point (Max. economical PCI). For unlimited budgets it is recommended to postpone repairing the rest defects that place at stage three.

Due to the new technique of maintenance management that arranged defects to commence with work to the most dangerous, there are three stages for maintenance cost. The first stage is the most benefit stage that presents efficient maintenance for low cost. This is considered the basic stage highways maintenance which upgrade highways to be safe for users. The second stage offers good benefits but, requires more investment. During this stage the road is given a good shape which is required in most countries. This also contains (maximum economical PCI) which represented by turning point that appears clearly on PCI-Cost curve and considered as target point in studying any economical maintenance plane. The third stage has a minimal benefit against very high cost. So, due to poor maintenance the study recommends neglecting the maintenance during this stage that wastes a lot of money to get minimal increment in %PCI.

Conclusion and Recommendation

This technique is suitable for both unlimited and limited budgets.

The aim is to raise highways efficiency to the best percentage that can be reached. This process is also concerned with making a balance between choosing the more dangerous and cheapest defects as priorities to be maintained. The financial view will be taken into consideration. Merging financial and technical views make this study more effective. Because highway projects and maintenance are expensive, it is recommended to use any technique managing maintenance of highways to reach maximum benefit and max money saving with high performance satisfaction.

(Mohamed Elsayed Mahmoud Eltantawi, WORLD HIGHWAYS Nesletter, May 2010)

Ελληνας έκανε το τσιμέντο... πράσινο

Σκυρόδεμα που δεν ρυπαίνει και ανακυκλώνεται, ανακάλυψε ο ερευνητής κ. Νικόλας Βλασόπουλος

Όποιος έχει δει έστω και για μία φορά σε... δράση τα φουγάρα μιας τσιμεντοβιομηχανίας, γνωρίζει ότι η κατασκευή του πιο διαδεδομένου οικοδομικού υλικού στον κόσμο είναι εξαιρετικά ρυπογόνος. Αυτό που ίσως δεν γνωρίζει είναι πως η παγκόσμια παραγωγή τσιμέντου ήδη ευθύνεται για το 5% των εκπομπών διοξειδίου του άνθρακα ετησίως, ποσοστό το οποίο ξεπερνά αυτό που αντιστοιχεί στις αερομεταφορές. Ακόμη χειρότερα, όλες οι προβλέψεις μιλούν για διπλασιασμό της παραγωγής τσιμέντου μέσα στις δύο επόμενες δεκαετίες, κάτι που σημαίνει και μεγαλύτερη επιβάρυνση στο κλίμα.

Κι όμως, χάρις στις πρωτοποριακές έρευνες ενός Έλληνα επιστήμονα, σύντομα θα υπάρξει μία εναλλακτική και πολύ πιο «πράσινη» λύση. Ο λόγος για τον Νικόλαο Βλασόπουλο, διδάκτορα από το Imperial College του Λονδίνου και συνεργάτη του ιδρύματος, ο οποίος έχει ανακαλύψει ένα νέο είδος σκυροδέματος, το οποίο μπορεί να παραχθεί με δραστικά μικρότερες εκπομπές - υπολογίζεται πως, στο... χειρότερο σενάριο, το οικολογικό τσιμέντο προκαλεί κατά 85% τουλάχιστον λιγότερα αέρια του θερμοκηπίου.

Υπό προϋποθέσεις, μάλιστα, το υλικό αυτό καταφέρνει ουσιαστικά να απορροφά από την ατμόσφαιρα περισσότερο διοξείδιο του άνθρακα απ' ό,τι απελευθερώνει, με επιπλέον όφελος για το περιβάλλον. Και η εταιρεία Novacem, που έχει εδώ και λίγα χρόνια ιδρύσει ο κ. Βλασόπουλος μαζί με άλλους ερευνητές από το Imperial, υπόσχεται πως το συγκεκριμένο προϊόν θα κυκλοφορήσει στην αγορά σε λιγότερο από μία πενταετία.

Ποιοι είναι όμως οι παράγοντες που κάνουν το συμβατικό τσιμέντο -το τσιμέντο Πόρτλαντ, όπως είναι γνωστό- «σύμμαχο» της υπερθέρμανσης του πλανήτη; Κατ' αρχάς τα συστατικά από τα οποία κατασκευάζεται: μία από τις βασικές πρώτες ύλες του κλασικού τσιμέντου είναι ο ασβεστόλιθος, ένα πέτρωμα που λόγω χημικής σύστασης εκλύει μεγάλες ποσότητες διοξειδίου του άνθρακα κατά την κατεργασία του. Επίσης, για την παραγωγή του κλασικού τσιμέντου, τα συστατικά «ψήνονται» σε θερμοκρασίες που φτάνουν τους 1.450 βαθμούς Κελσίου, «με συνέπεια να πρέπει να χρησιμοποιηθούν για αυτό τον σκοπό εξαιρετικά ρυπογόνα καύσιμα, όπως το πετ-κοκ» εξηγεί ο κ. Βλασόπουλος, μιλώντας στην «Κ».

«Το τσιμέντο μας παρασκευάζεται κυρίως από οξείδιο του μαγνησίου, χωρίς να χρησιμοποιούμε δηλαδή καθόλου ασβεστόλιθο, κάτι που σημαίνει πως εξαρχής έχει κατά 50% μικρότερο ανθρακικό αποτύπωμα», σημειώνει ο Έλληνας ερευνητής. Κι όχι μόνον αυτό· τα υπόλοιπα συστατικά που προστίθενται στο μείγμα παράγονται από χημικές αντιδράσεις, οι οποίες στην πραγματικότητα δεσμεύουν διοξείδιο του άνθρακα από την ατμόσφαιρα, μειώνοντας έτσι ακόμη περισσότερο τις συνολικές εκπομπές.

«Εξίσου σημαντικό όμως είναι πως το μείγμα που αναπτύξαμε χρειάζεται να θερμανθεί σε θερμοκρασίες που δεν ξεπερνούν τους 700 βαθμούς Κελσίου, με συνέπεια να μπορούμε να χρησιμοποιήσουμε καύσιμα πολύ πιο φιλικά στο περιβάλλον», συμπληρώνει. Όπως για παράδειγμα βιοκαύσιμα, καύσιμες ύλες δηλαδή φυτικής προέλευσης, οι οποίες, όταν καταναλωθούν, απελευθερώνουν τόσο διοξείδιο του άνθρακα όσο δέσμευσαν και τα φυτά από τα οποία αυτές προήλθαν. «Σε μία τέτοια περίπτωση μηδενίζονται οι ρύποι που οφείλονται στη θέρμανση του μείγματος, με συνέπεια η παραγωγή του τσιμέντου στην πραγματικότητα να αφαιρεί παρά να προσθέτει διοξείδιο του άνθρακα στην ατμόσφαιρα».

Στην πορεία των ερευνών, φάνηκε πως το προϊόν της Novacem έχει και άλλα σημαντικά οικολογικά πλεονεκτήματα, όπως για παράδειγμα ότι είναι δυνατόν να ανακυκλωθεί πλήρως μετά την κατεδάφιση ενός κτιρίου, ενώ αντίθετα το συμβατικό τσιμέντο μπορεί να επαναχρησιμοποιηθεί μόνο σαν χαμηλής ποιότητας δομικό υλικό. Βέβαια, όπως παραδέχεται ο Έλληνας ερευνητής, όλα αυτά τα πλεονεκτήματα θα ήταν άχρηστα αν το «πράσινο» σκυρόδεμα δεν μπορεί να παραχθεί σε τεράστιες ποσότητες. «Ωστόσο, οι πρώτες μελέτες για τα κοιτάσματα πυριτικού μαγνησίου -από το οποίο προέρχεται το οξείδιο του μαγνησίου, δηλαδή η πρώτη μας ύλη- μιλούν για 10.000 δισ. τόνους, αρκετούς δηλαδή για να καλύψουν τη ζήτηση για μερικούς αιώνες», διαβεβαιώνει. Μέσα στον επόμενο χρόνο άλλωστε, ο ίδιος εκτιμά πως θα έχουν ολοκληρωθεί και οι τελευταίες μελέτες ώστε το «πράσινο» σκυρόδεμα να είναι επίσης εφάμιλλο με το τσιμέντο Πόρτλαντ σε μηχανικές ιδιότητες και ανθεκτικότητα. Η εταιρεία ήδη σχεδιάζει το πρώτο πιλοτικό εργοστάσιο, το οποίο θα μπορεί να παράγει ετησίως 25.000 τόνους οικοδομικού υλικού και αναμένεται να είναι έτοιμο στα τέλη του 2011.

Μία από τις σημαντικότερες καινοτομίες του 2010

Το 2004, όταν ο κ. Βλασόπουλος ξεκίνησε το διδακτορικό του στο Imperial, αρκετοί αμφισβητούσαν το γεγονός ότι σε λίγα χρόνια θα μπορούσαμε να βρούμε νέες τεχνολογίες για να κατασκευάζουμε κτίρια ώστε να μην επιταχύνουμε την κλιματική αλλαγή. «Από την εποχή που σπούδαζα μηχανικός περιβάλλοντος στο Δημοκρίτειο Πανεπιστήμιο Θράκης, είχα πεισθεί πως η επιστήμη μπορεί όντως να κάνει πραγματικότητα την αειφόρο ανάπτυξη», λέει χαρακτηριστικά. Έτσι, όταν του προτάθηκε να ασχοληθεί ερευνητικά με τη δημιουργία ενός πιο οικολογικού τύπου σκυροδέματος, δέχθηκε, παρόλο που γνώριζε πως η επιτυχία κάθε άλλο παρά ήταν εξασφαλισμένη.

«Ωστόσο, για να υποκαταστήσεις ένα προϊόν που χρησιμοποιείται σε τόσο μαζική κλίμακα - φανταστείτε πως κάθε χρόνο παράγονται περίπου 2,5 δισεκατομμύρια τόνοι τσιμέντου Πόρτλαντ - θα πρέπει να αναπτύξεις ένα υλικό το οποίο να είναι άρτιο από κάθε σκοπιά», επισημαίνει. Σήμερα, έχει κάθε λόγο να αισθάνεται δικαιωμένος: Το περιοδικό Technology Review του MIT συμπεριέλαβε το τσιμέντο της Nocacem στις δέκα αναδυόμενες τεχνολογίες για το 2010, ενώ επίσης ανακηρύχθηκε καλύτερη καινοτομία στο φετινό συνέδριο ενεργειακών τεχνολογιών που διοργάνωσε το πρακτορείο Bloomberg. Το περιβαλλοντικό όφελος μεταφράζεται και σε οικονομικό, καθώς τα επόμενα χρόνια η τσιμεντοβιομηχανία θα ενταχθεί στο εμπόριο ρύπων, πληρώνοντας για τους τόνους διοξειδίου του άνθρακα που εκλύει στην ατμόσφαιρα.

(Κώστας Δεληγιάννης, «Η ΚΑΘΗΜΕΡΙΝΗ», Σάββατο 8 Μαΐου 2010)

High-profile failures raise worry

Some engineers suggest our focus needs to shift from cost to quality

One of the recent infrastructure failures includes the water pipe rupture in Weston. (Suzanne Kreiter/ Globe Staff)

A ceiling collapse in a Big Dig tunnel kills a woman heading to the airport. Crumbling railroad ties threaten the daily commute for thousands on the South Shore. A ruptured pipe connection puts 2 million residents of Greater Boston under orders to boil their drinking water.

All were recently built projects; all failed spectacularly. And while each failed for unique reasons, some still unknown, they are all vivid reminders of the vulnerability of public works projects that millions rely on to move fresh water, cars, and commuters in a seamless fashion. Even some engineers are frustrated.

"I'm just saying, can't we do anything right anymore?'' said Jerome J. Connor, a civil engineering professor at MIT. "Or are we a bunch of screw-ups, and that's what's happening?''

Throughout American history, public works have been symbols of civic pride and the can-do American spirit — damming rivers for power, laying rail lines across the West, building the interstate highway system, and delivering electrical power to the rural South.

While old projects with decades of strain are expected to give out over time, the recent failures of projects barely a decade old raise a host of questions: Were there errors in design? Shoddy work? A lack of oversight? A focus on speed and budget at the expense of quality? Or just bad luck?

"Especially if a few things go wrong, people say, 'What is going on with us as a society and a community?' '' said Gregory K. Dreicer, a historian of technology and curator at the Chicago Architecture Foundation. "And I think that's good. People should think about the systems that are supporting their lives every day, and who's designing them, and why are they designing them the way they are.''

The Big Dig tunnel where ceiling panels fell in 2006 was hailed as a modern engineering marvel. The Old Colony railroad ties now crumbling were put into use in 1997 and the manufacturer said they would last 50 years. The 1-ton clamp that broke on the water pipe in Weston last weekend was installed only seven years ago.

Farther afield, the oil rig that exploded in the Gulf of Mexico last month, killing 11 workers and spreading a devastating slick of crude, was built in 2001 and was considered among the most technologically advanced drilling platforms in the world.

At a time when the federal government is spending billions in stimulus funds to restore crumbling infrastructure and build new roads, bridges, and high-speed rail lines, questions about the recent failures have become especially urgent.

"Maybe you just need some really tough enforcers to scream, 'Hey, we want quality,' " Connor said. "You need to address it, though, because it's the tip of the iceberg."

For much of the 20th century, public works projects were centerpieces in American cities and towns, with giant water towers and grandly designed water department buildings held up as signs of pride and progress, Dreicer said.

Today, he said, public works projects are often pushed out of sight, because people care less about erecting monuments and just want the water and electricity to work.

"People take infrastructure for granted," Dreicer said. "The only time they think about it is when something goes wrong."

"What people see is a big, disastrous water main break that causes a whole lot of people inconvenience," added Robert R. Albee, a past president of the American Public Works Association, who spent 12 years as director of engineering for the Big Dig.

"What they don't see is that that was a very, very small element of a much larger project that had millions of moving parts to it.... Something did break. But the overall good of that project was absolutely enormous for Boston."

Some observers, reflecting on the recent failures in Boston and beyond, wondered if enduring works of infrastructure, such as the Brooklyn Bridge, are possible in a political culture that demands that anything done by government be done as cheaply and quickly as possible.

"I'm part of this problem," said Douglas B. MacDonald, a former secretary of transportation for Washington state and a former director of the Massachusetts Water Resources Authority. "We in the infrastructure business have been trying to convince the American public that we can be good stewards of money if we deliver projects on time and on budget."

But, ultimately, "what you really need is a common-sense proposition, down the middle, that takes into account price but realizes a cheap price for a bad job is no bargain," MacDonald said.

Connor said the recent problems locally and nationally have made him reflect on the problems facing American automakers and, closer to home, of the Frank Gehry-designed Stata Center at MIT, which began to crack, mold, and leak not long after it was built.

"We've got to raise that issue among people who are spending the public money, to focus on quality," he said. "A cheap meal is also cheap food. If you want an expensive meal, you have to pay for it."

Of course, neither the $15 billion Big Dig nor the $728 million water tunnel that ruptured would be considered cheap.

Even so, the Big Dig ceiling collapsed after workers used epoxy to secure the ceiling bolts, even though the type was not strong enough for such use.

The Old Colony Railroad used concrete ties, expecting them to outlast traditional wood ties; now that they are crumbling, the railroad is replacing them with wood.

Frederick P. Salvucci, a former state secretary of transportation instrumental in planning the Big Dig, said the public expects massive projects to function as reliably as mass-produced products, which are tested and retested.

"When you're doing a large construction project or even a small construction project — from fixing your kitchen to the Big Dig or the Massachusetts Water Resources Authority harbor cleanup — every construction project is a new venture with different idiosyncrasies," he said. "You don't get to test it a thousand times."

"And yet we expect complex public infrastructure projects to always be perfect," he added. "And that's the right expectation, but it's a very complex challenge."

Of course, building a pipe or tunnel is a human endeavor, and some amount of error is inevitable.

Public works projects almost always involve multiple entities, from contractors and subcontractors to project management firms and government agencies.

Civil engineers emphasize that the recent failures represent only a tiny fraction of the projects built. The vast majority work as designed: New waste-water treatment plants and tunnels have made Boston Harbor cleaner; Big Dig tunnels have made it easier to drive through the city while creating downtown parks.

When projects do fail, it is usually after years of wear, or relatively early in their lives, when first put under stress, said Robert S. Stephens, president of the Boston Society of Civil Engineers.

"From that standpoint, it's not a surprise to me that this would be uncovered," he said of the recent failures.

"There are no perfect engineers in the world. Mistakes get made. And there are no perfect contractors in the world. Things do go wrong in projects."

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(Globe Staff / May 10, 2010, Globe Newspaper Company)

New wells proposed to reduce earthquake risks downtown

SAN BERNARDINO - Redevelopment agencies and water gurus want to build new wells downtown to reduce future earthquake-related dangers.

A major earthquake, such as the long-feared rupture of the San Andreas fault, could cause groundwater below the downtown area's office buildings and residences to mix with

the soil. The result could change the top layer of terra firma into a muddy, shaky mess.

Those risks are greatest when groundwater is 50 feet below or closer to the surface, according to the Water Resources Institute at Cal State San Bernardino. Although recent years have been on the dry side, people who lived in San Bernardino during the 1980s may remember times when excess water flooded areas near downtown and the E Street corridor.

New wells could be used to draw future surplus water to the surface, lowering damage risks and putting the valuable liquid to use, said institute director Susan Lien Longville. A likely approach is to dig two wells in the vicinity of Meadowbrook Park.

"We know what path we're headed on. We don't have the studies done," Longville said.

The Inland Valley Development Agency is the lead government body on the project, which also involves the San Bernardino Economic Development Agency. The IVDA has hired Fontana-based Pacific Advanced Civil Engineering to draw up preliminary studies.

The IVDA did not return several calls for comment.

Any discussion of downtown water supply is likely to conjure the spectre of the Lakes and Streams project.

The grand concept of Lakes and Streams was to build new reservoirs near downtown for water storage and upscale waterfront developments.

Executing that plan would have required hundreds of millions of dollars and the use of eminent domain to seize hundreds of homes and businesses. Lakes and Streams, however, has been a dead letter for about four years.

The new plan is not Lakes and Streams redux, Longville said. The idea does not include any major "lakes," although Longville said non-drinkable water from future wells could be used for Seccombe Lake and a water feature near the new courthouse that is planned to be built downtown.

The plan does not involve exporting any water from San Bernardino's groundwater basin, Longville said.

(Andrew Edwards, Staff Writer, San Bernardino County Sun, California, May 10, 2010)

Berkeley quake trial shows bridge safety ideas

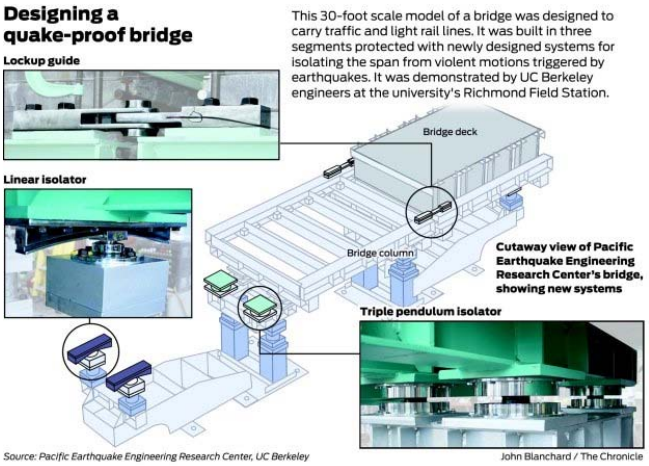
A mock-up bridge and a mock-up rail car shook, rattled, but never rolled Wednesday as earthquake engineers from UC Berkeley demonstrated a system designed to keep bridge traffic moving even in the strongest of seismic shaking.

The 30-foot, scale-model bridge, designed and built in three jointed segments by researchers at the university's Pacific Earthquake Engineering Research Center, was erected on a huge "shake table" that created the same violent ground motions that have marked major quakes in California, Japan and Chile.

As each simulated quake struck, the three bridge segments rattled and shook separately with a huge clatter, but they never separated. Nor did the roadbed on the bridge, while railroad tracks running the length of the roadbed remained precisely in line, and the wheels of a model flatbed rail car never left the tracks.

The demonstration took place at the university's Richmond Field Station, where the 400-foot computer-controlled shake table is used to mimic the effects of a quake on experimental models of concrete buildings, columns, earthquake "isolators" designed to keep skyscrapers from tumbling, and other structures likely to fall victim to major seismic motions.

Wednesday's series of simulated quakes severely stressed the railroad bridge as it withstood successive ground motions of a half-dozen historic quakes, among them Loma Prieta in 1989, that struck with a magnitude of 6.9; Northridge, 1994 (6.7); Kobe, Japan, 1995 (6.9); and February's devastating temblor off the coast of Chile (8.8).



Stephen Mahin, director of the earthquake engineering research center, said the concept of building segmented bridges with seismic isolators between the segments would be particularly useful for long stretches of elevated freeways, high-speed rail lines that often run on elevated tracks, and spans like the Carquinez and Dumbarton bridges.

"Bridges like this will bend in an earthquake, but they won't break," he said.

Mahin pointed to three major innovations on the scale-model bridge that are designed to protect its three segments, and that could be included, three segments at a time, to longer future bridges or freeway spans.

One new concept, Mahin said, are the steel "lockup guides" between each bridge segment that keep the center line of the bridge's roadway continually aligned during a quake, and even after the shock, when the ground beneath the bridge may be settling.

Then there are devices called "linear isolators" installed on the abutments on both ends of the bridge. Teflon coated, they allow the bridge itself to slide briefly in any direction during a quake, Mahin said.

The third new idea is that each column supporting the bridge is equipped with what the engineers call "triple pendulum isolators," which are automatically activated one at time as shaking from an earthquake increases. Their job is to keep the bridge deck from moving violently.

"We're confident," Mahin said, "that bridges like this won't collapse in damaging earthquakes, and that we can protect life."

Read more: http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2010/05/26/BAL91DL3VN.DTL#ixzz0paLTEbYK

(ASCE SmartBrief, May 27, 2010 - David Perlman, Chronicle Science Editor, San Francisco Chronicle, May 27, 2010)

Beachwood's BASF creates new crack-resistant concrete

BEACHWOOD, Ohio - **BASF Construction Chemicals** has invented a new kind of concrete that it says will transform the $20 billion repair construction industry, because once it sets, it's virtually crack-proof.

BASF says its "ZERO-C" (zero-cracking) line of concrete is a stronger and more durable alternative to the mortars that usually repair - and re-repair - crumbling historic buildings and other older structures.

"This is like finding the cure for cancer for our industry," marveled Peter Emmons, founder and chief executive of **Structural Preservation Systems**, a specialty repair contracting company in Hanover, Md.

"It's pretty ground-breaking for restoration construction, taking concrete and actually improving its performance," agreed Dilip Choudhuri, principal and executive director of structural diagnostics services for **Walter P. Moore** engineering firm in Houston, Texas, which repairs bridges, stadiums and buildings.

Even hairline cracks such as this one, on a ring of ordinary repair mortar inside BASF's Beachwood laboratories, can let in pollutants that can start deteriorating the integrity of the structure. Samples of BASF's "ZERO-C" concrete, in contrast, have resisted cracking for more than four months after being poured.

ZERO-C will also be available for contractors repairing residential driveways, sidewalks, balconies and other projects.

The construction industry has spent decades looking for materials that won't crack when they are used to repair and reinforce older materials, because even hairline cracks can let in pollutants and start disintegrating the concrete.

"The goal of our industry is to stop repairing the repair," Emmons said.

A 2006 industry summit challenged construction companies to come up with a solution, and BASF appears to be the first manufacturer to have done it, he said.

Research scientists at BASF Construction Chemicals, a division of the mammoth BASF SE German chemical company, spent years quietly creating prototypes, tinkering with the formula, and developing tests to simulate environmental conditions and exceed industry standards.

BASF invited 40 top engineers from around the U.S. and Canada to its Beachwood headquarters on Wednesday under the guise of showing them a new product, but didn't tell them what they'd come up with until Thursday morning, said Doug MacRae, vice president and business director.

While high-performance concrete tends to crack within a few days because it shrinks as it cures, Heather See, a BASF senior scientist and civil engineer, has samples of ZERO-C in her laboratory that have resisted cracking for more than 120 days after being poured.

BASF Construction Chemicals' new "ZERO-C" concrete not only resists cracking longer than other repair mortars, it's also formulated to dry smoothly after one quick swipe of the trowel. On Thursday, Robin Bellamy, BASF Construction Chemicals' manager of technical service, explains ZERO-C's properties as Rob Cordova trowels a freshly poured trench of concrete during a demonstration for visiting engineers.

The gray rings of concrete still look smooth and pristine, despite the fact that other kinds of concrete subjected to the same stress tests crack after 5 to 20 days.

Out in the parking lot, Robin Bellamy, BASF's manager of technical service, stood on a slab of concrete as workers poured ZERO-C into a wooden trench around his feet and smoothed out the top with a metal trowel.

"Even in this hot temperature, this material is going to be fine," he said.

He invited the engineers to examine an identical slab of concrete surrounded by ZERO-C prepared 10 days ago.

"We've replicated this time after time after time, and we've never had a failure yet," he said, referring to its smooth, crack-free surfaces.

"You can strike it, leave it, walk away, and feel confident in the ZERO-C."

To ensure that the construction crews get the same performance out in the field, BASF is packaging ZERO-C in durable, recyclable, pre-measured pouches of dry mortar and cement components and liquid materials.

So all they have to do on site is rip open the pouches, combine the ingredients, mix for two minutes and use, MacRae said.

Choudhuri said that when he first heard the name "ZERO-C," he thought it stood for reducing the carbon footprint, or environmental impact, of construction work. But "ZERO-Cracking" concrete is even better, he said.

"I'm looking forward to actually using it in our projects and seeing for myself how it performs," he said.

(ASCE SmartBrief, May 28, 2010 – Janet Cho, Cleneland.com, Daily Commercial News, May 27, 2010)

Δαπάνη Κατασκευής Αυτοκινητοδρόμων στην Κεντρική Ευρώπη και στην Ελλάδα

Central Europe - highway cost analysis

A study of highway construction costs in eight European countries highlights Austria as the most expensive. The report says that highways in Austria cost €12.87 million/km. The next most expensive country is Hungary at €11.21 million/km, followed by Slovakia at €9.56 million/km and then the Czech Republic at €8.86 million/km. At the other end of the spectrum, costs in Denmark are only €5.89 million/km, in Croatia €6.682 million/km, in Slovenia €7.29 million/km and in Germany €8.24 million/km. Terrain can increase costs significantly and construction of highways in mountainous terrain is most expensive in Germany at €25.99 million/km, followed by Austria with €24.97 million/km, with the Czech Republic, Slovenia and Croatia following in descending order. The costs of mountain highway construction were not collated for Denmark and Hungary due to the largely flat terrain. Construction of motorway bridges costs most, and is particularly expensive in Hungary, followed by Denmark, Germany and the Czech Republic. The lowest bridge costs are in Croatia, ahead of Slovenia and Slovakia. Construction of tunnels is most expensive in the Czech Republic, then in Germany and Hungary.

(World Highways eNewsletter June 03, 2010)

Τα παρακάτω στοιχεία για την δαπάνη κατασκευής των αυτοκινητοδρόμων στην Ελλάδα προέρχονται από την ιστοσελίδα της ΕΓΝΑΤΙΑ ΟΔΟΣ Α.Ε. και αφορούν στον Κύριο Άξονα της Εγνατίας Οδού, καθώς και από ανακοινώσεις του τέως Υ.ΠΕ.ΧΩ.Δ.Ε. για τον προϋπολογισμό του αυτοκινητοδρόμου ΚΟΡΙΝΘΟΣ – ΠΑΤΡΑ – ΠΥΡΓΟΣ – ΤΣΑΚΩΝΑ.

Για την κατασκευή της Εγνατίας Οδού από την Νυμφόπετρα μέχρι το χωριό Μεγάλη Βόλβη, μήκους 8 km περίπου σε ομαλό γεωμορφολογικό ανάγλυφο η δαπάνη κατασκευής ανήλθε σε 25 εκατ. ευρώ (με ΦΠΑ), ήτοι €3.125 εκατ./km. Στο τμήμα από τον Α/Κ Ρεντίνας έως τον Α/Κ Ασπροβάλτας, μήκους 10 km, που παρακάμπτει τα στενά της Ρεντίνας και έχει 3 ανισόπεδους κόμβους, μία μικρή σήραγγα και μία μεγάλη γέφυρα καθώς και εκτεταμένα υδραυλικά έργα (ημιορεινό ανάγλυφο) η δαπάνη κατασκευής ανήλθε στα 45 εκατ. ευρώ (με ΦΠΑ), ήτοι €4.5 εκατ./km.

Στο τμήμα από τον Α/Κ Περιστερίου μέχρι τον Α/Κ Μετσόβου, μήκους 9 km, μαζί με την σύνδεση της Εγνατίας Οδού με την Εθνική Οδό Ιωαννίνων-Τρικάλων, μήκους 3.5 km, συνεπώς συνολικά 12.5 km, σε ορεινό ανάγλυφο, η δαπάνη κατασκευής ανήλθε σε 265 εκατ. ευρώ (συμπεριλαμβανομένου του ΦΠΑ), ήτοι €21.2 εκατ./km.

Τέλος, στον αυτοκινητόδρομο Κ-Π-Π-Σ ο προϋπολογισμός του έργου, συνολικού μήκους 283.7 km, μεικτού αναγλύφου, ανέρχεται σε 2,098,650,000, ήτοι €7.4 εκατ./km.

Συνεπώς, η δαπάνη κατασκευής των αυτοκινητοδρόμων στην Ελλάδα είναι μάλλον χαμηλή, συγκρινόμενη με αυτήν στις χώρες της Κεντρικής Ευρώπης.

How ancient China was built on sticky rice, literally

The next time you get a bowl of rice, ask yourself: would I rather eat this or put this toward my next construction project?

As scientists and construction workers slowly dissect ancient construction projects, they're finding that sticky rice -- sometimes used in Chinese cuisine, but a staple of many South East Asian countries' diets -- was used to make super tough mortar.

In a study recently reported by scientist Bingjian Zhang in the American Chemical Society journal, "Accounts of Chemical Research," Zhang and fellow chemists say that they have found that a chemical in sticky rice help makes mortar strong enough to withstand earthquakes. (So that's what they were missing in Sichuan... rice.)

Atkins be damned, Chinese scientists have found a way to put rice to work.

The paper reports that when a sticky rice "soup" was mixed into mortar -- the material used to bind and fill gaps between bricks as well as other construction materials -- and used to restore ancient buildings, it outperformed other available substances.

Zhang notes that "construction workers in ancient China developed sticky rice mortar about 1,500 years ago by mixing sticky rice soup with the standard mortar ingredient." We feel like this is one of those discoveries that happened because someone knocked their lunch rice bowl into the mixer one too many times, but we're not complaining.

This sticky rice-based mortar is "stronger and more resistant to water than [the common] pure lime mortar,"

writes Zhang and was used to build everything from tombs to city walls.

If you're wondering what exactly is the key to the mix, the report says that amylopectin, a type of complex carbohydrate, is responsible for the mortar's strength (and who says carbs aren't good for you?). This 'secret ingredient' is transferred from the rice to the mortar mix.

We're curious to see if this discovery means more sticky rice-based mortars are on the way now as China's sustainable development industries continue to grow.

(CNNGo.com 7 June, 2010 στο ASCE SmartBrief 7 June, 2010)

Not so fast, Pisa! UAE lays claim to world's furthest leaning tower

The Capital Gate building in the desert kingdom's capital, Abu Dhabi, has been certified by Guinness World Records as the "World's Furthest Leaning Man-made Tower."

The Capital Gate building has been deliberately engineered to slant.

How far does it lean? Nearly five times farther than the Leaning Tower of Pisa in Italy.

The 35-story Abu Dhabi building has an 18-degree slope, compared with four degrees for the freestanding bell tower.

But unlike the tower in Pisa, the Capital Gate building has been deliberately engineered to slant.

The floor plates are stacked vertically up to the 12th floor, after which they are staggered over each other by between 300 mm to 1,400 mm -- giving the tower its lean, the owners said.

"It is a signature building which speaks to the foresight of the emirate," said Sheikh Sultan Bin Tahnoon al Nahyan, the chairman of the building's owner, Abu Dhabi National Exhibitions Company.

The mixed-use building will be ready for occupancy at the end of the year. It is featured in a new National Geographic documentary, called "Megastructures."

In January, Dubai -- one of seven emirates that make up the UAE -- unveiled the world's tallest skyscraper: the $1.5 billion, 160-story Burj Khalifa, which has a height of more than 800 meters (2,625 ft).

(CNN7 June, 2010 στο ASCE SmartBrief 8 June, 2010)

Families of two teenagers killed in quarry trespass accidents back the latest Mineral Products Association safety campaign

The dangers of trespassing in quarries are being highlighted by the Mineral Products associations' latest Stay Safe campaign and it is being backed by two families affected by the issue. Both families lost teenage sons last year through accidents in quarries and are lending their support to the initiative.

The MPA has said that the annual Stay Safe campaign aims to raise awareness of the danger of trespassing in quarries. The initiative was launched ahead of the period when quarry managers report an annual surge in quarry trespass by people of all ages.

The organisation has said that in 2009 four teenage boys lost their lives in the UK in active or disused quarries. Among them 15-year-old son Ryan Walker drowned in a disused quarry in Ashover, Derbyshire, while 18-year-old Jay Harris fell over 30m while walking with friends in a quarry near Nuneaton in Warwickshire. The MPA approached their parents to back the campaign and feature in a new hard-hitting video about the effect the accidents have had on the boys' family and friends.

"I don't want other parents to feel how I feel or go through what our family has gone through," explained Ryan's mother Tracey Walker. "If I can save one person, or change one person's mind about going in to a quarry - I'll feel I've achieved so much."

A Facebook page 'Stay Safe … Stay Out of Quarries' has also been launched and the MPA held five press conferences at quarries with trespass problems. Nearly 50 radio interviews took place and television coverage was achieved at a number of sites.

MPA Chief Executive Nigel Jackson said, "The Stay Safe campaign has evolved over recent years. We have moved the focus on to teenagers and specifically teenage boys, who are the biggest risk group for quarry trespass and fatalities. Our members do an excellent job in communicating the risks associated with the industry to younger children, but teenage boys are much more difficult to engage with.

"As a result we have used some very powerful testimony from the family and friends of Jay and Ryan, in the hope that this will deter teenagers from trespass or, at the very least, make them stop and think about the consequences of their actions."

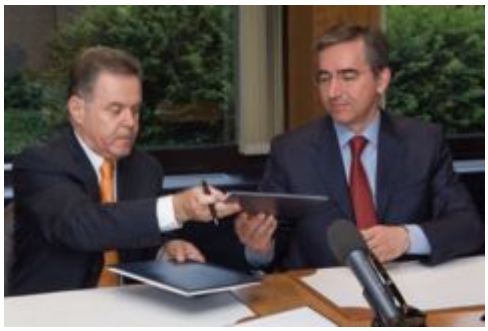
(Aggregates Business Europe, 08.0602010)

European Investment Bank to fund Athens metro extensions

The European Investment Bank (EIB) has agreed a € 150 million credit facility with the Attiko Metro Company in Greece for the extension of the Athens metro.

The funding will be used to extend line 3 of the city's metro towards Haidari and construct three new stations as well as extend line 2 by 1,5 km and add two new stations.

EIB vice-president, Plutarchos Sakellaris said, "EIB has been supporting metro investments in both Athens and Thessaloniki for more than 15 years. The Athens metro extension will reinforce the public transport system, providing a faster, more reliable and environmentally friendly mode of transport contributing to a cleaner environment for the Greek capital.



EIB vice-president, Plutarchos Sakellaris and Attiko Metro Company chairman Christos Tsitouras.

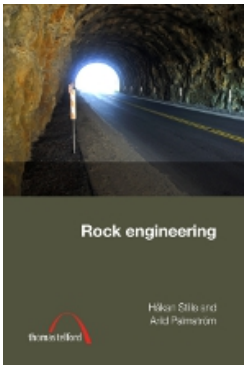
"This project is a good example of the catalyst role the EIB can play in helping to co-finance major infrastructure projects with the public and private sectors," he said.

Chairman of Attiko Metro, Christos Tsitourtas said the EIB's support would allow the company to realise significant metro projects in both Athens and Thessaloniki with the support of the EU. "I look forward to further cooperation for the future extensions of the metro in both Athens and Thessaloniki, which will serve the citizens of the two Greek Metropoles," he said.

The new credit facility brings the EIB's total financing for the Athens metro since 1994 to € 1.5 billion.

(Steve Skinner, KHL's World Construction Week, 22 June 2010)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Rock Engineering

H. Stille and A. Palmstrom

The first book to focus on risk and uncertainty, Rock engineering explains the geological principles and concepts required for successful geotechnical design and engineering of underground excavations.

With over 80 years combined experience, the authors use their unique practical and theoretical knowledge in applying geology in rock engineering to provide the reader with an understanding of how to work with the inevitable uncertainties in ground conditions on tunnelling and underground projects. Guidance is given on how these uncertainties should be considered in the selection of design tools and how modern information-based systems, such as observational method and dualistic quality control, can be used to deal with unknown conditions uncovered during construction.

Key coverage:

- Interaction between the ground and project related features
- Investigation strategy and derivation of investigation results in ground information assessment
- Methods for detection and analysis of risks and implications for design
- Uncertainties and strategies for handling them during construction
- Principles, applications and limitations of the various tools and methods in rock engineering.

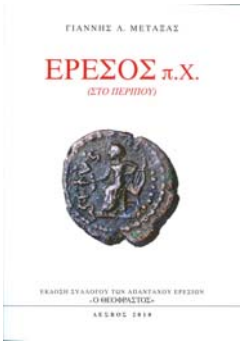
Rock engineering is the essential, internationally applicable, practical guide for engineers and geologists who need to consider ground conditions on underground projects. An informative resource for clients, consultants and contractors hoping to understand the risk and uncertainties that can affect the project, this book is also and a valuable reference for advanced students on rock engineering and engineering geology courses.

Contents

- Introduction
- Geology in rock engineering
- Investigations and measurements
- Derived ground information and location of project
- Ground behaviour
- Ground conditions and properties
- Rock engineering design tools
- Rock engineering in planning
- Rock engineering and excavation
- References and Appendix

(Thomas Telford Ltd, 22.06.2010)

ΒΙΒΛΙΟ ΟΧΙ ΓΕΩΤΕΧΝΙΚΟΥ ΠΕΡΙΕΧΟΜΕΝΟΥ ΑΛΛΑ ΑΠΟ ΓΕΩΤΕΧΝΙΚΟ ΜΗΧΑΝΙΚΟ



ΕΡΕΣΟΣ π.Χ.
(ΣΤΟ ΠΕΡΙΠΟΥ)

Γιάννης Λ. Μεταξάς

Σ' αυτό το βιβλίο καταγράφω τα σημαντικότερα γεγονότα που συνέβησαν κατά την αρχαιότητα στην Ερεσό της Λέσβου, με ταυτόχρονη παρουσίαση των σπουδαίων προσωπικοτήτων που γεννήθηκαν στην Ερεσό π.Χ.

Ξεκινώντας από την προϊστορία (7.000 π.Χ.) με τους Αιολείς και τους Πελασγούς, προχωρώ στην ποιήτρια ΣΑΠΦΩ (612 π.χ.), στον φιλόσοφο ΘΕΟΦΡΑΣΤΟ (372 π.χ.) και ΦΑΙΝΙΑ (360 π.Χ.), με ενδιάμεσες αναφορές στην Ναυμαχία της Σαλαμίνος (480 π.χ.) και στην Αποστασία της Μυτιλήνης (428 π.Χ), γεγονότα που έκριναν την τύχη της Ερεσού, της Λέσβου και ολοκλήρου του Ελληνικού κόσμου.

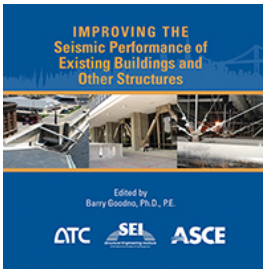
Τα επτά δοκίμια που συνθέτουν το βιβλίο αυτό, δημοσιεύτηκαν στο περιοδικό «ΕΡΕΣΟΣ», του Συλλόγου των απανταχού Ερεσίων «Ο Θεόφραστος», κατά τα τελευταία πέντε χρόνια. Επειδή όμως είχαν δημοσιευτεί σε πολλές συνέχειες, είχε νόημα να ενωθούν και να μπουν σε μία χρονολογική σειρά, ώστε και οι άνθρωποι που επισκέπτονται την Ερεσό να μπορούν να διαβάσουν για τις πολύ σημαντικές προσωπικότητες της Ερεσού και για ενδιαφέροντα ιστορικά γεγονότα που αφορούν το μέρος μας και γενικότερα το νησί της Λέσβου.

Πήρα το θάρρος και κατέγραψα τα ιστορικά στοιχεία που βρήκα σε αρκετά κλασσικά βιβλία, με ταυτόχρονο φιλοσοφικό και σκωπτικό σχολιασμό εκ μέρους μου. Πολλές φορές η φαντασία και η ροή του λόγου, οδηγούν το κείμενο έξω από τα αυστηρά ιστορικά πλαίσια. Όμως η ιστορία γράφεται από δύο. Στην συγκεκριμένη περίπτωση η ιστορία γράφτηκε από την πλευρά των Ερεσίων, καθ' όσον ο συγγραφέας τυγχάνει Ερέσιος. Παρ' όλα αυτά πιστεύω ότι προσπάθησα η «υποκειμενικότητα» των γραπτών μου να κρατηθεί σε ένα «μέτρο», χρησιμοποιώντας το χιούμορ σαν μέσο εξισορρόπησης ανάμεσα σε όλα αυτά τα πολύ σοβαρά γεγονότα. Εξ' άλλου εμείς στην Λέσβο δεν μπορούμε χωρίς χιούμορ και πειράγματα.

Θα ήθελα να ευχαριστήσω τα Δ.Σ. του Συλλόγου των Απανταχού Ερεσίων «ο Θεόφραστος», για την φιλοξενία και την ηθική συμπαράσταση όλα αυτά τα χρόνια. Ιδιαιτέρως δε τον Σπύρο Πιπερά και την Μαρία Αθανασιάδου για τα καλά τους λόγια και την θετική παρότρυνσή τους.

Τέλος με αυτό το βιβλίο θα ήθελα να ευχαριστήσω όλους τους Ερεσιώτες και ιδιαιτέρως τους σοφούς τσοπάνηδες, για την συμπάθεια και ευγένεια που μου δείχνουν από τότε που ήμουν μικρό παιδί.

(Γιάννης Μεταξάς, 2010)



Improving the Seismic Performance of Existing Buildings and Other Structures

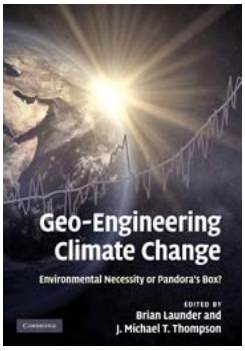
Goodno, B. (Editor)

Proceedings of the 2009 ATC & SEI Conference on Improving the Seismic Performance of Buildings and Other Structures, held in San Francisco, California, December 9-11, 2009. Sponsored by Applied Technology Council and the Structural Engineering Institute of ASCE.

The papers in this proceedings were presented at the ATC & SEI Conference on Improving the Seismic Performance of Existing Buildings and Other Structures, held December 9-11, 2009, in San Francisco, California. The goal of the conference was to provide an invaluable opportunity to advance the profession's understanding of the tools, techniques and innovations available to assist in meeting the challenges of seismic evaluation and rehabilitation. For those new to the profession, these proceedings are an opportunity to get up to speed on core issues surrounding seismic rehabilitation.

This collection of papers focuses solely on improving the seismic performance of existing buildings and other structures. The papers present new information on the seismic evaluation and seismic rehabilitation of existing buildings, including case studies, new discoveries, innovative use of technologies and materials, implementation issues, needed improvements to existing standards and methods, and socioeconomic issues. The proceedings is intended to advance the engineering profession's understanding of the tools, techniques, and innovations available to meet the challenges of seismic evaluation and rehabilitation. For those new to the profession, these proceedings are an opportunity to get up to speed on core issues surrounding seismic rehabilitation.

(ASCE, 2010)



Geo-Engineering Climate Change

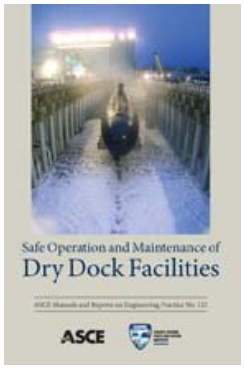
Environmental Necessity or Pandora's Box?

Launder, B. and Thompson, J.M.T.

This book is the first to present a detailed and critical appraisal of the geo-scale engineering interventions that have been proposed as potential measures to counter the devastation of run-away global warming. Early chapters set the scene with a discussion of projections of future CO2 emissions and techniques for predicting climate tipping points. Subsequent chapters then review proposals to limit CO2 concentrations through improved energy technologies, removal of CO2 from the atmosphere, and stimulated uptake by the oceans. Schemes for solar radiation management involving the reflection of sunlight back into space and using artificially brightened clouds and stratospheric aerosols are also assessed. Pros and cons of the various schemes are thoroughly examined – throwing light on the passionate public debate about their safety. Written by a group of the world's leading authorities on the subject, this comprehensive reference is essential reading for researchers and government policy makers at Copenhagen and beyond.

• Background historical and philosophical articles, such as that by James Lovelock, provide insights for specialists as well as the concerned public • The advantages and pitfalls of all the proposed interventions are thoroughly debated by leading researchers • Provides an authoritative reference for scientists and government policy makers – creating a platform for further debate at Copenhagen 2009 and beyond

(Cambridge University Press, 2010)



Safe Operation and Maintenance of Dry Dock Facilities

Edited by Paul A. Harren

Prepared by the Dry Dock Asset Management Task Committee of the Ports and Harbors Committee of the Coasts, Oceans, Ports, and Rivers Institute of ASCE

Safe Operation and Maintenance of Dry Dock Facilities is the first manual of practice to provide guidance for the operation of four main types of dry dock facilities: floating dry docks, graving docks, marine railways, and vertical lifts. Until now, some of these facilities have been operated and maintained without a thorough understanding of the design of their dry docks and, therefore the features that are vital to the safe operation of the facility. This manual provides a cost-effective program for maintaining and operating a safe dry dock facility by examining in depth condition assessment, maintenance, control inspection, and dock operations.

This manual is an essential safety and management references for engineers and managers working for commercial entities that operate dry docks.

(ASCE, 2010)

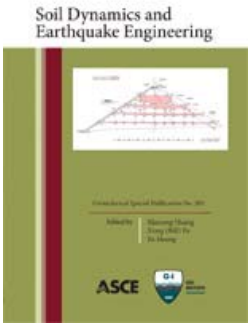
Soil Behavior and Geo-Micromechanics

Edited by Roger Meier; Andrew Abbo; Linbing Wang Geotechnical Special Publications (GSP) 200

Proceedings of sessions of Geo-Shanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 41 papers addressing many different areas of soil behavior, constitutive modeling, and geo-micromechanics. Papers cover topics ranging from experimental studies of soil shear strength and compressibility to theoretical advances in Biot's consolidation theory and constitutive modeling. The research described in this proceedings advances understanding of soil as an engineering material and improves our ability to model the behavior of soil in slopes, foundations, and earth structures.

(ASCE, 2010)



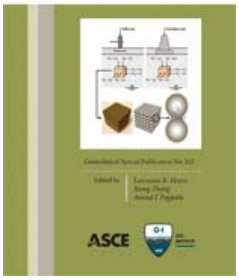
Soil Dynamics and Earthquake Engineering

Edited by Maosong Huang; Xiong (Bill) Yu; Yu Huang
Geotechnical Special Publications (GSP) 201

Proceedings of sessions of GeoShanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 43 papers that examine a variety of topics in soil dynamics and earthquake engineering. Topics inlcude: dynamic soil-structural interactions under seismic loads; dynamic properties of soils and rocks; and seismic zoning and earthquake hazard assessment. Papers cover important issues such as the dynamic responses of earth dams, piles and pile groups, soil nailing, tunnels, landfills, and shallow foundations.

(ASCE, 2010)



Experimental and Applied Modeling of Unsaturated Soils

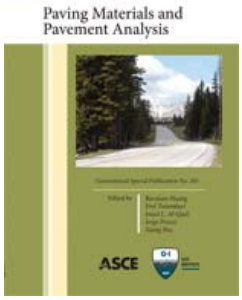
Edited by Laureano R. Hoyos; Xiong Zhang; Anand J. Puppala
Geotechnical Special Publications (GSP) 202

Proceedings of sessions of GeoShanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 28 papers examining the most current thinking and practices involving unsaturated soils. Geotechnical and civil engineers all over the world face problems with a wide range of geosystems involving materials that remain under partially saturated conditions throughout the year. The lack of education and training among engineering graduates and practitioners to deal properly with unsaturated soil conditions has resulted in faulty or excessively conservative designs, frequent construction delays, and deficient long-term performance of built infrastructure. Over the last few decades, however, the discipline of unsaturated soil mechanics has begun to receive increasing attention worldwide, providing better explanations for soil behavioral patterns than conventional saturated soil mechanics.

Papers in this proceedings address, first, general characterization and constitutive behavior, and second, applied modeling and analysis.

(ASCE, 2010)



Paving Materials and Pavement Analysis

Edited by Baoshan Huang; Erol Tutumluer; Imad L. Al-Qadi; Jorge Prozzi; Xiang Shu
Geotechnical Special Publications (GSP) 203

Proceedings of sessions of GeoShanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 73 papers examining bound and unbound material characterization, modeling, and performance of highway and airfield pavements. Pavement design and paving material selection are important for efficient, cost-effective, durable, and safe transportation infrastructure.

Topics include:

- asphalt paving materials characterization and modeling;
- concrete pavement technology
- pavement base materials
- pavement performance and analysis

(ASCE, 2010)

Geoenvironmental Engineering and Geotechnics
Progress in Modeling and Applications

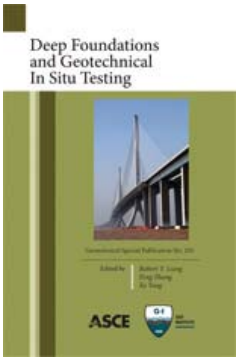
Edited by Qiang He; Shui-Long Shen
Geotechnical Special Publications (GSP) 204

Proceedings of sessions of Geo-Shanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China;

Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 39 papers that represent the latest developments in the application of soil, rock, and groundwater mechanics in geotechnical engineering modeling and practice. Topics include the relationship between geotechnical engineering and sustainability; new evidence and research into the strength and deformational behavior of soil; and recent advances in characterization and modeling of groundwater flow in geological formations of diverse geotechnical properties. This Geotechnical Special Publication examines these and other important areas of geotechnical engineering using three main categories: *Geoenvironmental Engineering*, *Geotechnics* and *Seepage and Porous Mechanics* .

(ASCE, 2010)



Deep Foundations and Geotechnical In Situ Testing

Edited by Robert Y. Liang; Feng Zhang; Ke Yang
Geotechnical Special Publications (GSP) 205

Proceedings of sessions of Geo-Shanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains 49 papers examining the areas of deep foundations and in situ geotechnical testing and monitoring techniques. This proceedings offers the latest and most current thinking on topics such as piled raft system and soil-structure interaction; deep foundations; innovative foundations; and in situ testing.

(ASCE, 2010)

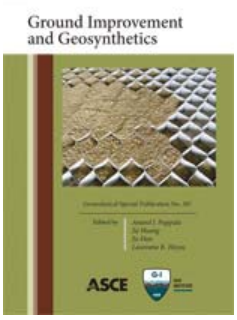
Deep and Underground Excavations

Edited by Fulvio Tonon; Xian Liu; Wei Wu
Geotechnical Special Publications (GSP) 206

Proceedings of sessions of Geo-Shanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains papers presenting the latest research into using the subsurface as a civil engineering dimension. The pressure exerted by increasing population, sensitivity toward the environment, and the ever-increasing cost of the land are a few of the reasons that underground excavations are necessary to society's health and future. Excavations below the surface provide space for services, transportation of people and goods, water supply and disposal, sanitation, and storage. These papers offer global examples of practical applications of excavations, especially in China. These papers analyze deep excavations and retaining structures, tunnels and underground excavations, and new frontiers in urban geotechnology.

(ASCE, 2010)



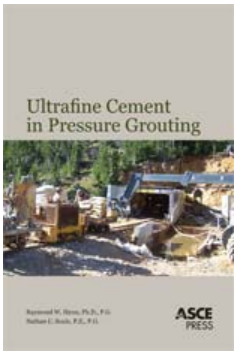
Ground Improvement and Geosynthetics

Edited by Anand J. Puppala; Jie Huang; Jie Han; Laureano R. Hoyos
Geotechnical Special Publications (GSP) 207

Proceedings of sessions of Geo-Shanghai 2010, held in Shanghai, China, June 3-5, 2010. Hosted by Tongji University, China; Shanghai Society of Civil Engineering, China; Chinese Institution of Soil Mechanics and Geotechnical Engineering, China.

This Geotechnical Special Publication contains papers presenting the most current research on ground improvement and geosynthetics. Topics include: ground improvement, especially with regard to unstable ground; soft soils; expansive soils; collapsible soils; reclaimed soils; contaminated soils; and others. Papers analyze improvement methods including mechanical and hydraulic methods, chemical stabilization methods in both shallow and deep ground, and reinforcement methods using geosynthetics.

(ASCE, 2010)



Ultrafine Cement in Pressure Grouting

Rayment W. Henn and Nathan C. Soule

Ultrafine Cement in Pressure Grouting presents the technical and practical information required by engineers to plan and implement grouting programs that are cost effective and technically sound. As a key component of modern grouting programs, ultrafine cement is an ideal solution for geotechnical engineers and construction contractors who are grappling with the challenges of managing costs while developing sites that may be less than ideal. Increasingly, the virtues of ultrafine cement lead engineers and contractors to use it rather than the less-expensive portland cements.

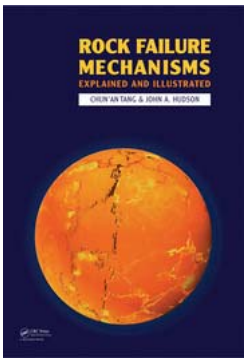
The authors concisely define ultrafine cement, describe its engineering properties, and explain its manufacture, packaging, and storage. Mixing and pumping procedures and quality control issues are covered, as well as recommendations for specifying ultrafine cement in contracts. An appendix offers 16 brief project descriptions.

Ultrafine Cement in Pressure Grouting is a fundamental reference that will be consulted frequently by geotechnical engineers who specify grouting materials for construction projects.

Raymond W. Henn, Ph.D., P.G., M.ASCE, is a principal of Lyman Henn, Inc., where he is responsible for tunnel and underground engineering and for construction management services. He is the author of *Practical Guide to Grouting of Underground Structures* (ASCE Press, 1996) and the editor of *AUA Guidelines for Backfilling and Contact Grouting of Tunnels and Shafts* (ASCE Press, 2003).

Nathan C. Soule, P.E., P.G., A.M.ASCE, is a project engineer at Lyman Henn, Inc., working on geotechnical and geological projects.

(ASCE, 2010)



Rock Failure Mechanisms: Illustrated and Explained
Chun'An Tang and John A. Hudson

When dealing with rock in civil engineering, mining engineering and other engineering, the process by which the rock fails under load should be understood, so that safe structures can be built on and in the rock. However, there are many ways for loading rock and rock can have a variety of idiosyncracies. This reference book provides engineers and researchers with the essential knowledge for a clear understanding of the process of rock failure under different conditions. It contains an introductory chapter explaining the role of rock failure in engineering projects plus a summary of the theories governing rock failure and an explanation of the computer simulation method. It subsequently deals in detail with explaining, simulating and illustrating rock failure in laboratory and field. The concluding chapter discusses coupled modelling and the anticipated future directions for this type of computer simulation. An appendix describing the RFPA numerical model (Rock Failure Process Analysis program) is also included.

Features

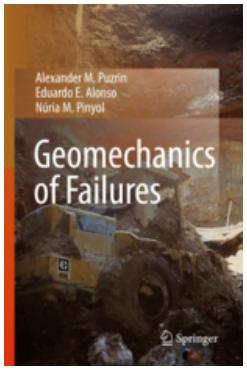
- A unique reference guide that covers all aspects of rock failure be two world renowned experts
- Presents vital information on the safety of structures built on and in rock masses
- Includes a software CD-ROM and manual of the Rock Failure Process Analysis (RFPA) code, to generate many of the illustrations included
- Support material available at www.mechsoft.cn.
- User-friendly, richly illustrated
- Intended for professionals and researchers in Civil, Mining, Construction and Geological Engineering

About the Authors

Chun'an Tang has a PhD in Mining Engineering and is a Professor at the School of Civil & Hydraulic Engineering at Dalian University of Technology in China. He is an advisor for design and stablity problem modelling in mining and civil rock engineeringand and Chairman of the China National Group of the International Society for Rock Mechanics.

John Hudson is emeritus professor at Imperial College, London and is active as an independant consultant for Rock Engineering Consultants. He has a PhD in Rock Mechanics and completed over a 130 rock engineering consulting assignments in mining and civil engineering. He is a fellow at the Royal Academy of Engineering in the UK and President of the International Society for Rock Mechanics.

(CRC Press, August 10, 2010)



Geomechanics of Failures

Puzrin, Alexander M., **Alonso**, Eduardo E., **Pinyol**, Núria

It is not an easy task to fascinate a student with a standard course on Soil Mechanics and Geotechnical Engineering. If, however, the same material is presented as a tool to explore a natural or a man-made "disaster", both the motivation and the ability to absorb this material increase dramatically. The case studies in this book could help to build an introductory Forensic Geotechnical Engineering course, covering such basic topics as settlements, bearing capacity and excavations.

The failure cases considered in this book have something in common – they can be all reasonably well explained using so called "back-of-the-envelope" calculations, i.e., without sophisticated models requiring finite element analysis. These simple methods based on clear mechanical considerations are the endangered species of the computer dominated era, though sometimes they could prevent a disaster caused by a wrong application of computer models. In particular, the upper bound limit analysis has repeatedly proven itself as a powerful tool allowing for sufficiently accurate estimates of the failure loads and leaving a lot of room for creativity.

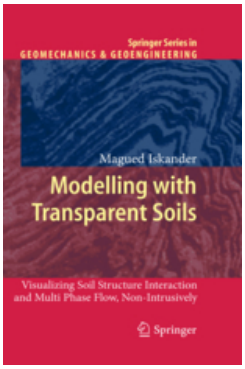
No one is exempt from making mistakes, but repeating well known mistakes reveals a gap in education. One of the objectives of this book is to attempt bridging this gap, at least partially. More failure cases covering a larger area of geotechnical problems are included into the companion book "Geomechanics of Failures: Advanced Topics" by the same authors.

Content Level: Professional/practitioner

Keywords: bearing capacity - excavations - failures - geomechanics - geotechnical engineering - mitigation measures - settlements - soil mechanics - textbook

Related subjects: Computer & Mathematical Applications - Earth Sciences & Geography - Engineering

(Springer, 2010)



Modelling with Transparent Soils

Visualizing Soil Structure Interaction and Multi Phase Flow, Non-Intrusively

Series: Springer Series in Geomechanics and Geoengineering

Iskander, Magued

The fundamental premise of this monograph is that transparent synthetic materials with geotechnical properties similar to those of natural soils can be used to study 3D deformation and flow problems in natural soils. Transparent soils can be made by matching the refractive index of synthetic soil materials and the pore fluid. This monographs presents the geotechnical behaviour of several families of transparent soils that can be combined to meet model-test requirements, in terms of strength, deformation, or permeability.

"Modelling with Transparent Soils" demonstrates how an optical system consisting of a laser light, a CCD camera, a frame grabber, and a PC can be used to measure spatial deformations in transparent soil models non-intrusively. Transparent soil models are sliced optically using a laser light sheet. A distinctive speckle pattern is generated by the interaction of the laser light and transparent soil. A 2D deformation field is obtained from two speckle images by using an image processing technique named adaptive cross-correlation, which is an advanced form of the digital image cross-correlation (DIC) algorithm that utilizes both window sizing and window shifting methods. The monograph demonstrates that comparison of 2D deformation fields between transparent soil and natural soil showed that the results were comparable in almost every aspect. Three dimensional fields can be produced by combining multiple 2D fields in Matlab.

Multiphase flow and surfactant flushing tests were also simulated using a layered transparent soil systems and several contaminants. The developed technology allows for visualizing the contamination concentration and evaluating the performance of remediation technologies in bench scale model tests.

Content Level: Research

Keywords: Centrifuge - DNAPL - Geomechanics - Mechanics - Model Tests - Modelling - Multi Phase Flow - NAPL - Soil Structure Interaction - Tank Tests

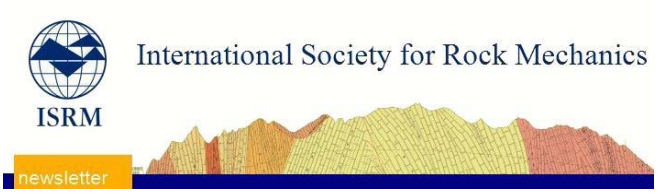
Related subjects: Earth Sciences & Geography - Engineering

(Springer, 2010)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.issmge.org

Κυκλοφόρησε το Bulletin Vol. 4, Issue 2, June 2010 της International Society for Soil Mechanics and Geotechnical Engineering.



www.isrm.net/adm/newsletter

Κυκλοφόρησε το Τεύχος No. 10 – Ιούνιος 2010 Newsletter της International Society for Rock Mechanics.

www.geoengineer.org

Κυκλοφόρησαν τα Τεύχη #65 και #66 του Newsletter του Geoengineer.org (Μάιος και Ιούνιος 2010) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωτεχνικής μηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).

INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

ita@news n°35
http://ita-aites.org/cms/index.php?id=729&no_cache=1

Κυκλοφόρησε το Τεύχος No. 35 – Ιούνιος 2010 των ita@news της International Tunnelling Association.

http://www.piarc.org/library/aipcr/8/3026,Newsletter21VE.pdf

Κυκλοφόρησε το Τεύχος No. 21 (Ιούνιος 2010) της World Road Association (PIARC).

ΕΕΕΕΓΜ
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
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«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» «αναρτώνται» και στην ιστοσελίδα www.hssmge.gr