



Bárdenas Reales - Navarra - Spain



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

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Δευτέρα 9 Μαΐου 2011, Θεσσαλονίκη «Infrastructure Projects in Landslide-Prone Areas (Retaining measures, structures in unstable slopes)», Heinz BRANDL Heinz

Τρίτη 10 Μαΐου 2011, Αθήνα «Infrastructure Projects in Landslide-Prone Areas (Retaining measures, structures in unstable slopes)», Heinz BRANDL

Πέμπτη 19 Μαΐου 2011, Αθήνα «Seismic Imaging from Tunnels and Galleries. Challenges and Benefits of Viewing the Sub-surface From Underground», Calin COSMA (διοργάνωση από το Εργαστήριο Εφαρμοσμένης Γεωφυσικής της Σχολής Μηχανικών Μεταλλείων Μεταλλουργών του ΕΜΠ)

Δευτέρα 30 Μαΐου 2011, Αθήνα «Μη Κορεσμένα Εδάφη», Μιχάλης ΜΠΑΡΔΑΝΗΣ

Παρασκευή 17 Ιουνίου 2011, Αθήνα «Development in the Field of Reinforced Earth Structures», Ivan VANIČEK

Δευτέρα 5 Σεπτεμβρίου 2011, Αθήνα «Geology, engineering and ground response to tunnelling», Jamie STANDING (συνδιοργάνωση με την Ελληνική Επιτροπή Σηράγγων και Υπογείων Έργων)

Δευτέρα 12 έως Πέμπτη 15 Σεπτεμβρίου 2011, Αθήνα «15th European Conference on Soil Mechanics and Geotechnical Engineering»

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ΔΗΜΗΤΡΗΣ ΧΡΥΣΙΚΟΣ 1956 - 2011

Το Εργαστήριο Γεωτεχνικής Μηχανικής του Πανεπιστημίου Πατρών θρηνεί την απώλεια του Δημήτρη Χρυσικού, ο οποίος έφυγε αιφνίδια το πρωί της 2^{ης} Μαΐου 2011.

Ο Δημήτρης γεννήθηκε στον Πειραιά το 1956. Ολοκλήρωσε τις εγκύκλιες σπουδές του στη Βαρβάκειο Σχολή (1974). Απέκτησε Δίπλωμα Πολιτικού Μηχανικού από την Πολυτεχνική Σχολή του Πανεπιστημίου Πατρών (1979) και Διδακτορικό Δίπλωμα από το Τμήμα Πολιτικών Μηχανικών του ιδίου Πανεπιστημίου (1998).

Εργάστηκε στο Πανεπιστήμιο Πατρών από το 1980, πρώτα ως Επιστημονικός Συνεργάτης στην Έδρα Συνθέσεως των Κατασκευών ΙΙ της Πολυτεχνικής Σχολής και στη συνέχεια στο Εργαστήριο Στατικής των Κατασκευών της Πολυτεχνικής Σχολής.

Το 1983 εντάχθηκε στον Τομέα Γεωτεχνικής Μηχανικής και Υδραυλικής Μηχανικής (Εργαστήριο Γεωτεχνικής Μηχανικής), στο οποίο υπηρέτησε, πρώτα ως Επιστημονικός συνεργάτης και στη συνέχεια ως Λέκτορας, μέχρι τον πρόωρο θάνατο του. Δίδαξε επί σειρά ετών μαθήματα Εδαφομηχανικής, Θεμελιώσεων, Βελτιώσεων-Ενισχύσεων Εδαφών και Γεωσυνθετικών Υλικών. Υπήρξε συγγραφέας ή συσυγγραφέας περισσότερων των 30 επιστημονικών δημοσιεύσεων και επιβλέπων ή συνεπιβλέπων σειράς διπλωματικών εργασιών και διπλωμάτων ειδίκευσης Γεωτεχνικού Μηχανικού.

Εργάστηκε με ζήλο ως μέλος επιτροπών του Τμήματος Πολιτικών Μηχανικών και ως Γραμματέας του Ελληνικού Συνδέσμου Γεωσυνθετικών.

Αφήνει πίσω του την γυναίκα του Αγγέλα και πολλούς φίλους εντός και εκτός Πανεπιστημίου. Οι συνάδελφοι του θα τον θυμούνται για την αφοσίωση του στην οργάνωση του εκπαιδευτικού έργου του Εργαστηρίου Γεωτεχνικής Μηχανικής, για την μεγάλη συμβολή του στην μηχανοργάνωση και τη διεκπεραίωση διοικητικών και οικονομικών υποθέσεων του Εργαστηρίου, και τη συνεργασία του στην έρευνα.

Απεβίωσε στο γραφείο του, την ώρα της δουλειάς που τόσο αγαπούσε. Καλό ταξίδι Δημήτρη.



Τα μέλη του Εργαστηρίου Γεωτεχνικής Μηχανικής
Γιώργος Αθανασόπουλος
Δημήτρης Ατματζίδης
Γιώργος Μυλωνάκης
Κώστας Παπαντωνόπουλος

ΠΡΟΓΡΑΜΜΑ ΕΚΔΗΛΩΣΕΩΝ ΠΕΡΙΟΔΟΥ ΜΑΪΟΥ – ΙΟΥΝΙΟΥ ΚΑΙ ΣΕΠΤΕΜΒΡΙΟΥ 2011



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ΜΗΧΑΝΙΚΗΣ

«Infrastructure Projects in Landslide-Prone Areas (Retaining measures, structures in unstable slopes)»

Η διάλεξη θα δοθεί την Δευτέρα 9 Μαΐου στην Θεσσαλονίκη (στην Πολυτεχνική Σχολή του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, ώρα 18:00) και την Τρίτη 10 Μαΐου στην Αθήνα (στην αίθουσα εκδηλώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου, ώρα 19:00) από τον Heinz BRANDL, Πολιτικό Μηχανικό, Καθηγητή και Chairman Institute for Soil Mechanics and Geotechnical Engineering του Technical University of Vienna.

ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

Landslide prevention and slope stabilisation as well as risk assessment are essential for the design, construction and maintenance of structures in unstable slopes. Roads, highways and railways are frequently running in landslide-prone areas that may be seismic zones as well. The lecture underlines the influence of water and shear parameters on slope stability and the importance of determining the residual shear strength. Slope creeping causes excessive lateral pressures on structures; details for calculation are presented.

High embankments (up to 130 m height) have proved successful as cost effective, environmentally friendly alternative to slope bridges in the toe zone of unstable slopes. Data from long-term experience regarding geotechnical performance, maintenance, etc. are presented. "Floating" embankments (reinforced with geosynthetics, etc.) in creeping slopes underline the importance to work with and not against nature.

Barriers against large-scale rockfall, avalanches and debris flow are also presented. Earth dams with geosynthetic reinforcement can withstand several 100 000 m³ of sliding masses.

Building in unstable slopes requires engineering flexibility and structures, which can be strengthened step by step if necessary. This involves semi-empirical design ("active design") based on calculated risk and the observational method including contingency plans and long-term monitoring. Several case histories demonstrate this engineering philosophy which has proved suitable for nearly 40 years already.

ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΗ

O.Univ.-Prof. Dr.techn. Dr.h.c.mult. Dipl.-Ing. Heinz Brandl has been full University Professor for Geotechnical Engineering since 1977 chairing the Geo-technical Institute founded by Professor Terzaghi in 1928 at the Technical University in Vienna, Austria, until 2009.

Prof. Brandl's creative work comprises about 490 scientific publications (including 18 books) partly translated in 18 languages. He delivered nearly 500 invited lectures, e.g. the 2001 Rankine Lecture and has been active world-wide since 1968 as chairman, general reporter, keynote lecturer etc. at numerous international conferences on geotechnical engineering, geosynthetics, road and environmental engineering.

Since 1963 he has been fully responsible for about 4000 projects of civil engineering, road engineering, geotechnical, environmental, structural and hydraulic engineering, thus intensively combining research and development, theory and practice.

Prof. Brandl is member of several international scientific committees within ISSMGE and related societies; he was Vice-President of the ISSMGE in the period 1997 to 2001. Since June 2003 he has been President of the Austrian Society for Engineers and Architects.



«Seismic Imaging from Tunnels and Galleries. Challenges and Benefits of Viewing the Subsurface From Underground»

Το Εργαστήριο Εφαρμοσμένης Γεωφυσικής της Σχολής Μηχανικών Μεταλλείων Μεταλλουργών του ΕΜΠ, σε συνεργασία με την Ευρωπαϊκή Ένωση Γεωφυσικών (EAGE, <http://www.eage.org>) διοργανώνει την Πέμπτη 19.05.2011 και ώρα 16:00, στο Αμφιθέατρο Πολυμέσων του ΕΜΠ (κάτω από την Κεντρική Βιβλιοθήκη) διάλεξη του Dr. Calin Cosma με τίτλο «Seismic Imaging from Tunnels and Galleries. Challenges and Benefits of Viewing the Subsurface from Underground».

Ο Dr. Calin Cosma είναι ο Γεωφυσικός που έχει βάλει τις βάσεις και έχει αναπτύξει την μέθοδο των Cross-Hole Seismics.

ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

The most common reason to perform seismic investigations in tunnels is to detect, map and image cost effectively structural features that could jeopardise the safety and integrity of the excavations. Other applications are delineation of mineral resources and characterizations of the rockmass for geologic storage facilities.

Tunnel construction demands highly specialized standardized techniques able to produce in a short time easily interpretable images, while hydrogeological and mechanical rock characterizations require exhaustive, intricate and typically more time-consuming approaches.

The lecture is an excursion through tunnel and gallery seismics, from measuring layouts, to data acquisition and processing, interpretation, to the modelling of the structural features ahead and around excavation works.

The seismic acquisition techniques presented range from recorded production explosions to drilling noise converted into seismic signal, to the engineered sources on the tunnel wall and in boreholes with frequencies ranging from tens of Hz to tens of kHz. These produce 2D and 3D velocity and elastic moduli maps and migrated seismic amplitude maps. The core of the processing technique is the Image Point (IP) migration. The IP migration method incorporates naturally dip, polarization and coherency filters, which increase the resolution and the interpretability of the migrated images.

The conclusion is that seismic surveys in tunnels can be used, economically, for rock mass characterization and high quality results can be obtained in excavation production conditions. Rock features such as faults, fractured zones and single long fractures, rock contacts and hydraulically conductive zones can be detected and mapped.

ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΗ

Dr Calin Cosma, is a recognized professional in applied seismics. He has over 25 years of experience in developing and implementing multi-disciplinary geoscience research programs, developing rock characterization tools and techniques, teaching and tutoring. Developed geophysical methods for the detection of discontinuities ahead of a tunnel face since late 30's

Dr Cosma works with nuclear waste disposal site characterization, carbon capture and storage and mining. He co-authored hundreds of reports and scientific papers on hard rock seismic imaging, characterization and methods for nuclear waste disposal, ore delineation, 3D fracture mapping, tomographic inversion, multi-azimuth VSP methods.

Calin received a M.Sc. in Physics of the Earth from University of Bucharest and a PhD from the same institution.



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«Μη Κορεσμένα Εδάφη»

Η διάλεξη θα δοθεί την Δευτέρα 30 Μαΐου 2011 στην Αθήνα (στην αίθουσα εκδηλώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου, ώρα 19:00) από τον Μιχάλη ΜΠΑΡΔΑΝΗ, Πολιτικό Μηχανικό, ΕΔΑΦΟΣ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Α.Ε.

ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

Η μηχανική συμπεριφορά των μη κορεσμένων εδαφών καθορίζεται από την παρουσία στο εδαφικό υλικό αρνητικής πίεσης αρχικά, και μύζησης (suction) στη συνέχεια, μετά από την επίτευξη αποκορεσμού (desaturation), η οποία εμφανίζεται λόγω της συνύπαρξης της υγρής και της αέριας φάσης στους πόρους του εδάφους.

Στη διάλεξη θα παρουσιαστεί η ιδιαιτερότητα της φύσης των μη κορεσμένων εδαφών λόγω της παρουσίας τριών φάσεων (στερεά, υγρή και αέρια), η έννοια της μύζησης ως φυσικού μεγέθους και η χαρακτηριστική καμπύλη εδάφους-νερού (soil-water characteristic curve), δηλαδή η συσχέτιση μεταξύ του βαθμού κορεσμού και της αρνητικής πίεσης πόρων αρχικά και της μύζησης στη συνέχεια, η οποία αποτελεί και την κύρια ιδιότητα που πρέπει να προσδιοριστεί για την μελέτη των μη κορεσμένων εδαφών.

Θα γίνει παρουσίαση των υπάρχουσών μεθόδων και συσκευών μέτρησης και ελέγχου της μύζησης, αφού η εμβάθυνση στις μεθόδους αυτές εκτός από την κατανόηση των υπάρχοντων «εργαλείων» για την μελέτη της μηχανικής συμπεριφοράς των μη κορεσμένων εδαφών, βοηθά και στην κατανόηση της έννοιας της μύζησης και του τρόπου που εκδηλώνεται η μηχανική συμπεριφορά των μη κορεσμένων εδαφών.

Η διάλεξη θα ολοκληρωθεί με την παρουσίαση της μηχανικής συμπεριφοράς των μη κορεσμένων εδαφών και ειδικότερα:

- της συμπίεσής τους, με παραδείγματα από την αξιολόγηση και την ερμηνεία εργαστηριακών δοκιμών μονοδιάστατης συμπίεσης,
- της διατμητικής τους αντοχής, με παραδείγματα από τα ζητήματα που ανακύπτουν κατά τις αντίστροφες αναλύσεις ευσταθείας πρανών και κατολισθήσεων, και
- της διαπερατότητάς τους ως προς το νερό, με παραδείγματα από τα ζητήματα που ανακύπτουν σε αναλύσεις μη μόνιμης ροής με την μέθοδο των πεπερασμένων στοιχείων.

ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΗ

Αποφοίτηση το 1997 από το Τμήμα Πολιτικών Μηχανικών ΕΜΠ και μετάβαση στο Imperial College για παρακολούθηση του Master's Εδαφομηχανικής με επιβλέποντα τον καθηγητή John Burland. Εκπόνηση διδακτορικής διατριβής από το 1999 στην Μηχανική Συμπεριφορά των Μη Κορεσμένων Εδαφών με τον καθηγητή Μιχάλη Καββαδά. Ένταξη από το 1999 στο δυναμικό της εταιρείας ΕΔΑΦΟΣ (εταίρος από το 2004 και διευθυντής του εργαστηρίου της από το 2009), ασχολούμενος κυρίως με κατολισθήσεις και προβλήματα ευστάθειας πρανών, αξιολογήσεις και προβλήματα υπόγειας ροής. Συγγραφή 30 επιστημονικών άρθρων, τα μισά από τα οποία για την μηχανική συμπεριφορά των μη κορεσμένων εδαφών. Μέλος της Τεχνικής Επιτροπής TC-106 της Διεθνούς Ένωσης Εδαφομηχανικής και Γεωτεχνικής Μηχανικής για τα Μη Κορεσμένα Εδάφη, της ASTM και της BGA καθώς και κριτής επιστημονικών άρθρων για το αντικείμενο των μη κορεσμένων εδαφών σε περιοδικά (GEGE) και εξειδικευμένα συνέδρια (2nd European Conference on Unsaturated Soils, 2012, Naples, Italy, 5th Asia-Pacific Conference on Unsaturated Soils, 2011, Pattaya, Thailand).



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& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

«Development in the Field of Reinforced Earth Structures»

Η διάλεξη θα δοθεί την Παρασκευή 17 Ιουνίου 2011 στην Αθήνα (στην αίθουσα εκδηλώσεων της Σχολής Πολιτικών Μη-

χανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου, ώρα 19:00) από τον Ivan Vanicek, Πολιτικό Μηχανικό, Καθηγητή στην Faculty of Civil Engineering, Czech Technical University, Prague.

ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

Basic principles of soil reinforcement - short overview.

Fundamental demands on reinforcing elements – tensile strength and maximum elongation at failure, shear strength of contact, creep properties of reinforcing materials.

Reinforced earth structures design – limit state design approach – ULS – classical methods (LEM), design parameters, internal stability, external stability, FEM; SLS – classical methods, FEM.

Directions of new development – pre-stressed reinforced earth structures; FEM – inclusion of creep; randomly distributed short synthetic fibres; monitoring of strength x strain behaviour of geosynthetics in earth structures.

Practical examples – Reinforced wall reconstruction; Failure of reinforced wall due to overturning.

ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΗ

His higher education and professional carrier is connected with the Geotechnical Department of the Czech Technical University in Prague, where he obtained full professorship at 1988. During his professional carrier he also gained foreign experiences - in UK at the Imperial College as Academic visitor, where between 1975 and 1976 he cooperated with Prof. Bishop or in Russia, where he cooperated with Prof. Tsytovitch (1978) and with Prof. Ivanov (1983) each time 1 month.

His research activities were presented apart from papers and monographs within different thesis and habilitation works for: MSc. in 1967; PhD. in 1975; DIC in 1977; Assoc. Prof. in 1980; DSc. in 1985; Prof. 1988. Research activities were strongly connected with embankment dams, dykes; with environmental geotechnics (spoil heaps, tailing dams, landfills, underground repositories) and finally with soil reinforcement with the help of geosynthetics. At the present time he is responsible on the domestic level for wider research activities as is project by Ministry of Education - "Sustainable Construction". On the European level the research cooperation proceeds under the frame of European Scientific Fund, within which metros in Prague, London and Barcelona are instrumented and monitored – "Ageing of underground structures – Prague Metro", CTU Press, 2008.

For the teaching activities he completely elaborated subjects as Soil Mechanics, Environmental Geotechnics and Earth Structures. From nearly 20 textbooks and monographs he wrote or co-authored it is possible to mention some of them: Soil Mechanics - 1982, Tensile cracks behaviour in embankment dams - 1987, Environmental Geotechnics - 1991, Limit state design of reinforced soils - 2000, Remediation of old landfills and ecological burdens - 2002, (all in Czech) and new book "Earth Structures", which was published by Springer in 2008. These publications are also strongly based on his own research and consulting activities, which are performed either via CTU or via his own consulting firm "Geotechconsult".

His activities in learned and professional societies started mostly after 1989. In 1991 he founded the Czech Geotechnical Society, (currently chairman), which is part of the Czech Institution of Civil Engineers (member of CICE presidium). In 1997 he was elected as a chairman of the Czech and Slovak National Committee of ISSMGE. From the beginning of nineties he joined practically all conferences of ISSMGE – International, European, Danube European as well international congresses of Environmental Geotechnics.

At many of these conferences he played some key role. In 2003 arranged European Conference ISSMGE in Prague. From these days his connection with ISSMGE is increasing – in the frame of Council Meetings, Touring Lectures (2007 in Albania), representing ISSMGE in Joint European Working Group “Professional Task, Responsibilities and Co-operation in Geo-Engineering”, etc. Very close cooperation he also has with representatives of individual countries from the ELGIP platform.

In 2009 elected by vice-president ISSMGE for Europe.

Ivan is married to Nad'a; they have two adult sons – Martin and Jiří, both civil – geotechnical and hydro engineers, working in their own consulting firm Geosyntetika, Ltd., nevertheless they of course cooperate with dad.



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

«Geology, engineering and ground response to tunnelling»

Η διάλεξη θα δοθή την Δευτέρα 5 Σεπτεμβρίου στην Αθήνα (στην αίθουσα εκδηλώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου, ώρα 19:00) από τον Jamie Standing, Πολιτικό Μηχανικό, Senior Lecturer in Geotechnical Engineering at Imperial College London.

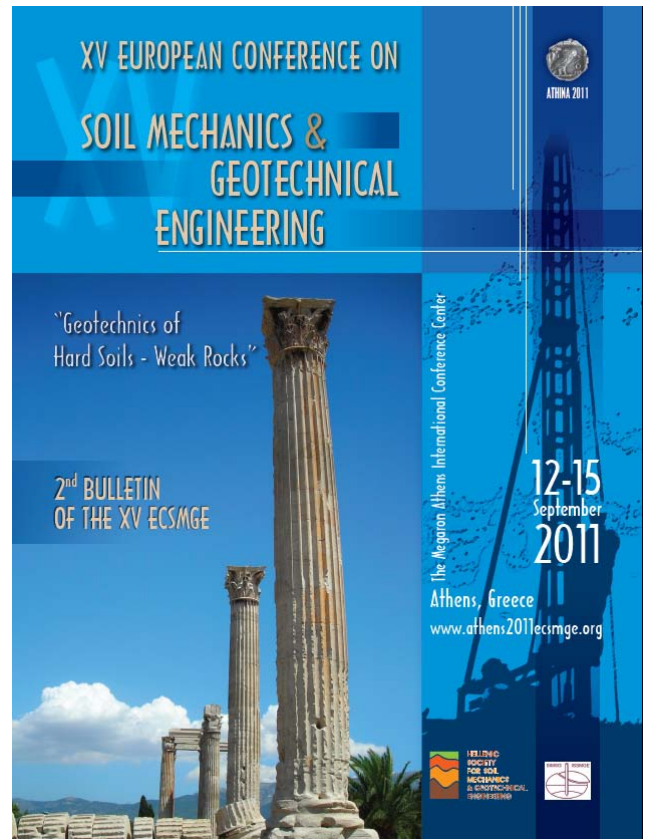
ΠΕΡΙΛΗΨΗ ΔΙΑΛΕΞΗΣ

Geotechnical Engineers clearly understand that geology plays a key role in their field. Frequently though, more subtle aspects of geology are overlooked. Detailed monitoring of the ground during the construction of tunnels for the Jubilee Line Extension and the Channel Tunnel Rail Link and equally detailed study of the ground conditions have revealed the significant influence of sub-units of the London Clay formation. The lecture will focus on the response of London Clay to tunnelling works – however it is important to recognise that similar ground features are extensively found in other strata. If the depositional environment of a soil is well understood along with any subsequent geological events, anticipating the ground conditions and their response to geotechnical processes can be greatly improved. Tunnelling-induced ground surface and subsurface responses in terms of displacements, strains and pore pressure changes will be presented and discussed in the context of the geology and the tunnelling method for both the short- and long-term condition.

ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ ΟΜΙΛΗΤΗ

Dr Standing is a Senior Lecturer in Geotechnical Engineering at Imperial College London. His main research activities are strongly linked to soil-structure interaction, including tunnelling, piling, embankments and ground reinforcement using soil nailing and the study of these process using full-scale field monitoring and small-scale laboratory models. He has published more than sixty journal and conference papers and was awarded the Géotechnique medal in 2006. He was co-editor of 'Building response to tunnelling: case studies from construction of the Jubilee Line Extension' that was published following the Imperial College research on

the JLE project. He subsequently led a full-scale research project on the CTRL (to assess the effect of tunnelling on piled foundations) and has recently secured EPSRC funding to investigate the effect of tunnelling on existing tunnels in collaboration with the Crossrail project.



Κυκλοφόρησε το 2nd Bulletin του XV European Conference on Soil Mechanics and Geotechnical Engineering με λεπτομέρειες για την διοργάνωση του συνεδρίου, των συνεδριών, των τεχνικών επισκέψεων κ.λπ. Σημειώνεται ότι έχουν εγκριθεί 380 περίπου περιλήψεις άρθρων και έχουν υποβληθεί περί τα 300 άρθρα.

Το 2nd Bulletin καθώς και το έντυπο εγγραφής στο συνέδριο είναι αναρτημένα στον ιστοχώρο του συνεδρίου www.athens2011ecsmge.org.

Το παρακάτω άρθρο του μέλους της ΕΕΕΕΓΜ Σπυρίδωνος Κωνσταντή επελέγη από την British Tunnelling Society για την διεκδίκηση του βραβείου Harding.

Probabilistic Assessment of Face Stability Conditions for Shallow Tunnels in Soft Ground

Spyridon Konstantis

Dipl.-Ing MS MSc Ove Arup & Partners International Ltd

ABSTRACT

The present contribution discusses the probabilistic preliminary assessment of face stability conditions and necessary support pressure for tunnels with low overburden heights in weak rock masses and soils. The assessment has been based on three different analytical methods: a) the 3-D wedge limit equilibrium model with side friction, b) the convergence-confinement method and c) a combination of the above. The random variables in the parametric studies were the tunnel diameter D , the overburden height H , the shear strength parameters c and ϕ of the ground (assumption of uncorrelated parameters), the ground unit weight γ , the elasticity modulus E and the Poisson's ratio ν . The ground-water conditions have been included as an independent variable in the 3-D wedge limit equilibrium model with side friction and no destabilising seepage forces on the tunnel face were taken into account in any of the assessment methods (assumption of zero hydraulic gradient). The probabilistic analyses were performed with the software package @Risk and Monte Carlo Simulation was used as the sampling technique for the random variables. In spite of the wide range of values included in terms of tunnel geometrical and soft ground strength and deformability characteristics, the results present a very similar trend. The produced dimensionless design charts can, therefore, become a very practical tool in conceptual studies and preliminary design for the assessment of face stability conditions and necessary support pressure for shallow tunnels in soft ground.

Keywords: tunnel, soft ground, weak rock mass, face stability, face support pressure, probabilistic assessment, Monte Carlo simulation

1. INTRODUCTION

The stability of the tunnel face is of paramount importance, particularly for shallow tunnels excavated in crowded urban environments, under severe environmental constraints and in many cases in challenging and difficult ground conditions.

Tunnel face instability may potentially lead to unacceptable relaxation of the advance core, which could in turn lead to excessive face extrusion and radial pre-convergence /0/. According to /0/ and /0/, control of radial pre-convergence and face extrusion in the advance core is critical in shallow urban tunnelling as, in a properly supported non-TBM tunnel, 70% to 80% of the total surface settlement can be attributed to ground deformations taking place ahead of the face. In proper excavated TBM tunnels this percentage varies depending primarily on the type of boring machine and excavation method used, with the prevalent component of the overall surface settlement in this case being the radial convergence of the void behind the tail skin.

In extreme cases, absence of adequate support pressure may potentially initiate a partial or total failure of the tunnel face with the form of a chimney and in some cases a crater that reaches the ground surface with detrimental effects for the surface and subsurface structures and utilities in the area above the tunnel.

The factors that could initiate tunnel face instability, either with the form of excessive relaxation of the advance core or partial or total collapse of the face, are associated with the geometrical characteristics of the tunnel, the strength and deformability characteristics of the ground surrounding the tunnel, the in situ stress state in the area of excavation as well as the presence of underground water table above the tunnel crown and the development of destabilising seepage forces.

The actual problem of tunnel face stability and support pressure is in essence three dimensional. Consequently, a thorough and in depth study of the stability conditions would require sophisticated three dimensional numerical analysis. However, 3D numerical analyses have a number of certain drawbacks mainly associated with complicated input preparation and output presentation, time consuming analysis, multiple simulation stages and incompatibility between improved accuracy and level of knowledge of ground conditions /0/.

In conceptual studies and preliminary design of tunnels, the engineers do not always have the time or the luxury to perform 3D numerical analysis to assess the tunnel face stability conditions, especially when parametric analyses have to be carried out. In these cases they would rather require a practical tool that would enable them to quickly check the tunnel face stability conditions, assess the necessary support pressure as well as evaluate different option in terms of geometrical characteristics of the tunnel.

The outcome of the present work is a series of dimensionless practical design charts that have been produced on a probabilistic basis. These charts can be used to assess the support pressure that needs to be applied on the tunnel face to ensure stability conditions. Due to the wide range of values included in the parametric analyses, the charts can be used for a variety of conditions in terms of tunnel geometrical and ground strength and deformability characteristics.

2. FACE STABILITY MODELS

In the literature, there are many analytical methods available for defining face support pressure /0/. Most of these methods make use of limit equilibrium models as well as upper and lower bound theorems of plasticity.

In the current contribution, the assessment of face stability conditions and necessary support pressure that needs to be applied on the tunnel face has been based on three different analytical methods: a) the 3-D wedge limit equilibrium model with side friction, b) the convergence-confinement method and c) a combination of the above.

2.1. 3D wedge limit equilibrium model with side friction – Silo load

This method is based on the silo theory (Janssen 1895) and on the three-dimensional model of sliding mechanism proposed by Horn (1961). It was later extended by /0/ and is referred to as Anagnostou & Kovari method.

The failure mechanism comprises a wedge ahead of the tunnel face and a prism above it, as shown in Figure 1. The method is based on the stereoscopic equilibrium of the wedge and the loads acting on it are: (a) the self weight W (b) the resulting normal N and shear T and T_s forces along the failure surfaces ADE, BCF and ABFE, (c) the support pressure P applied on the tunnel face ABCD and (d) the

vertical overburden load R acting on the surface CDEF. The circular tunnel cross section is approached by a square with side length the tunnel diameter D .

The ground is assumed to behave as elastic- perfectly plastic material in accordance with the Mohr-Coulomb failure criterion. At every point along the slide surfaces, the shear strength is:

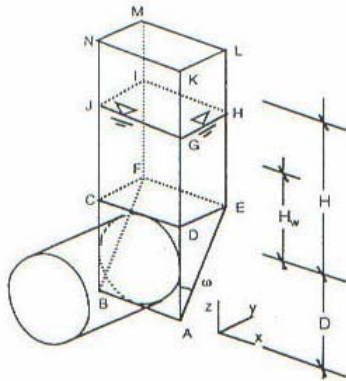


Figure 1 Tunnel face stability model of Anagnostou & Kovari method

$$\tau = \frac{c}{F} + \sigma \frac{\tan \phi}{F} \quad (1)$$

where σ is the normal stress, c the ground cohesion, ϕ the ground internal friction angle and F the safety factor.

The vertical stress σ_v acting on the interface CDEF is determined through Terzaghi's silo theory assuming that the prism CDEFGH acts as silo. If the water table exists above the tunnel crown, the calculations are performed on the basis of effective stresses and hydrostatic distribution of the water pressures along the slide surfaces. In that case the theory is first applied on the part of the prism above the ground water table and then on the remaining part between the ground water level and the tunnel crown, in order to take into account the different unit weights of the soil above and below the ground water table.

The mean effective vertical stress σ'_v on the surface CDEF is given by the following expression:

$$\sigma'_v = \frac{\gamma' r - c}{\lambda \tan \phi} \left(1 - e^{-\lambda \tan \phi H_w / r} \right) + \frac{\gamma_d r - c}{\lambda \tan \phi} \left(e^{-\lambda \tan \phi H_w / r} - e^{-\lambda \tan \phi H / r} \right) \quad (2)$$

where H , H_w , γ_d and γ' is the overburden height, the ground water table height above the tunnel crown (see Figure 1), the dry unit weight and the effective unit weight under buoyancy of the ground, respectively.

In equation (2), λ is a constant coefficient representing the ratio of horizontal to vertical stresses that act on the vertical slide surfaces of the prism. Terzaghi and Jelinek (1954) suggested the use of $\lambda=1$. Based on experiments conducted by Gudehus & Melix (1986) and Melix (1987), the value $\lambda=0.8$ was suggested by /0/.

Moreover, r in equation (2) is the ratio of the volume to the periphery of the prism and is defined as:

$$r = 0,5D \tan \omega / (1 + \tan \omega) \quad (3)$$

Equation (2) is valid for safety factor F equal to 1. Other values of the safety factor may be considered by replacing the cohesion c and $\tan \phi$ through c/F and $\tan \phi/F$, respectively.

Regarding the stress distribution on the slide surfaces ADE and BCF the linear approach suggested by DIN 4126 (1986) and shown in the following Figure 2 is adopted.

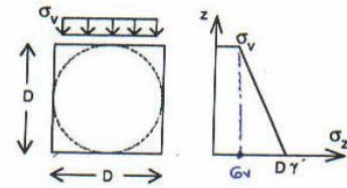


Figure 2 Vertical stress distribution on the slide surfaces of the wedge

The mean shear (frictional) resistance τ_ϕ is calculated through the integration of the term $\lambda \sigma_z \tan \phi$ on the slide surfaces ADE and BCF:

$$\tau_\phi = \lambda \left(\frac{1}{3} \gamma' D + \frac{2}{3} \sigma_v \right) \frac{\tan \phi}{F} \quad (4)$$

In this case the cohesion contribution is neglected. In reality, cohesion will contribute with its residual value c_{res} but it is omitted for simplicity.

Numerical analyses were performed by /0/ in order to verify the accuracy of the approach presented in Figure 2. The equilibrium of the wedge was analysed according to the silo theory and the wedge was divided in horizontal slices. The analysis showed that the approach proposed in DIN 4126 overestimates the vertical stress σ_z and hence the shear resistance. However, the uncertainties associated with the linear approach of figure 2 can be eliminated by choosing a lower value of λ in equation (4). The value $\lambda=0.4$ was suggested by /0/ for the wedge, namely half of the value that was suggested for the prism.

The support pressure is determined on the basis of equilibrium of horizontal and vertical forces acting on the wedge and the process is iterative. The maximum support pressure, for a certain safety factor, corresponds to the critical slope ω_{cr} of the wedge.

2.2. Convergence-Confinement method

The excavation of a tunnel causes changes in the stress state of the surrounding ground and induces ground deformations.

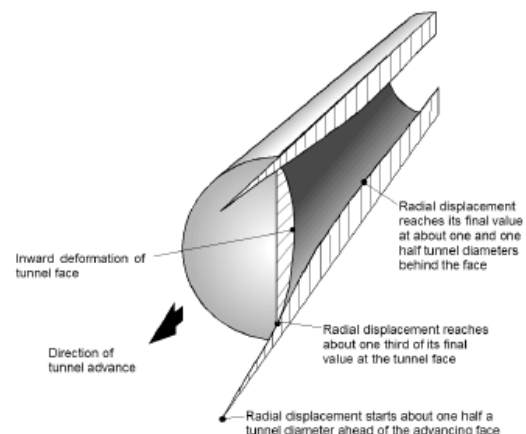


Figure 3 Pattern of deformation in the ground surrounding an advancing unsupported tunnel

Figure 3 shows the pattern of deformations in the ground surrounding an advancing unsupported tunnel /0/. The ground is mobilised in the advance core ahead of the tunnel face resulting in pre-deformations. On the tunnel face, the ground deforms inwards and a percentage of the final radial convergence has already occurred.

The ground deformations that take place in the advance core are the result of the gradual reduction of the in situ stress P_o . This stress relaxation is depicted in Figure 4 and can be expressed as:

$$P_i = (1 - \lambda) P_o \quad (5)$$

where P_o is the geostatic stress (isotropic) and λ is the deconfinement ratio.

In the advance core, P_i represents the self supporting mechanisms of the ground with the form of a fictitious, gradually reduced internal support pressure.

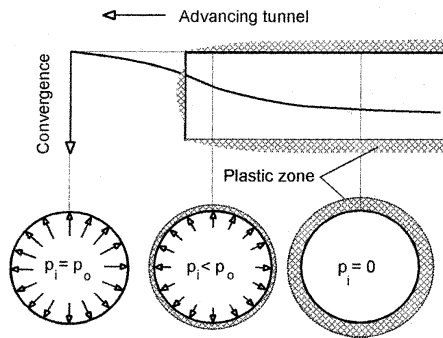


Figure 4 Gradual reduction of in situ stress P_o relative to the distance from the advancing face of an unsupported tunnel

The radial displacement/convergence of the tunnel wall u_r can be related with the support pressure P_i through the ground reaction curve (see Figure 5).

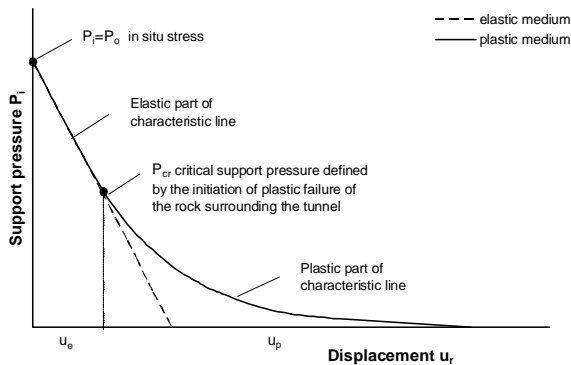


Figure 5 Ground reaction curve of an excavated tunnel

As the tunnel advances, the support pressure P_i is gradually reduced and the tunnel wall displacement u_r increases. The ground deformation is elastic at the beginning and the relaxation rate of the initial stress is significant. When stress reaches a critical value P_{cr} there is a transition from elastic to plastic area with reduction of the relaxation rate and simultaneous increase of the displacement rate.

The so called longitudinal deformation profile (see Figure 6) is the representation of the ratio of radial convergence of the tunnel wall u_r to the maximum convergence $u_{r,max}$ relative to the distance from the advancing tunnel face /0/.

By applying continuum mechanics theory for a circular opening excavated through an elasto-plastic medium, it is possible to correlate the deconfinement ratio λ with the relative distance from the advancing tunnel face /0/, as depicted in Figure 7. N_s is the overload factor defined in equation (7).

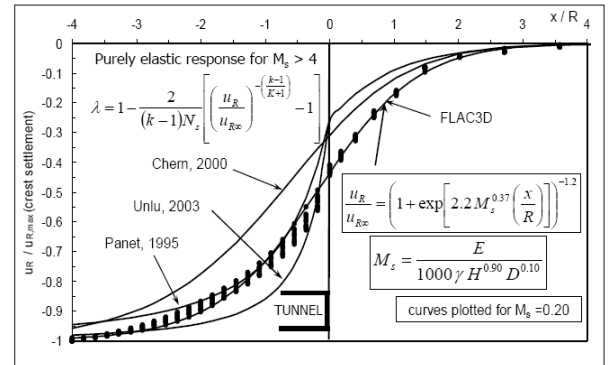


Figure 6 Longitudinal deformation profile of an advancing tunnel

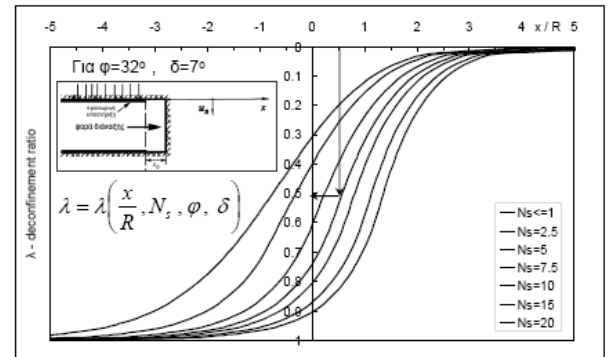


Figure 7 Longitudinal deconfinement profile of an advancing tunnel

In an advancing tunnel without support pressure on the face (see Figure 8), the geostatic horizontal pressure σ_3 in the advance core (lateral confinement) is gradually reduced. In a simplified approach, the stress state at the tunnel face represents in essence uniaxial compression conditions /0/.

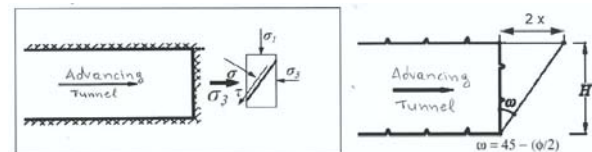


Figure 8 Stress conditions in the advance core of an unsupported tunnel face

The initial safety factor FS_o of the unsupported tunnel face can be expressed as the ratio of the in situ strength of the ground to the in situ stress:

$$FS_o = \frac{\sigma_{cm}}{\sigma_1} \quad (6)$$

where $\sigma_{cm} = 2 * c * \cos \phi / (1 - \sin \phi)$ is the in situ uniaxial compressive strength of the ground and $\sigma_1 = (1 - \lambda) P_o$ is the equivalent deconfinement stress at distance $x = H * \tan(45 - \phi/2) / 2$ ahead of the tunnel face.

The initial safety factor is finally defined as:

$$FS_o = \frac{2}{(1-\lambda)N_s} \quad (7)$$

where $N_s = 2P_o/\sigma_{cm}$

If support pressure σ_3 (lateral confinement) is applied on the tunnel face (active in the case of closed TBM shields or passive in the case of SCL tunnels with the form of e.g. grouted fibre glass dowels in the advance core), the stress state at the face represents in essence triaxial conditions /0/. In that case, the in situ strength of the ground increases to $\sigma_c = \sigma_3 \tan^2(45 + \phi/2) + \sigma_{cm}$. Assuming that the deconfinement ratio λ is not affected by the application of the support pressure at the tunnel face, the improved safety factor FS is defined as:

$$FS = \frac{\sigma_c}{\sigma_1} = FS_o + \frac{1}{(1-\lambda)} \left(\frac{\sigma_3}{P_o} \right) \tan^2 \left(45 + \frac{\phi}{2} \right) \quad (8)$$

2.3. 3D wedge limit equilibrium model with side friction – Deconfinement load

This method is in principle the same as the method described in section 0. The differences pertain to the definition of the vertical stress σ_v acting on the surface CDEF and the shear forces T_s acting along the failure surfaces ADE and BCF (see Figure 1) /0/.

In this method the vertical overburden stress acting on the wedge is defined as:

$$\sigma_v = (1-\lambda)P_o \quad (9)$$

where P_o is the geostatic stress at tunnel level and λ is the deconfinement ratio at distance $x = H \tan(45 - \phi/2)/2$ ahead of the tunnel face (see Figure 8).

The shear forces T_s acting on the wedge sides are defined as:

$$T_s = (ADE)\tau_f \quad (10)$$

$$\tau_f = c/F + K\sigma_{vo} \tan \phi/F \quad (11)$$

where K is the earth pressure coefficient, σ_{vo} is the vertical in situ stress on the wedge sides and F is the safety factor.

The nature of the earth pressure coefficient K depends primarily on the stress relaxation in the tunnel advance core. In front of the advance core, the stress state is geostatic and the earth pressure coefficient represents conditions at rest K_o . During the advancing of the tunnel, radial pre-convergence starts to develop in the advance core and the stress state could be assumed to represent active earth pressure conditions K_a in accordance with Rankine's theory. In the present work, however, the earth pressure coefficient at rest K_o was adopted in the parametric analyses.

It can be seen from equation (11) that the cohesion contribution to the shear resistance τ_f of the wedge sides is not neglected in this method.

3. TUNNEL STABILITY FACTOR

The Tunnel Stability Factor (TSF) has been proposed by /0/ to assess the behaviour of underground openings in weak rock/soft ground conditions and can be considered as an important parameter for the initial assessment of the overall behaviour of the tunnel.

The tunnel stability factor is defined as:

$$TSF = \frac{\sigma_{cm}}{\gamma H^a D^{1-a}} \quad (12)$$

where σ_{cm} is the in situ strength of the ground surrounding the tunnel, γ is the ground unit weight, H is the height of overburden and D is the equivalent tunnel diameter.

The exponent a is a parameter that depends on the type of tunnel behaviour under consideration, such as assessment of tunnel stability in relation to radial convergence and potential squeezing phenomena, assessment of tunnel face stability etc.

Parametric analyses were performed by /0/ to assess the tunnel stability in weak rocks in terms of radial convergence of the tunnel walls, the evolution of plastic zone around the excavation and the potential for evolution of squeezing phenomena, in relation to the TSF. Based on their studies, /0/ proposed the value 0.75 for the exponent a . In this case, the relative contribution of the overburden height H is higher compared to the tunnel diameter, since the potential for evolution of squeezing is in direct conjunction with the ratio of the in situ strength of the rock mass to the overburden pressure /0/.

Parametric analyses based on the 3D wedge limit equilibrium model with side friction described in section 0, were performed by /0/ to assess the tunnel face stability conditions for shallow tunnels in weak rock/soft ground in relation to the TSF. Based on the curve fit to the analyses results with the highest value of R^2 , the value 0.35 was suggested for the exponent a for tunnel face stability considerations. In these parametric analyses, the values of the random variables were changed one at a time without automatic random selection.

4. Probabilistic Analyses

4.1. Application

In the present work, each analytical method for the assessment of tunnel face stability conditions and support pressure was programmed in a Microsoft Excel spreadsheet. The probabilistic analyses were carried out with the risk analysis software package @Risk /0/.

4.2. Random Variables

The random variables in the probabilistic analyses were the equivalent tunnel diameter D , the overburden height H , the shear strength parameters c and ϕ of the ground, the ground unit weight γ , the elasticity modulus E and the Poisson's ratio ν . The probabilistic analyses were performed on the basis of uniform distribution for each random variable.

The examined cases included the following value range of tunnel geometrical and ground strength and deformability characteristics:

- Equivalent tunnel diameter $D = 4\text{m}-10\text{m}$
- Overburden heights (ground level to tunnel crown) $H = 5\text{m}-30\text{m}$
- Cohesion $c = 5\text{KPa}-25\text{KPa}$
- Angle of internal friction $\phi = 20^\circ-35^\circ$
- Dilatancy angle $\psi = 0^\circ-\phi^\circ/6$
- Elasticity modulus $E = 15\text{MPa}-60\text{MPa}$
- Poisson's ratio $\nu = 0,15-0,25$
- Ground unit weight $\gamma = 18-22 \text{ KN/m}^3$

In reality, the ground shear strength parameters c and ϕ are in principal correlated. According to /0/, the assumption of negative correlation between the shear strength parameters gives a greater reliability of the tunnel face stability compared to the one of uncorrelated variables. However, due to the generalised approach of tunnel face stability conditions in the present work, the shear strength parameters c and ϕ were assumed to be uncorrelated.

The coefficient of earth pressure at rest K_0 was taken, according to Jacky's formula, as $1 - \sin\phi$.

The tangent of dilatancy angle ψ expresses the ratio of volumetric ϵ_{vol} to shear ϵ_{shear} strain of the ground. The angle value depends primarily on the type and density of the ground and can be expressed as a function of the angle of internal friction ϕ . The dilatancy value range adopted corresponds to grounds with low to medium density.

The ground water conditions in terms of ground water table above the tunnel crown H_w were included in the 3D wedge limit equilibrium model described in 0 as an independent variable. Moreover, in all the analytical methods used in the present work, the assumption of zero hydraulic gradient was adopted, i.e. no destabilising seepage forces were taken into account on the tunnel face.

4.3. Sampling Technique

Monte Carlo simulation was used as the sampling technique for the random variables in the probabilistic analyses. Each analysis included 15000 simulations

5. SAFETY FACTOR CONSIDERATIONS

The probabilistic studies in the present contribution were performed on the basis of unity safety factor (FS or $F=1$). This approach is in accordance with the general framework of EC7 that requires in principle design resistance $R_d \geq$ design effect of actions E_d or expressed through the traditional safety factor:

$$FS = R_d / E_d \geq 1 \quad (13)$$

In essence, the tunnel face can be considered as a vertical slope. In EC7 the design requirements for the overall stability of a slope are defined through the GEO and STR Limit States that concern failure (ULS) or excessive deformation (SLS) of the ground and/or of any supporting structure, respectively.

The analytical methods adopted here for the assessment of face stability conditions do not consider the structural contribution of the support systems but only the resulting support pressure, hence the STR limit states are not relevant. Moreover, they are based on failure mechanisms rather than deformation driven modes. Consequently, the overall stability of the tunnel face can be considered here as a GEO Ultimate Limit State (ULS) situation.

In the framework of EC7, the values of ground strength and deformability parameters in section 0 are considered design values, where the partial material factors applied on the characteristic values depend on the Design Approach (DA) adopted.

6. RESULTS

6.1. 3D wedge limit equilibrium model with side friction – Silo load

6.1.1. Tunnel Stability Factor (TSF) Verification

The first part of the probabilistic studies with this analytical method aimed to verify the conclusions drawn by /0/ with respect to the definition of TSF and in particular the expo-

nent a ($a=0,35$). In their work, /0/ had assumed the following value range of tunnel geometrical and ground shear strength parameters:

- Equivalent tunnel diameter $D=4m-10m$
- Overburden heights (ground level to tunnel crown) $H=10m-20m$
- Cohesion $c=5KPa-20KPa$
- Angle of internal friction $\phi=25^\circ-30^\circ$
- Ground unit weight $\gamma=21-23 \text{ KN/m}^3$

Figure 9 shows the results, based on 10000 simulations, for $a=0.35$ and for the above mentioned value range of parameters in dry conditions. The results follow a very similar and well determined trend of behaviour.

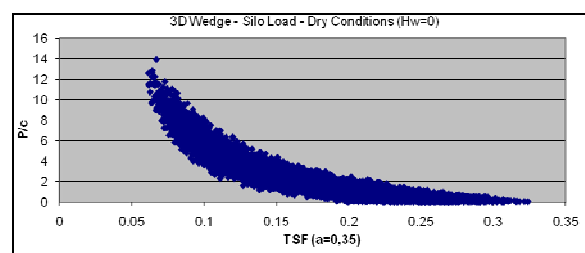


Figure 9 P/c vs. TSF ($a=0.35$ and $H_w=0$) for the value range of parameters adopted by /0/

The following Figure 10 presents the correlation coefficients of the (input) random variables for the (output) support pressure P . The results indicate that the relative impact of the tunnel diameter D and the overburden height H to the support pressure P is represented by $a \approx 0.10$ in the optimum definition of TSF for this range of input variables. Figure 11 presents the probabilistic analysis results for $a=0.10$. It is obvious that the scatter is significantly reduced compared to $a=0.35$ and the results follow a better determined trend of behaviour.

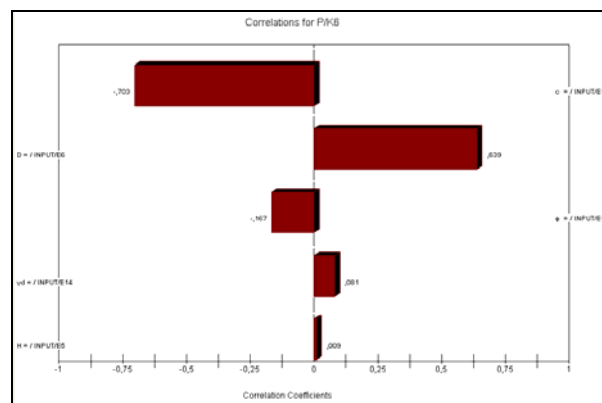


Figure 10 Correlation coefficients of (input) random variables for the (output) support pressure

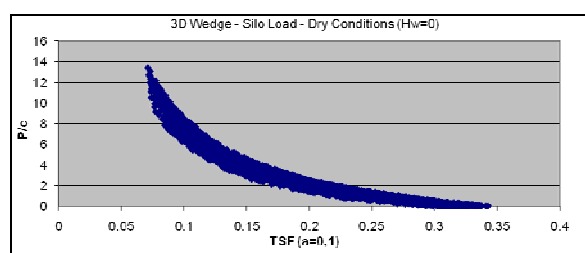


Figure 11 P/c vs. TSF ($a=0.10$ and $H_w=0$) for the value range of parameters adopted by /0/

The following sections 0 and 0 contain the results of the probabilistic studies for dry and wet conditions, respectively, for the value range of parameters presented in section 0

In all the subsequent sections, the optimum definition of TSF is derived through the correlation coefficients of the input random variables (tunnel diameter D and overburden height H) for the output support pressure P.

6.1.2. Dry conditions (Hw=0)

The optimum definition of TSF for this case is for $a=0.07$. The results are presented in Figure 12 where it can be seen that the scatter increases with the reduction of TSF but the trend of behaviour still remains very well determined.

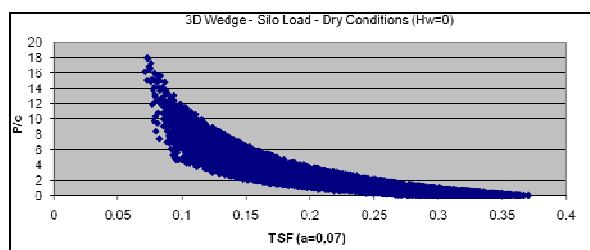


Figure 12 P/c vs.TSF ($a=0.07$ and $H_w=0$)

In spite of the different value range of input parameters considered in this probabilistic analysis, the optimum definition of TSF for the 3D wedge model with silo load under dry conditions ($H_w=0$) is for exponent a that ranges from 0,07 to 0,10. However, the scatter of the results is influenced by the value range of input parameters. For increasing value range, the scatter increases as TSF decreases.

6.1.3. Existence of ground water table – Wet conditions (Hw≠0)

The ground water conditions ($H_w \neq 0$) were included in this method as an independent variable. A series of probabilistic analyses were carried out for $H_w = \{H, 3H/4, H/2, H/4, H/8\}$ in order to find the optimum definition of TSF for each case. Figure 13 illustrates the excellent exponential correlation between the ratio H_w/H and the exponent a of the optimum TSF. The results of the probabilistic analysis are presented in Figure 14.

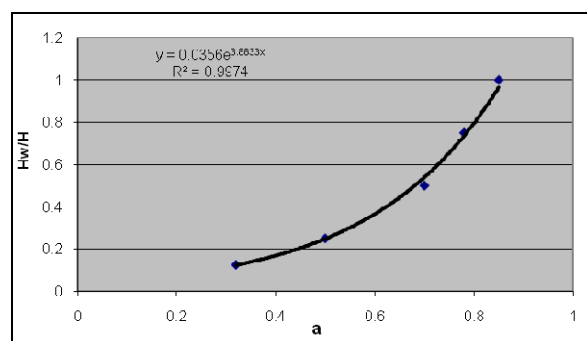


Figure 13 H_w/H vs. exponent a of optimum TSF

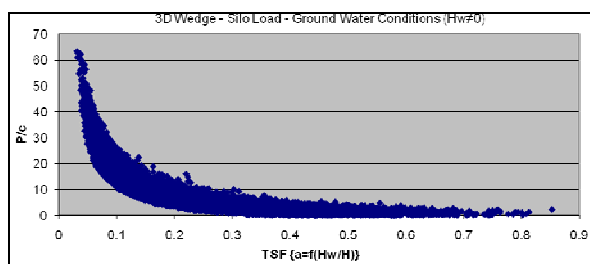


Figure 14 P/c vs.TSF $\{a=f(H_w/H) \text{ and } H_w \neq 0\}$

The results follow the same trend of behaviour as in the case of dry conditions. Also in this case the trend is very well determined.

6.2. Convergence – Confinement method

6.2.1. Elastic Analysis

The results of the probabilistic studies based on the convergence-confinement method for elastic conditions are presented in the following Figure 15.

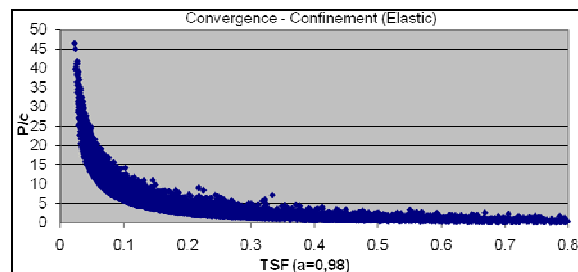


Figure 15 P/c vs. TSF ($a=0.98$)

In this case, even though the results follow the same trend of behaviour as the 3D wedge limit equilibrium model presented in section 0, the exponent a tends to unity.

6.2.2. Plastic Analysis

The results of the probabilistic analysis based on the convergence-confinement method for plastic conditions were not possible to be correlated through the ratio P/c and the optimum TSF. However, the deconfinement coefficient λ can be correlated with the overload factor N_s , defined in equation (7), as presented in Figure 16.

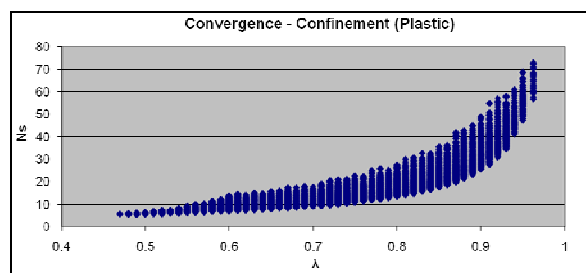


Figure 16 N_s vs. λ

The necessary support pressure P can then be defined through Figure 17 as a percentage of the in situ stress P_0 .

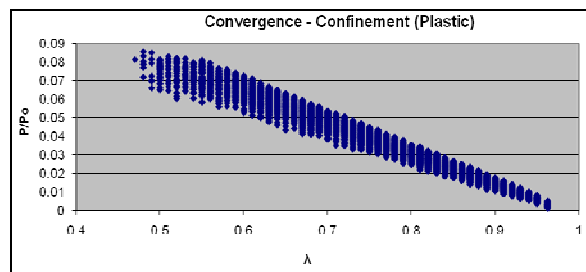


Figure 17 P/P_0 vs. λ

As the deconfinement coefficient λ increases, the necessary support pressure P to ensure stability conditions on the tunnel face decreases. However, high values of λ correspond to high values of N_s which in turn are associated with tunnel cross sectional instability. Consequently, the convergence - confinement method based on plastic analysis should be used with extreme care for the assessment of face stability conditions and must be accompanied with

cross sectional analysis to evaluate the overall behaviour and stability conditions of the tunnel.

6.3. 3D wedge limit equilibrium model with side friction – Deconfinement load

The probabilistic results of this analytical method are presented in the following Figure 18, where the deconfinement load has been determined through the elastic analysis.

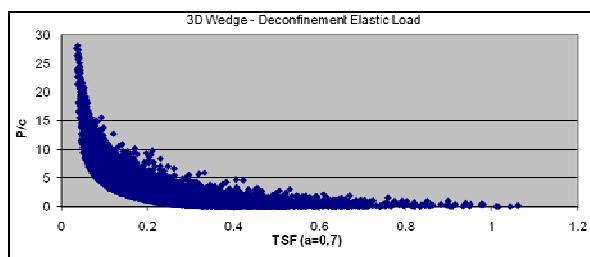


Figure 18 P/c vs. TSF (a=0.7)

The results follow the same trend of behaviour as in both the cases of the 3D wedge model with silo load and the elastic convergence-confinement method.

7. CONCLUSIONS

In the present contribution, probabilistic analyses have been carried out with three different analytical methods in order to assess, on a preliminary basis, the face stability conditions and necessary support pressure.

The main conclusion that can be drawn is that the optimum definition of the Tunnel Stability Factor (TSF) in terms of the exponent a highly depends on the analytical method used, whereas the influence of the value range of input variables is minor.

However, in spite of the wide range of values included in the parametric studies in terms of tunnel geometrical and soft ground strength and deformability characteristics and the different definitions of the optimum TSF, the results present a very similar and well determined trend of behaviour. Exception is the convergence-confinement plastic analysis, the results of which must be used with extreme care.

The produced design charts could therefore be used in conceptual studies/preliminary design for the assessment of tunnel face stability conditions and support pressure for shallow tunnels in soft ground environment. The choice among the different design charts depends solely on the analytical method that the engineer wishes to adopt for the assessment.

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ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΤΕΧΝΙΚΩΝ ΕΠΙΣΤΗΜΟΝΩΝ



The Harding Prize

The Harding Prize is named after the founder Chairman of the Society, Sir Harold Harding. The prize is awarded to the winner of a biennial competition. The Competition is open to all aged 33 or under.

The three finalists of this year's competition, which was open to young tunnellers aged 33 or under, presented their papers and the winner was selected by the BTS Committee. Details of the three finalists are as follows:

Andreas Feiersinger – *Comparison of Deformations Predicted Using 3D Finite Element Analysis with Deformations Encountered During Construction (Green Park Station, London)*

Spyridon Konstantis – *Probabilistic Assessment of Face Stability Conditions for Shallow Tunnels in Soft Ground*

Robert Milner – *Settlement due to Tunnelling on the West Ham Flood Alleviation Scheme*

The 2011 competition was won by Robert Milner.

The winner was given two tickets for the Society's Annual Dinner where he was presented with, a copy of Sir Harold Harding's book "Tunnelling history and my own involvement", a cheque for £500 and a certificate. Runners up whose papers were selected for presentation received a cheque for £100.

Entrants to the 2013 competition must submit an original paper relating to any aspect of tunnelling which they consider of interest to those in the tunnelling industry. The papers will be reviewed by the BTS committee and writers of selected papers invited to make an oral presentation to the April 2013 BTS meeting.

ΚΑΤΑΤΑΞΕΙΣ ΠΑΝΕΠΙΣΤΗΜΙΩΝ

«Πωλούν» το καλό τους όνομα για να προσελκύσουν φοιτητές - πελάτες

Brand names στην παιδεία

Όλο και περισσότερο τα πανεπιστήμια, σε παγκόσμιο επίπεδο, λειτουργούν σαν ανταγωνιστικές επιχειρήσεις που προσπαθούν να προσελκύσουν φοιτητές - πελάτες, εμπορεύμενα το καλό τους όνομα που αποτελεί φήμη στην αγορά. Με αυτή τη διαπίστωση η εκπαιδευτική επιθεώρηση των «Τάιμς» αιτιολόγησε χθες την απόφασή της να δημιουργήσει, για πρώτη φορά, μια νέα παγκόσμια κατάταξη των πανεπιστημίων βασισμένη στη φήμη που έχουν αυτά ανάμεσα στους ίδιους τους πανεπιστημιακούς: τα πιο φημισμένα πανεπιστήμια στον κόσμο. Μάλιστα η εφημερίδα χαρακτηρίζει «super-brands» (υπερφίρμες) την αγγλοσαξονική εξάδα που ηγείται της κατάταξης και τονίζει ότι οι φοιτητές, ιδίως στις χώρες όπου επιτρέπονται τα διδάκτρα, ουσιαστικά «αγοράζουν» τη φήμη του πανεπιστημίου, ένα εμπορικό σήμα που αργότερα θα έχει απήχηση στην αγορά εργασίας. Αλλά και οι πανεπιστημιακοί, όταν καταθέτουν μια πρόταση χρηματοδότησης κάποιου ερευνητικού προγράμματος ή στέλλουν μια μελέτη τους για δημοσίευση σε έγκυρο επιστημονικό περιοδικό, γνωρίζουν ότι η φήμη του πανεπιστημίου τους θα παίξει ρόλο στην τελική κρίση. Έτσι η φήμη του πανεπιστημίου γίνεται τμήμα και της δικής τους φήμης ως πανεπιστημιακών.

Ήδη οι «Τάιμς» δημοσιοποιούν κάθε χρόνο μια παγκόσμια κατάταξη των καλύτερων πανεπιστημίων του κόσμου βασισμένη σε 13 διαφορετικά κριτήρια, όμως είναι η πρώτη φορά που δημιουργείται ανάλογη λίστα στηριγμένη αποκλειστικά στην εκτίμηση που έχουν οι ίδιοι οι πανεπιστημιακοί. Αυτό επειδή, σημειώνουν, ακόμα και αν ένα πανεπιστήμιο μπορεί να ιδωθεί και σαν «εμπορικό σήμα», βασικός παράγοντας που καθορίζει τη δύναμή του είναι η φήμη που έχει στη διδασκαλία και στην έρευνα.

Η νέα «κατάταξη παγκόσμιας φήμης» λοιπόν στηρίζεται σε εκτιμήσεις που έκαναν 13.388 πανεπιστημιακοί διεθνούς κύρους από 131 χώρες για τη διδασκαλία και την έρευνα που διεξάγεται στα ιδρύματα. Επελέγησαν καθηγητές με περισσότερες από 50 επιστημονικές δημοσιεύσεις και τουλάχιστον 16 χρόνια υπηρεσίας.

Όπως σε κάθε κατάταξη, υπερτερούν τα αγγλοσαξονικά ιδρύματα (45 αμερικανικά και 12 βρετανικά στα 100), όμως αξιοσημείωτο είναι ότι εμφανίζονται και ορισμένα γαπωνέζικα πανεπιστήμια που είχαν πολύ χαμηλότερες κατατάξεις στην τακτική λίστα των «Τάιμς», αλλά και πανεπιστήμια, όπως το Λομονόσοφ της Μόσχας, τα οποία είτε δεν υπάρχουν καν στις τακτικές κατατάξεις ή συμπεριλαμβάνονται πολύ χαμηλά. Γερμανία, Ελβετία, Ολλανδία και Σουηδία συμπληρώνουν τις ευρωπαϊκές χώρες με περισσότερες διακρίσεις, ενώ έκπληξη προκαλεί η κατώτερη θέση της Γαλλίας.

ΧΩΡΙΣ ΕΛΛΗΝΙΚΗ ΠΑΡΟΥΣΙΑ. Στη λίστα των πιο φημισμένων πανεπιστημίων του κόσμου δεν υπάρχει ελληνικό. Τα τελευταία χρόνια πάντως κυκλοφορούν δεκάδες κατατάξεις πανεπιστημίων από διάφορους φορείς (π.χ. Πανεπιστήμιο Σαγκάης) και μέσα ενημέρωσης στις οποίες χρησιμοποιούνται διαφορετικά κριτήρια. Έτσι σε άλλες τα ελληνικά πανεπιστήμια εμφανίζονται σε σχετικά καλές θέσεις, όπως σε αυτήν του QS World University Rankings - όπου το Πολυτεχνείο της Αθήνας κατετάγη πέρυσι στην 114^η καλύτερη θέση του κόσμου στον τομέα της Μηχανικής και Τεχνολογίας και

συνολικά 5 ελληνικά πανεπιστήμια ήταν στη λίστα των 500 καλύτερων του κόσμου - και σε άλλες δεν περιλαμβάνονται.

Δείτε την πλήρη κατάταξη:

<http://www.timeshighereducation.co.uk/world-universityrankings/2010-2011/reputation-rankings.html>



(Νίκος Μάστορας / ΤΑ ΝΕΑ On-line, Παρασκευή 11 Μαρτίου 2011)

3 Ελληνικά Πανεπιστήμια στα 100 καλύτερα!

Τρία ελληνικά πανεπιστήμια, σε λίστα με τα 100 καλύτερα του κόσμου, δεν είναι άσχημα. Τα ελληνικά πανεπιστήμια βρίσκονται στα εκατό κορυφαία πανεπιστήμια του κόσμου, όσον αφορά τις ειδικότητες των Μηχανολόγων Μηχανικών, Πολιτικών Μηχανικών και Ηλεκτρολόγων Μηχανικών, σύμφωνα με τα αποτελέσματα της Εταιρείας Quacquarelli Symonds που ειδικεύεται στις κατατάξεις των Πανεπιστημίων σε παγκόσμιο επίπεδο.

ΕΜΠ

Το Εθνικό Μετσόβιο Πολυτεχνείο είναι το μόνο ελληνικό πανεπιστήμιο που τοποθετείται τόσο ψηλά και στις τρεις ειδικότητες.

ΑΠΘ

Το Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης (Α.Π.Θ.) κατέχει την 199 θέση παγκοσμίως στα πεδία των Πολυτεχνικών Επιστημών και της Πληροφορικής με το Τμήμα Πολιτικών Μηχανικών στη θέση μεταξύ 51 – 100. Σημειωτέον ότι το Α.Π.Θ. ως ίδρυμα κατά το παρελθόν έτος 2009 – 2010 βρισκόταν μεταξύ των θέσεων 401 – 450.

Πανεπιστήμιο Κρήτης

Το Πανεπιστήμιο της Κρήτης προκρίνεται ως ένα από τα καλύτερα για Μηχανολόγους Μηχανικούς.

Καθόλου άσχημα! Το χειρότερο πάντως, είναι πως όλοι γνωρίζουμε, πως έχουν δυνατότητες να φτάσουν και πιο ψηλά, ωστόσο για τους γνωστούς λόγους (και τις συνθήκες που επικρατούν μέσα στα πανεπιστήμια, είτε λόγω των χαμηλών επιδοτήσεων, είτε λόγω της απαξίωσης που έχουμε προκαλέσει οι ίδιοι οι φοιτητές) τα περιορίζουμε!

<http://www.topuniversities.com/university-rankings>

(Συντάκτης: G_Lindermann_20 • Αναρτήθηκε στις 9 Απριλίου, 2011)

Civil & Structural Engineering Rankings 2011

Rank	Title	Country	Academic	Employer	Citations	Score
1	Massachusetts Institute of Technology (MIT)	United States	100.0	84.9	45.5	84.6
2	Stanford University	United States	86.3	73.9	56.3	76.6
3	University of Cambridge	United Kingdom	80.4	93.8	28.7	74.1
4	University of California, Berkeley (UCB)	United States	87.7	64.4	38.8	70.9
5	Imperial College London	United Kingdom	81.1	65.7	40.1	68.3
6	University of Oxford	United Kingdom	60.3	94.1	20.1	62.4
7	National University of Singapore (NUS)	Singapore	70.7	57.4	43.0	61.2
8	The University of Tokyo	Japan	79.8	44.6	31.7	59.6
9	California Institute of Technology (Caltech)	United States	70.3	43.8	54.2	59.1
10	ETH Zurich (Swiss Federal Institute of Technology)	Switzerland	64.1	49.9	34.7	54.0
51-100	National Technical University of Athens	Greece	27.9	33.2	56.3	
51-100	Aristotle University of Thessaloniki	Greece	23.9	22.0	40.0	
101-150	University of Patras	Greece	17.3	23.3	36.3	

International Faculty Index

International reputation is an undeniable component of today's world class universities. How better to evaluate that than to assess the proportion of international students and faculty who are attracted to that institution. Representing 5% each in this evaluation, the international students score and international faculty score are calculated based on those proportions.

Academic Reputation Index

The Academic Reputation Index is the centrepiece of the QS World University Rankings® carrying a weighting of 40%. It is an approach to international university evaluation that QS pioneered in 2004 and is the component that attracts the greatest interest and scrutiny. In concert with the Employer Reputation Index it is the aspect which sets this ranking most clearly apart from any other.

Employer Reputation Index

The Employer Reputation component is unique amongst current international evaluations in taking into consideration the important component of employability. The majority of undergraduate students leave university in search of employment after their first degree, making the reputation of their university amongst employers a crucial consideration.

Μπορεί τα πολυτεχνεία και οι πολυτεχνικές σχολές μας να μην ευρίσκονται στα 50 πρώτα της παγκόσμιας κατάταξης στη συνολική αξιολόγησή τους, όμως η ερευνητική δουλειά που παράγουν ξεπερνά και τα πρώτα των πρώτων!!! Η Σχολή Πολιτικών Μηχανικών του ΕΜΠ κατατάσσεται στις καλύτερες όσον αφορά στα citations (αναφορές σε εργασίες από άλλους ερευνητές). Αλλά και οι Πολυτεχνικές Σχολές του

ΑΠΘ και του Πανεπιστημίου Πατρών δεν πάνε πίσω. Το γιατί πέφτουμε χαμηλά στη συνολική κατάταξη οφείλεται αφ' ενός μεν στους γνωστούς σε όλους λόγους (που αναφέρονται στο προπαρατεθέν άρθρο), αφ' ετέρου δε στο ότι δεν είμαστε καθόλου καλοί στην διαφήμιση του καλού προϊόντος που παράγουμε. Κρίμα...

ΠΡΟΣΚΛΗΣΕΙΣ ΓΙΑ ΣΥΜΜΕΤΟΧΗ ΣΕ ΕΡΕΥΝΗΤΙΚΑ ΠΡΟΓΡΑΜΜΑΤΑ

GEM REQUEST FOR PROPOSALS: SITE EFFECTS

Posting date: April/May 2011
Submission deadline: May/June 2011
Expected decision: August/September 2011
Target budget range: 450,000 Euros
Timescale: 24 months

GEM is supported by international institutions, countries and corporations who have come together to establish uniform and open standards to calculate and communicate earthquake risk worldwide. GEM is developing an open-source engine, OpenQuake, that will allow all stakeholders around the globe to calculate seismic risk, including the consequences of earthquakes on society and the economy, measured over space and time. The Global Components datasets that GEM is gathering (e.g. active faults, earthquakes, building inventories and building vulnerabilities) are essential input components of the GEM risk models, and will be widely used by other scientists.

A major source of variability in seismic shaking arises from site effects, including sedimentary basins, river valleys or deltas, topographic ridges, and lithologic contrasts associated with faults, valleys, and contrasting tectonic terrains.

Currently, methods to incorporate site amplification on a global or national scale include topographic slope from Shuttle Radar Topography Mission (SRTM) data (e.g., Allen & Wald, USGS Open-File Rep., 2007); soil or geologic map data (Wills et al, BSSA 2000 & BSSA 2006 for California; OneGeology for the world, www.onegeology.org); VS30 data where available (Castellaro et al., SRL, 2008); or H/V (horizontal over vertical seismic velocity) measurements to infer the fundamental period of the soil formation (e.g., Rodriguez & Midorikawa, Earthquake Engin. & Struct. Dyn., 2001).

GEM has funded international consortia to develop ground motion prediction equations (GMPEs) for a representative suite of tectonic settings, and to gather and interpret macroseismic intensity observations (the perceived effects of shaking and damage) associated with historical earthquakes, for which most of the data come from populated basins. The successful Site Effects Global Components consortium would be expected to interact with both groups to insure that the furnished global site amplification estimation method can be used with GEM's ground motion prediction equations, is consistent with instrumental and intensity observations, and can be integrated with local data such as urban microzonation studies and shear wave velocity measurements in the uppermost 30 m (VS30).

Specific tasks and deliverables expected for this project include:

T0. Create a comprehensive database schema to store the information necessary to describe, characterize or infer the local site response (e.g. superficial geology, empirical amplification functions, numerically-computed amplification functions, compressional and shear waves velocity profiles, topography). The database should be designed in a way

that will allow unequivocal storage of the information and continuous integration with new data.

T1. Populate the database schema defined in T0 with globally available information (the data used for at least 20 microzonation studies of major cities should be included).

T2. Using the database created in T1, construct a global default model of amplitude-dependent site amplification functions for different intensity measures used in the GEM-supported GMPE's. The model must have at least $0.01^\circ \times 0.01^\circ$ resolution at the equator (i.e. $\sim 1 \times 1$ km), and must be based on a well-documented explanation of methods and calibrations (the Shuttle Radar Topography Mission (SRTM) digital elevation model has 90 m or $\sim 0.001^\circ$ spatial resolution). The creation of this initial model should be coordinated with Task 6 of the GMPE Project, 'Design the specifications to compile a global database of soil classification.' Note that the model developed within this task must be adopted in PSHA calculations and thus integrate with state-of-the-art GMPE's and PSHA methodologies.

T3. Using the database created in T1, consider topographic amplification along ridges or promontories and develop ways to capture this using SRTM or geologic map data. Note here as well that the model developed within this task must be adopted in PSHA calculations and thus integrate with state with state of the art GMPEs and PSHA methodologies.

T4. Identify urban sites (such as Mexico City, Quito) that are ill-served by this or other site amplification proxies because of extremely soft soils or the presence of unusually deep basins, and propose alternatives where feasible.

T5. Build a guidebook for scientists and engineers in GEM's regional programs on how to contribute data to the database (T0), how to combine local, national, regional and global amplification models eventually obtainable, and how to, update T2 and T3 models when new information will be available.

<http://globalquakemodel.org>

ΠΡΟΚΗΡΥΞΕΙΣ ΒΡΑΒΕΙΩΝ ΚΑΙ ΔΙΑΓΩΝΙΣΜΩΝ ΓΙΑ ΓΕΩΤΕΧΝΙΚΟΥΣ ΜΗΧΑΝΙΚΟΥΣ



Ralph B. Peck Award



This award was established in 1999 by the Geo-Institute of the Society in honor of Ralph B. Peck, Hon.M.ASCE. Funds to support this award were donated by ASFE: Professional Firms Practicing in the Geosciences.

- I. The Ralph B. Peck Award is presented for outstanding contributions to the geotechnical engineering profession through the publication of a thoughtful, carefully researched case history or histories, or the publication of recommended practices or design methodologies based on the evaluation of case histories.
- II. The award will be given no more often than once a year either to a single author or to two or more collaborating authors for the publication of a case history or histories, or methodologies and recommended practices based on case histories, that provide valuable insights into the geotechnical aspects of constructed facilities. The award may be given for a single paper or for two or more papers written by the same author(s). The published work must involve the evaluation of subsurface conditions pertaining to the performance of constructed works, with appropriate analysis, description of project design, and recommendations for improved future design and construction practices. The relevant paper or papers will be cited during the presentation of the award.
- III. Emphasis will be placed on a peer-reviewed paper or papers published in an appropriate journal and/or in conference proceedings within an approximate five-year period before the award decision.
- IV. The award recipient or recipients will be invited to deliver the Peck Lecture describing the lessons learned from the relevant case history or histories at a location chosen by the Board of Governors of the Geo-Institute. The lecture will be given no later than one year after its announcement.
- V. The award will be given without regard for Society membership or nationality.
- VI. The selection of the Award recipient will be made by the Board of Governors of the Geo-Institute of ASCE from a list of three nominees to be provided by the

Award Committee of the Geo-Institute of ASCE. Final approval shall be the responsibility of the ASCE Executive Committee. Nominations will be considered from any society with members engaged in the practice of geotechnical engineering.

- VII. The award consists of a gold-plated medal and cash prize determined annually by, and subject to, the approval of the Executive Committee of the ASCE Board of Direction, based on the income from the award endowment. The lead author shall receive the medal and cash prize. All other authors shall receive only a certificate.

To nominate, submit the following:

- A cover letter, signed by the nominator
- An Official Award Nomination form
- One copy of the paper

Electronic submissions are encouraged to awards@asce.org by June 1. Paper submissions are also accepted, in which case one copy of the complete nomination package should be received by the Honors and Awards Program at the ASCE headquarters: 1801 Alexander Bell Drive, Reston, VA 20191-4400.



International Society for Rock Mechanics ROCHA MEDAL 2013

Η ISRM μας έστειλε την παρακάτω προκήρυξη για το ROCHA MEDAL 2013. Σημειώνουμε ότι ο δεύτερος αποδέκτης του μεταλλίου, από τότε που θεσπίστηκε (1983), είναι ο καθηγητής Τεχνικής Γεωλογίας και Βραχομηχανικής της Πολυτεχνικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης Σταύρος Μπαντής.

Since 1982 a bronze medal and a cash prize have been awarded annually by the ISRM for an outstanding doctoral thesis in rock mechanics or rock engineering, to honour the memory of Past President Manuel Rocha while stimulating young researchers.

In addition to the Rocha Medal award to the winning submission, one or two runner-up certificates may also be awarded.

An invitation is now extended to the rock mechanics community for nominations for the Rocha Medal 2013.

Full details on the Rocha Medal are provided in ISRM By-law No. 7.

The nomination must reach the ISRM Secretary General by 31 December 2011.

All relevant information can be obtained from the ISRM website, at <http://www.isrm.net>.



**ISRM 50th Anniversary Young Members' Slide Show
Competition
"The Future Directions for Engineering Rock
Mechanics"**

Deadline is 30 June 2011

In October 2011, the International Society for Rock Mechanics will begin the celebrations to commemorate its 50th anniversary; these celebrations will include a number of special events and initiatives.

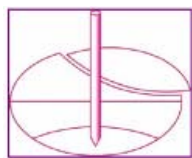
One of the initiatives consists of a competition open to Young Members of the ISRM to present their vision of "The Future Directions for Engineering Rock Mechanics". Candidates are asked to prepare a fully explanatory PowerPoint slide show explaining, illustrating and justifying their ideas.

The winner will be invited to present the slide show at the Second ISRM International Young Scholars' Symposium on Rock Mechanics, which will take place in Beijing, China, on 14-16 October 2011, i.e. immediately preceding the 12th ISRM International Congress also being held in Beijing. In addition, the winning slide show will be announced and published on the ISRM website. The winner will also be formally acknowledged with a certificate during the ISRM Congress.

It is anticipated that the winner will be granted a financial contribution to the air travel costs (if necessary) plus free registration and inexpensive accommodation at both the Young Scholars' Symposium on Rock Mechanics and the ISRM Congress in Beijing.

The ISRM invites all its members who are aged 35 years or less during 2011 to submit a PowerPoint slide show on their vision of "The Future Directions for Engineering Rock Mechanics". The slide show must be presented in English, and consist of exactly 40 slides and shall be submitted to the ISRM Secretariat (secretariat.isrm@lnec.pt) not later than 30 June 2011.

ΑΝΑΣΚΟΠΗΣΗ ΓΕΩΤΕΧΝΙΚΩΝ ΕΚΔΗΛΩΣΕΩΝ



5^ο Διεθνές Συνέδριο Γεωτεχνικής Σεισμικής Μηχανικής 10-13 Ιανουαρίου 2011, Σαντιάγκο, Χιλή

Το Διεθνές Συνέδριο Γεωτεχνικής Σεισμικής Μηχανικής διεξάγεται κάθε τέσσερα χρόνια και αποτελεί την σημαντικότερη επιστημονική εκδήλωση της Τεχνικής Επιτροπής TC203 (Earthquake Geotechnical Engineering and Associated Problems) της ISSMGE.

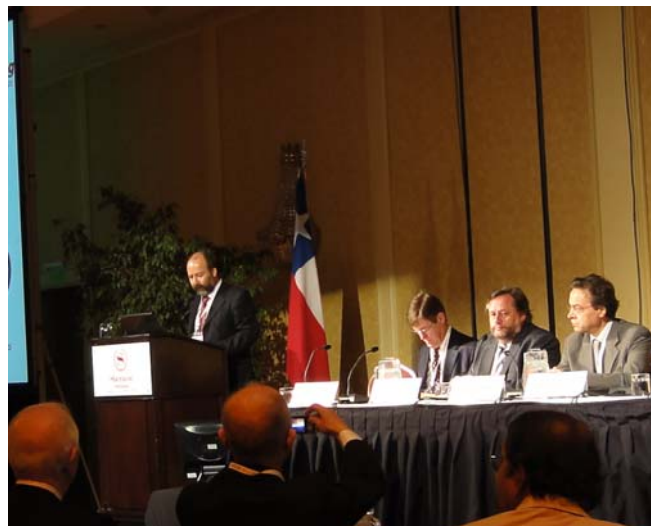


Delegates of 5ICEGE - January 10-13, 2011, Santiago-Chile

Μετά από την Θεσσαλονίκη (4ICEGE, 2007) το 5^ο Διεθνές Συνέδριο Γεωτεχνικής Σεισμικής Μηχανικής διοργανώθηκε στο Σαντιάγκο της Χιλής από την TC203 της Διεθνούς Εταιρίας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ISSMGE), την Γεωτεχνική Εταιρεία της Χιλής (Chilean Geotechnical Society) και το Τμήμα Πολιτικών Μηχανικών του Πανεπιστημίου της Χιλής (Civil Engineering Department Chile's University (www.5icege.cl)). Στις διάφορες επιτροπές διοργάνωσης του συνεδρίου συμμετείχαν ο καθηγητής Κ. Πιτιλάκης (πρόεδρος του 4^{ου} Συνεδρίου ICEGE που πραγματοποιήθηκε στην Θεσσαλονίκη τον Ιούνιο του 2007, και πρόεδρος της TC203 για το χρονικό διάστημα 2010-2013), ο καθηγητής Γ. Γκαζέτας και οι καθηγητές Δ. Μπέσκος, Π. Ντακούλας, Ν. Μακρής και Γ. Μυλωνάκης.

Η προσκεκλημένη ομιλία προς τιμήν του καθηγητή Κ. Ishihara (3rd Ishihara Lecture) δόθηκε από τον καθηγητή του Rensselaer Polytechnic University Institute (USA), καθηγητή Ricardo Dobry με θέμα: "An Investigation into Why Liquefaction Charts Work: A Necessary Step Toward Intergrading the State of the Art and Practice".

Στο συνέδριο συμμετείχαν πλέον των 400 συνέδρων από 35 χώρες και μεταξύ αυτών τα μέλη μας: Κ. Πιτιλάκης, Γ. Γκαζέτας, Α. Αναστασιάδης, Φ. Γελαγώτη και Ι. Κουρκούλης.



Opening ceremony of the 5ICEGE in Santiago, Chile. From left: Prof. R. Verdugo (Chairman of 5ICEGE), Prof. J-L Briaud (President of ISSMGE), Prof. Roberto Terzariol (Vice-President of South America) and Prof. K. Pitilakis (Chairman of TC203)

Συνολικά 210 εργασίες συμπεριλήφθηκαν στα πρακτικά του συνεδρίου μεταξύ των οποίων και 19 άρθρα (σχεδόν το 10% !) μελών της ΕΕΕΓΜ. Συγκεκριμένα παρουσιάστηκαν και συμπεριελήφθησαν στα πρακτικά οι εξής εργασίες:

Προσκεκλημένες ομιλίες :

- George Gazetas, *Seismic Design and Analysis of Buried Structures, State-of-the Art Lecture*
- Kyriazis Pitilakis, *Seismic Risk Assessment and Management of Lifelines, Utilities and Infrastructures, Theme Lecture.*

Εργασίες στα Πρακτικά των Συνεδρίου (κατά αλφαβητική σειρά) :

- Anastasiadis A., K. Pitilakis, K. Senetakis, A. Souli, *Dynamic Response of Sandy and Gravelly Soils: Effect of Grain Size Characteristics on G-γ-D Curves.*
- Avgerinos V., S. Kontoe *Seismic Design of Circular Tunnels: Numerical Validation of Closed Formed Solutions.*
- Drosos V., N. Gerolymos, G. Gazetas *Seismic Response of Bridge Pile-Columns.*



Opening ceremony of the 5ICEGE in Santiago, Chile. Prof. Kyriazis Pitilakis (Chairman of TC203)



Opening Ceremony of 5ICEGE – President of ISSMGE Professor Jean-Louis Briaud.

- Fotopoulou S., K. Pitilakis, C. Anagnostopoulos *Vulnerability Assessment of RC Buildings Due To Earthquake Induced Slow Moving Slides.*
- Gelagoti F., R. Kourkoulis, I. Anastasopoulos, G. Gazetas, *Effect of Soil Non-Linearity on the Seismic Response of a Very Soft Alluvial Valley.*
- Giannakos S., N. Gerolymos, G. Gazetas, *On the Lateral Response of Piles: Numerical Analysis Against Centrifuge Experiments.*
- Kakderi K. G., K. D. Pitilakis, *Seismic Performance and Reliability of Port Facilities – The Case of Thessaloniki (Greece).*
- Kloukinas P., G. Mylonakis *Rankine Solution for Seismic Earth Pressures on L-Shaped Retaining Walls.*
- Kountouzis P., C. Stamatopoulos, G. Milonakis *Evaluation of The Seismic Motion, of The Liquefaction Susceptibility And Their Consequences In Valimitika, Greece, as a Result of the Aegion Earthquake of 1995.*
- Kourkoulis R., F. Gelagoti, I. Anastasopoulos, G. Gazetas, *Stabilization of Seismically Unstable Slopes Using Piles: Parametric Analysis.*
- Ktenidou O.-J., F. J. Chavezgarcia, D. Raptakis, K. Pitilakis, *Numerical Investigation of Site Effects at Aegion, Greece.*
- Papadimitriou A., *Topographic Aggravation of the Peak Seismic Acceleration near Two Dimensional Hills and Slopes.*



3rd Ishihara Lecture by Prof. Ricardo Dobry.

- Senetakis K., A. Anastasiadis, K. Pitilakis, *Experimental Investigation of the Dynamic Properties of Granular Soil/Rubber Mixtures Using a Resonant Column Device.*
- Stamatopoulos C., *The Liquefaction Strength of Silty Sands In Terms of The State Parameter.*
- Tasiopoulou P., N. Gerolymos, G. Gazetas, *Piles in Lateral Spreading: A Simple Method versus Centrifuge Experiments.*
- Valsamis A., G. Bouckovalas, Y. Chaloulos *Simplified Design of Single Piles under Liquefaction Induced Lateral Spreading.*
- Zania V., Y. Tsompanakis, N. Psarropoulos, *Seismic Distress and Protection of Flexible Membrane Liners of Solid Waste Landfills.*

Τα πλήρη κείμενα των εργασιών υπάρχουν αναρτημένα στον δικτυακό τόπο του συνεδρίου.



From left: Prof. Roberto Terzariol (Vice-President of South America), Prof. R. Verdugo (Chairman of 5ICEGE, Chile), Prof. K. Pitilakis (Chairman of TC203, Greece), Prof. R. Dobry (USA), Prof. J-L Briaud (President of ISSMGE, USA), Prof. K. Ishihara (Japan), Prof. I. Idriss (USA), Prof. S.P. Pinto (Portugal), Prof. T. Kokusho (past Chairman of TC4).



TC203 – Meeting in Santiago, Chile

Κατά τη διάρκεια του συνεδρίου πραγματοποιήθηκε η συνεδρίαση της επιτροπής TC203 της ISSMGE με την νέα σύνθεσή της, παρουσία του προέδρου της ISSMGE καθηγητή Jean-Louis Briaud. Τα μέλη της ΕΕΕΕΓΜ που συμμετέχουν στην επιτροπή είναι : Κ. Πιτιλάκης (πρόεδρος), Γ. Μπουκοβάλας (core member), Γ. Γκαζέτας, Γ. Αθανασόπουλος, Α. Παπαδημητρίου και Α. Αναστασιάδης (Γραμματέας). Στη συνεδρίαση συζητήθηκαν και αποφασίστηκαν οι βασικοί άξονες και οι δραστηριότητες της επιτροπής για το χρονικό

διάστημα 2010-2013, οι οποίες θα αναρτηθούν σύντομα στο ιστότοπο της ISSMGE (TC203).

Το επόμενο, Διεθνές Συνέδριο Γεωτεχνικής Σεισμικής Μηχανικής, 6ICEGE, θα πραγματοποιηθεί τον Σεπτέμβριο του 2015 στην πόλη Christchurch της Νέα Ζηλανδίας που δυστυχώς επλήγει και πάλι από ισχυρότατο σεισμό, ο οποίος μάλιστα προκάλεσε αυτή την φορά πολύ μεγάλες απώλειες (http://www.eltam.gr/index.php/el/scimat/cat_view/45-scimat/48---).



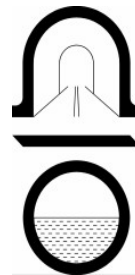
Chairman of the 5ICEGE (right: Prof. R. Verdugo) receives the symbol of ICEGE from Chairman of 4ICEGE and TC203 Prof. K. Pitilakis (left).

Επίσης, αποφασίστηκαν οι παρακάτω προσεχείς επιστημονικές εκδηλώσεις:

- "International Conference on Earthquake Geotechnical Engineering from Case History to Practice – In Honor of Professor Kenji Ishihara", που θα διεξαχθεί τον Ιανουάριο του 2012 στην πόλη Luxor της Αιγύπτου.
- "Second International Conference on Performance-Based Design in Earthquake Geotechnical Engineering", που θα διεξαχθεί τον Μάιο του 2012 στην πόλη Taormina της Ιταλίας.

Φεβρουάριος 2011

Κυριαζής Πιτιλάκης, Πρόεδρος της TC203
Αναστάσιος Αναστασιάδης, Γενικός Γραμματέας της TC203



ΓΕΝΙΚΗ ΣΥΝΕΛΕΥΣΗ ΚΑΙ ΑΡΧΑΙΡΕΣΙΕΣ ΕΛΛΗΝΙΚΗΣ ΕΠΙΤΡΟΠΗΣ ΣΗΡΑΓΓΩΝ ΚΑΙ ΥΠΟΓΕΙΩΝ ΕΡΓΩΝ

Η Γενική Συνέλευση και της ΕΕΣΥΕ διεξήχθη την Δευτέρα, 28 Μαρτίου 2011 στην αίθουσα τελετών του ΕΜΠ, Κτίριο Διοίκησης, στην Πολυτεχνειούπολη Ζωγράφου.

Τα θέματα της Γενικής Συνέλευσης ήταν :

1. Εκλογή Προέδρου της Γ.Σ.
2. Απολογισμός πεπραγμένων του απερχόμενου Δ.Σ.
3. Οικονομικός απολογισμός
4. Εισήγηση Εξελεγκτικής Επιτροπής
5. Τοποθετήσεις – Διευκρινήσεις – Παρουσίαση Υποψηφιοτήτων
6. Ψηφοφορία επί των Απολογισμών
7. Εφορευτική Επιτροπή για τη διενέργεια Αρχαιρεσιών
8. Αρχαιρεσίες για την εκλογή νέου Δ.Σ.

Κατά τις διεξαχθείσες αρχαιρεσίες, στις υποψήφιοι για το Διοικητικό Συμβούλιο της ΕΕΣΥΕ ήταν οι :

1. Αγγίσταλης Γεώργιος, Γεωλόγος
2. Γιούτα Μήτρα Παρασκευή, Μετ. Μηχανικός
3. Θανόπουλος Ιωάννης, Δρ Πολ. Μηχανικός
4. Λουκάτος Νέστωρ, Πολ. Μηχανικός
5. Μπακογιάννης Ιωάννης, Μετ. Μηχανικός
6. Μπούσουλας Νικόλαος, Πολ. Μηχανικός MSc
7. Ντουινιάς Γεώργιος, Δρ Πολ. Μηχανικός
8. Ραπτόπουλος Σταύρος, Πολ. Μηχανικός
9. Τζαρούχη Σοφία, Δρ Γεωλόγος
10. Τσιφουτίδης Γεώργιος, Δρ Γεωλόγος
11. Φορτσάκης Πέτρος, Πολ. Μηχανικός MSc

και για την Ειδική Εξελεγκτική Επιτροπή οι :

1. Γεωργίου Δημήτριος
2. Καζίλης Νικόλαος
3. Μπαρσάκης Σωτήριος
4. Νικολάου Δημήτριος

και εξελέγησαν, κατά σειρά επιτυχίας, οι παρακάτω για το Διοικητικό Συμβούλιο :

1. Ντουινιάς Γεώργιος
2. Γιούτα Μήτρα Παρασκευή
3. Μπακογιάννης Ιωάννης
4. Θανόπουλος Ιωάννης
5. Φορτσάκης Πέτρος
6. Αγγίσταλης Γεώργιος
7. Ραπτόπουλος Σταύρος

με αναπληρωματικούς τους :

1. Τσιφουτίδη Γεώργιο
2. Μπούσουλα Νικόλαο

Για την Ειδική Εξελεγκτική Επιτροπή εξελέγησαν οι :

1. Γεωργίου Δημήτριος
2. Καζίλης Νικόλαος
3. Νικολάου Δημήτριος

Κατά την πρώτη συνεδρίαση το νεοεκλεγέν Διοικητικό Συμβούλιο συνεστήθη σε σώμα ως ακολούθως:

Πρόεδρος : Μπακογιάννης Ιωάννης
 Αντιπρόεδρος : Ντουινιάς Γεώργιος
 Γραμματέας : Γιούτα Μήτρα Παρασκευή
 Ταμίας : Ραπτόπουλος Σταύρος
 Εκδότης : Φορτσάκης Πέτρος
 Μέλη : Θανόπουλος Ιωάννης
 Αγγίσταλης Γεώργιος



ΓΕΝΙΚΗ ΣΥΝΕΛΕΥΣΗ ΕΛΛΗΝΙΚΗΣ ΕΠΙΤΡΟΠΗΣ ΜΕΓΑΛΩΝ ΦΡΑΓΜΑΤΩΝ

Στις 29.03.2011 πραγματοποιήθηκε με συμμετοχή πάνω από 50 μελών της η ετήσια Γενική Συνέλευση (Γ.Σ.) της Ελληνικής Επιτροπής Μεγάλων Φραγμάτων. Θέματα της Γ.Σ. ήταν η έγκριση του Διοικητικού και Οικονομικού Απολογισμού του 2010 και του Προϋπολογισμού του 2011 και η ενημέρωση των μελών για διάφορα τρέχοντα θέματα και προγραμματιζόμενες εκδηλώσεις.

Κατά τη Γ.Σ. τέθηκε σε ψηφοφορία και εγκρίθηκε ομόφωνα ο Διοικητικός και ο Οικονομικός Απολογισμός του 2010 (με μυστική ψηφοφορία) καθώς και ο Προϋπολογισμός του 2011. Προηγήθηκε η ενημέρωση των μελών για τα πεπραγμένα του 2010, τα οποία συνοπτικά έχουν ως ακολούθως :

1. Μέλη ΕΕΜΦ

Η ΕΕΜΦ, σε καταγραφή της 31-12-2010, έχει :

- 334 τακτικά μέλη (εξ αυτών υπάρχουν πλήρη στοιχεία μόνο για τα 202 μέλη) και
- 8 έκτακτα μέλη, από τα οποία τα 5 είναι επιχειρήσεις ή εταιρείες

Από τα τακτικά μέλη, έως την παραπάνω ημερομηνία έχουν εκπληρώσει τις οικονομικές τους υποχρεώσεις έναντι της ΕΕΜΦ τα 85.

2. Δραστηριότητες ΕΕΜΦ κατά το έτος 2010

2.1 Συνεδριάσεις Δ.Σ.

Εντός του 2010 πραγματοποιήθηκαν 9 συνεδριάσεις του Δ.Σ. της ΕΕΜΦ (στις 26/01, 10/03, 13/04, 11/05, 15/06, 20/07, 16/09, 14/10 και 18/11).

2.2 Νέα μέλη

Εντός του 2010 εγκρίθηκε καταρχήν από το Δ.Σ. της ΕΕΜΦ η εγγραφή 18 Τακτικών και 5 Εκτάκτων μελών (ένα εκ των οποίων είναι Εταιρεία). Η Γ.Σ. ενέκρινε ομόφωνα τα υπόψη νέα μέλη, καθώς και επιπλέον 14 τακτικά και 3 έκτακτα νέα μέλη, τα οποία είχαν γίνει δεκτά καταρχήν από το Δ.Σ. της ΕΕΜΦ εντός του 2011.

2.3 78^η Ετήσια Συνάντηση ICOLD

Ο Πρόεδρος της ΕΕΜΦ συμμετείχε, ως εκπρόσωπος της, στην 78^η Ετήσια Συνάντηση της ICOLD στο Χανόι του Βιετνάμ, με δαπάνες της ΔΕΗ Α.Ε. Στην Ετήσια Συνάντηση συμμετείχαν επίσης τα μέλη της ΕΕΜΦ κ.κ. Θανόπουλος και Ντακούλας.

ο Ο Πρόεδρος της ΕΕΜΦ συμμετείχε στις εργασίες της Επιτροπής Καταγραφής του Παγκόσμιου Καταλόγου Φραγμάτων (World Register of Dams and Documentation – WRDD). Πριν την έναρξη των εργασιών είχε αποσταλεί στον Πρόεδρο της Επιτροπής του WRDD κ. Floegl ο πλήρης κατάλογος με τα στοιχεία τόσο των Ελληνικών φραγμάτων, όσο αυτών και γειτονικών χωρών (Αλβανία, FYROM και Βοσνία – Ερζεγοβίνη), καθώς οι χώρες αυτές δεν συμμετέχουν με αντιπροσώπους τους στην Επιτροπή του WRDD. Η Ελλάδα έχει πλέον πλήρως εκπληρώσει τις υποχρεώσεις τις οποίες είχε αναλάβει απέναντι στη WRDD κατά την 77^η Ετήσια Συνάντηση της ICOLD στη Brasilia.

ο Κατά τη διάρκεια των εργασιών της Εκτελεστικής Συνόδου έγινε αποδεκτός ως μέλος της Τεχνικής Επιτροπής Β της ICOLD (Seismic Aspects on Dam Design), ο κ. Αχ. Παπαδημητρίου, η υποψηφιότητα του οποίου είχε υποστηριχτεί από την ΕΕΜΦ. Σήμερα πλέον η ΕΕΜΦ συμμετέχει με 3 μέλη της σε αντίστοιχες Τεχνικές Επιτροπές της ICOLD, καθιστώντας την παρουσία της εμφανέστερη.

2.4 8^ο Συνέδριο του European Club της ICOLD

Στις 22 και 23 Σεπτεμβρίου 2010 διεξήχθη στο Innsbruck της Αυστρίας το 8^ο Συνέδριο του European Club της ICOLD με θέμα : "Dam safety – Sustainability in a changing Environment".

Το European Club της ICOLD έχει συσταθεί πριν 15 χρόνια και σ' αυτό συμμετέχουν οι περισσότερες Εθνικές Επιτροπές Μεγάλων Φραγμάτων των Ευρωπαϊκών χωρών (η Ελλάδα δεν συμμετείχε έως το 2010). Αντικείμενο του Club είναι η συνεργασία και ο συντονισμός των Εθνικών Επιτροπών, η έκδοση Τεχνικών Δελτίων για θέματα φραγμάτων μέσω της σύστασης Ομάδων Εργασίας κλπ. Το European Club έχει ήδη προχωρήσει σε πολύ ενδιαφέρουσες δημοσιεύσεις επί διαφόρων θεμάτων αιχμής στη μελέτη και συμπεριφορά φραγμάτων (μπορείτε να πληροφορηθείτε σχετικά επισκεπτόμενοι τον σύνδεσμο: <http://cnpgeb.inag.pt/IcoldClub/index.htm>).

Τις εργασίες του Συνεδρίου παρακολούθησαν εκ μέρους της ΕΕΜΦ με δικά τους έξοδα τα μέλη του Δ.Σ. της ΕΕΜΦ Κ. Αναστασόπουλος, Γ. Ντουινιάς, Δ. Νικολάου καθώς και ο τέως Πρόεδρος Ν. Μουτάφης. Στα πλαίσια του Συνεδρίου παρουσιάστηκαν 126 εργασίες, μεταξύ των οποίων και αυτή των Κ. Αναστασόπουλου, Χ. Οικονομίδη, Χ. Παπαχατζάκη και Σ. Σιάχου με τίτλο : "Securing Watertightness of Papadia Dam Foundation".

Κατά τη Συνεδρίαση του Προεδρείου του European Club της ICOLD την τελευταία ημέρα του Συνεδρίου, η ΕΕΜΦ έγινε ομόφωνα δεκτή ως το 21^ο μέλος της. Η ΕΕΜΦ είχε υποβάλει υποψηφιότητα για να καταστεί μέλος του European Club το 2009.

2.5 ICOLD European Club Workshop on Public Safety around Dams and Waterways (Chambery, Γαλλία, 28-30 Ιανουαρίου 2010)

Στο Συνάντηση αυτή συμμετείχε εκ μέρους της ΕΕΜΦ, με δαπάνες της ΔΕΗ Α.Ε, το μέλος της Εξελεγκτικής Επιτροπής κ. Ι. Θανόπουλος. Στη Συνάντηση, στην οποία συμμετείχαν εκπρόσωποι από την Αυστρία, Γαλλία, Γερμανία, Νορβηγία, Πορτογαλία, Σουηδία και Μεγ. Βρετανία, συζητήθηκαν θέματα δημόσιας ασφάλειας γύρω από τα φράγματα & υδατορεύματα.

Η προσέγγιση στο θέμα αυτό ποικίλει από κράτος σε κράτος. Γενικά όμως όλες οι χώρες της ΕΕ διαθέτουν ένα νομοθετημένο κανονιστικό πλαίσιο σχετικό με την ασφάλεια στον τομέα αυτό. Είναι χαρακτηριστικό τέλος ότι όλοι οι κανονισμοί για θέματα δημόσιας ασφάλειας προήλθαν μετά από ένα ατύχημα.

2.6 Ομάδες Εργασίας

Το έτος 2010 συνεχίστηκαν οι Εργασίες των ακολούθων Ομάδων Εργασίας :

- ο Κατάρτισης του Καταλόγου των Μεγάλων Ελληνικών Φραγμάτων (Συντονίστρια : Χ. Παπαχατζάκη, μέλη : Ε. Ράμπιας, Π. Τσίρα)
- ο Τεχνικής ορολογίας φραγμάτων (Συντονίστρια : Σ. Σιάχου, μέλη : Δ. Λαμπρόπουλος, Ν.Ι. Μουτάφης, Ε. Καλτσά, Α. Πιστρίκα)
- ο Τροποποίησης του Καταστατικού της ΕΕΜΦ (Συντονιστής : Α. Μπενσασσών, μέλη: Κ. Αναστασόπουλος, Δ. Νικολάου)
- ο Επεξεργασίας Σχεδίου Π.Δ. Διοικητικής Αρχής για την ασφάλεια των Φραγμάτων (Συντονιστής : Δ. Νικολάου, μέλη: Κ. Αναστασόπουλος, Ν.Ι. Μουτάφης, Γ. Ντουνιάς)

Εντός του 2010 συστάθηκαν οι ακόλουθες νέες Ομάδες Εργασίας :

- ο Κριτηρίων επιλογής σεισμικών διεγέρσεων στο πλαίσιο αντισεισμικού σχεδιασμού Μεγάλων Φραγμάτων στον Ελληνικό χώρο (Συντονιστής Ν. Κλήμης, μέλη : Α. Αναστασιάδης, Α. Παπαδημητρίου, Β. Μάργαρης και Χ. Παπαϊωάννου).
- ο Καθορισμού Κριτηρίων επιλογής πλημμυρών σχεδιασμού για Φράγματα (Συντονιστής : Ι. Στεφανάκος, μέλη : Ι. Κουσόπουλος, Α. Πιστρίκα, Α. Ράμπιας)

2.7 Ιστοσελίδα ΕΕΜΦ (www.eemf.gr).

Συνεχίστηκε ανά τακτά διαστήματα με επιμέλεια του μέλους του Δ.Σ. της ΕΕΜΦ κ. Παπαχατζάκη η ενημέρωση και ο εμπλουτισμός της Ιστοσελίδας στο Διαδίκτυο. Σημειώνεται ότι βρίσκεται υπό σύνταξη σελίδα με τα βασικά τεχνικά χαρακτηριστικά και φωτογραφίες των μεγάλων ελληνικών φραγμάτων.

2.8 Προώθηση στόχων ΕΕΜΦ

Οι δραστηριότητες και οι στόχοι της ΕΕΜΦ παρουσιάστηκαν αφενός στα γραφεία του ΟΑΔΥΚ (Οργανισμός Ύδρευσης Δυτικής Κρήτης) σε στελέχη του Οργανισμού, και αφετέρου στους φοιτητές του μεταπτυχιακού προγράμματος Επιστήμης και Τεχνολογίας Υδατικών Πόρων του ΕΜΠ, με στόχο την προσέλκυση νέων μελών και τη στελέχωση των Ομάδων Εργασίας της ΕΕΜΦ. Έγινε επίσης παρουσίαση στους νεοπροσληφθέντες μηχανικούς της ΔΕΗ Α.Ε./ΔΥΗΠ.

Ο Γενικός Γραμματέας της ΕΕΜΦ, με σειρά άρθρων που έχει δημοσιεύσει στο Διαδικτυακό τόπο www.capital.gr, υπερασπίζεται το ρόλο των φραγμάτων και αντικρούει τις θέσεις των γνωστών αντιπάλων τους. Στην Ιστοσελίδα μας, στη στήλη "Το Βήμα των Φραγμάτων" υπάρχουν σύνδεσμοι (links) για την προσέλαση των άρθρων αυτών.

3. Τρέχουσες δραστηριότητες ΕΕΜΦ

3.1 Ομάδες Εργασίας

Οι Ομάδες Τροποποίησης Καταστατικού της ΕΕΜΦ αφενός και Επεξεργασίας Σχεδίου Π.Δ. Διοικητικής Αρχής για την ασφάλεια των Φραγμάτων αφετέρου περάτωσαν τις εργασίες τους και τα τελικά κείμενα θα αναρτηθούν σύντομα στο δικτυακό τόπο της ΕΕΜΦ προκειμένου να σχολιαστούν.

Στα πλαίσια της προσπάθειας για τη σύσταση Ομάδας εργασίας για την παραγωγή φίλτρων από θραυστά ασβεστολιθικά υλικά, έγιναν επαφές με ειδικούς, Έλληνες και ξένους. Προκειμένου να υποβοηθηθεί η προσπάθεια, η ΕΕΜΦ απευθύνθηκε και στις Εθνικές Επιτροπές όλων των χωρών που συμμετέχουν στην ICOLD. Από τις επαφές αυτές, στις οποίες ανταποκρίθηκαν 5 Εθνικές Επιτροπές, προέκυψε ότι η εμπει-

ρία στο θέμα αυτό είναι περιορισμένη. Οι προσπάθειες για τη σύσταση της Ομάδας Εργασίας συνεχίζονται.

3.2 Σχέδιο Π.Δ. Διοικητικής Αρχής για την ασφάλεια των Φραγμάτων – Ημερίδα

Με την ολοκλήρωση των εργασιών της Ομάδας Επεξεργασίας, το Σχέδιο Π.Δ. για τη σύσταση Διοικητικής Αρχής για την ασφάλεια των Φραγμάτων θα αναρτηθεί σύντομα στην Ιστοσελίδα της ΕΕΜΦ και θα αποσταλεί ηλεκτρονικά στα μέλη μας.

Μετά την ολοκλήρωση της διατύπωσης απόψεων επί του σχεδίου (η οποία θα περατωθεί εντός του Απριλίου), η ΕΕΜΦ προγραμματίζει τα ακόλουθα :

- ο Συναντήσεις με επικεφαλής φορέων που διαχειρίζονται φράγματα και ενημέρωση τους για το περιεχόμενο του προτεινόμενου Π.Δ.
- ο Διοργάνωση Ημερίδας στο ΕΜΠ τη Δευτέρα, 7 Ιουνίου, στην οποία θα συζητηθεί και θα σχολιαστεί το τελικό κείμενο του Σχεδίου Π.Δ. Στην ημερίδα έχουν προσκληθεί και θα συμμετάσχουν εκπρόσωποι Διοικητικών Αρχών Φραγμάτων ή ανάλογων οργάνων από το εξωτερικό, οι οποίοι θα παρουσιάσουν τις εμπειρίες τους από τη λειτουργία των αρχών αυτών στις χώρες τους.

Κωνσταντίνος Αναστασόπουλος
Πρόεδρος Δ.Σ. ΕΕΜΦ



Εκδήλωση στη Μνήμα του ΣΤΑΥΡΟΥ ΧΡΙΣΤΟΥΛΑ

Την Δευτέρα 4 Απριλίου 2011 πραγματοποιήθηκε στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών Ε.Μ.Π. εκδήλωση στην μνήμα του Σταύρου Χριστούλα, Καθηγητή Ε.Μ.Π. και μέλους της ΕΕΕΕΓΜ. Κατά την διάρκεια της εκδήλωσης τιμήθηκε με υποτροφία, συνοδευόμενη από χρηματικό έπαθλο, από την οικογένεια του Σταύρου Χριστούλα, η πρώτη σε βαθμό επιτυχίας στις εισαγωγικές εξετάσεις στην Σχολή Πολιτικών Μηχανικών το Ακαδημαϊκό Έτος 2010 – 2011 καταγόμενη από την περιοχή της Καρδίτσας, γενέθλιο τόπο του Σταύρου Χριστούλα, Ελένη – Μαρία Παυλοπούλου.

Στη συνέχεια παρατίθεται σύντομη αναφορά στη ζωή και στο έργο του Σταύρου Χριστούλα

Ο Σταύρος Χριστούλας γεννήθηκε στην Καρδίτσα στις 27 Νοεμβρίου 1937. Έλαβε δίπλωμα Πολιτικού Μηχανικού από το ΕΜΠ, τον Ιούλιο του 1961.

Το 1963 διορίστηκε στο Υπουργείο Δημοσίων Έργων (Δ/ση Τεχνικών Υπηρεσιών Ν. Καρδίτσας) και το 1965 τοποθετήθηκε Προϊστάμενος Έργων στην ίδια Δ/ση.

Από τον Ιανουάριο 1967 έως τον Ιούλιο 1967, με υποτροφία της γαλλικής κυβέρνησης, παρακολούθησε στη Γαλλία μεταπτυχιακό κύκλο σπουδών Εδαφομηχανικής.

Το Δεκέμβριο του 1969 τοποθετήθηκε Διευθυντής (Νομομηχανικός) στη Διεύθυνση Τεχνικών Υπηρεσιών Ν. Καρδίτσας.

Από τον Οκτώβριο 1973 έως τον Ιούλιο 1975, με υποτροφία του ΙΚΥ εκπόνησε στο Université Libre de Bruxelles διδακτορική διατριβή και του απονεμήθηκε ο τίτλος του διδάκτορος μηχανικού.

Τον Οκτώβριο του 1977 επελέγη Διευθυντής Ερευνών Εδαφών του Κέντρου Δημοσίων Έργων (ΚΕΔΕ), όπου και υπηρέτησε μέχρι το Νοέμβριο του 1987, οπότε εξελέγη στη Σχολή Πολιτικών Μηχανικών του ΕΜΠ σε θέση επίκουρου καθηγητή.

Το 1992 εξελέγη στη βαθμίδα του αναπληρωτή καθηγητή και υπηρέτησε μέχρι το 1999, οπότε και συνταξιοδοτήθηκε, λόγω της ασθένειάς του.

Η θητεία του Σταύρου στο ΚΕΔΕ/ΥΠΕΧΩΔΕ σηματοδότησε την ανάπτυξη της Γεωτεχνικής Μηχανικής στο χώρο των δημοσίων έργων. Οι άοκνες προσπάθειές του για την προσέλκυση νέων αξιόλογων επιστημόνων, η οργάνωση σύγχρονων εργαστηρίων, οι διακρατικές επιστημονικές συνεργασίες, η σύνταξη Πρότυπων Τεχνικών Προδιαγραφών δοκιμών Γεωτεχνικής ήταν μερικά από τα επιτεύγματα του Σταύρου, που χαρακτήρισαν την περίοδο εκείνη ως «χρυσή εποχή του ΚΕΔΕ».

Πέραν των άλλων στο ΚΕΔΕ στα πλαίσια συνεργασίας με το LCPC πραγματοποιήθηκε ικανός αριθμός ερευνητικών κοινών προγραμμάτων από όπου αντλήθηκαν πολλές επιστημονικές δημοσιεύσεις.

Την περίοδο 1979-1983 διετέλεσε επιστημονικός συνεργάτης του Univ. Libre de Bruxelles. Υπήρξε μέλος διεθνών επιστημονικών-τεχνικών επιτροπών, υπεύθυνος για την οργάνωση συνεδρίων, καθώς και πρόεδρος επιστημονικών συνεδριάσεων τόσο σε ελληνικά όσο και σε διεθνή συνέδρια.

Το δημοσιευμένο έργο του στη Γεωτεχνική Μηχανική (62 επιστημονικές δημοσιεύσεις και 17 κείμενα επιστημονικού περιεχομένου) αποτελεί ακόμη αξιόλογη πηγή γνώσεων και αναφοράς για τους νέους ερευνητές.

Κατά το διάστημα της θητείας του στο ΕΜΠ διεύρυνε ακόμη περισσότερο τις συνεργασίες με το LCPC και την ENPC. Έτσι ικανός αριθμός διπλωματικών εργασιών εκπονήθηκε σε συνεργασία με την ENPC. Από τις συνεργασίες αυτές προέκυψαν αργότερα οι συνθήκες καθιέρωσης του Διπλού Διπλώματος της Σχολής Πολιτικών Μηχανικών ΕΜΠ και της αντίστοιχης Σχολής του ENPC.

Ο Σταύρος Χριστούλας ήταν ένα καλλιεργημένος άνθρωπος, με γενικότερη παιδεία, ανήσυχο ερευνητικό πνεύμα, εργατικός και συνεργάσιμος, αυτοκριτικός, υποστηρίζοντας με πάθος τις απόψεις του, αλλά αξιολογώντας πάντοτε τις απόψεις και ιδέες των άλλων, πολύ αγαπητός στους συναδέλφους του, αλλά και καταδεκτικός τόσο με τους νεότερους συνεργάτες του όσο και με τους σπουδαστές της Σχολής Πολιτικών Μηχανικών του ΕΜΠ.

Έτσι θα τον θυμόμαστε πάντοτε, όλοι εμείς που είχαμε την τύχη να συνεργαστούμε μαζί του και να εκτιμήσουμε το χαρακτήρα του και την προσφορά του.

Ανδρέας Αναγνωστόπουλος – Γιώργος Τσιαμπάος



Γεωτεχνική Διάλεξη στην ΕΜΑΕΤ

Την Δευτέρα 4 Απριλίου 2011 το μέλος της ΕΕΕΕΓΜ και της ISSMGE / TC301 Preservation of Historic Sites Δημήτρης Εγγλέζος παρουσίασε, στα πλαίσια των εκδηλώσεων της Εταιρείας Μελέτης Αρχαίας Ελληνικής Τεχνολογίας, διάλεξη με τίτλο «Σχεδιασμός περιμετρικού τείχους της Ακρόπολης των Αθηνών – Ιστορική παρουσίαση και αξιολόγηση με βάση σύγχρονες γεωτεχνικές αντιλήψεις».

Στο πλαίσιο της διάλεξης, παρουσιάστηκε κατ' αρχήν ιστορική επισκόπηση της κατασκευής του περιμετρικού Τείχους της Ακρόπολης, από τη Μυκηναϊκή περίοδο (13^{ος} αιώνας π.Χ.), την κυρίως κατασκευή του Τείχους κατά τους κλασικούς χρόνους (Βόρειο Τείχος (Θεμιστόκλειο) το 479 π.Χ., Νότιο και Ανατολικό Τείχος (Κιμώνειο αρχικά, το 466 π.Χ. και Περικλίο στη συνέχεια), καθώς και τις μεταγενέστερες (εξωτερικές) επεμβάσεις κατά τους μεσαιωνικούς και Οθωμανικούς χρόνους). Έγινε συστηματική παρουσίαση των παραγόντων αλληλεπίδρασης κατά τη μελέτη του Τείχους (τεχνητές επιχώσεις – δομικά υλικά από φυσικούς λίθους και δόμηση του Τείχους ως τοίχος βαρύτητας – ασβεστολιθικό υπόβαθρο θεμελίωσης με τις εκτιμώμενες φυσικές και μηχανικές ιδιότητές τους), καθώς και των κυριότερων αναπτυσσόμενων δράσεων, με ιστορική-χρονική διάσταση (λχ σεισμικές δράσεις, πρόσθετα φορτία, εκσκαφές, επανεπιχώσεις κλπ). Επίσης, έγινε ποιοτική εκτίμηση του σχεδιασμού του Τείχους βάσει γεωτεχνικών κριτηρίων όπως, η φύση και συμπίκνωση των υλικών επιχώσης, η δυνατότητα στράγγισης του Τείχους και των επιχώσεων, οι διαστάσεις της κατασκευής (λόγος πλάτους βάσης προς αντηστηριζόμενο ύψος), καθώς και η σεισμική τρωτότητα του Τείχους κατά περιοχές, βάσει της αναμενόμενης (κανονιστικά κατά EC-8) σεισμικής κίνησης, με τη χρήση σχετικών εμπειρικών καμπυλών. Επίσης, προτάθηκε κατάλληλη προσομοίωση του Τείχους για την πραγματοποίηση 2-Δ και 3-Δ αναλύσεων ελέγχου και σχεδιασμού, η οποία ελέγχθηκε με χαρακτηριστικές ανόδρους αναλύσεις αστοχιών σε επιλεγμένες θέσεις στο Βόρειο και στο Νότιο Τείχος. Για τις αναλύσεις χρησιμοποιήθηκαν τα διαθέσιμα ιστορικά και αρχαιολογικά στοιχεία, προκειμένου να προσομοιωθούν τα απαιτούμενα διαδοχικά υπολογιστικά στάδια. Από τις ανόδρους αναλύσεις αλλά και τη σύγκριση με μετρήσεις από σύγχρονα συστήματα ενόργανης παρακολούθησης, προέκυψε η αξιοπιστία της προτεινόμενης προσομοίωσης. Η προσομοίωση αξιοποιήθηκε για τον κανονιστικό έλεγχο του περιμετρικού Τείχους σε ολισθήση, ανατροπή και φέρουσα ικανότητα θεμελίωσης, βάσει των σύγχρονων κανονιστικών προτύπων EC-7 (στατικές συνθήκες) και EC-8 (σεισμικές συνθήκες). Από τις αναλύσεις διεφάνη η καταρχήν επάρκεια του αρχαίου σχεδιασμού σε στατικές συνθήκες (για όλο το τείχος), σε σεισμικές συνθήκες (για το Νότιο και ανατολικό τμήμα του τείχους), αλλά και η προβληματική απόκριση του Βόρειου Τείχους σε ισχυρή σεισμική κίνηση, σε συμφωνία εξάλλου με τις διαθέσιμες ιστορικές μαρτυρίες για σεισμικές αστοχίες. Τέλος, τονίσθηκε η σημασία της εδαφομηχανικής επιστήμης κατά τον έλεγχο και τη μελέτη μνημειακών δομών, ως απαραίτητο στοιχείο μιας πλήρους και αποτελεσματικής διεπιστημονικής προσέγγισης.

Ο Δημήτριος Εγγλέζος γεννήθηκε στις 13 Μαΐου 1963. Δίπλωμα Πολιτικού Μηχανικού, Ε.Μ.Π. (1990). Διδακτορική Διατριβή στον Τομέα Γεωτεχνικής της Σχολής Πολιτικών Μηχανικών Ε.Μ.Π. «Θεωρητική και πειραματική διερεύνηση της συμπεριφοράς του εδαφικού στοιχείου υπό δυναμική φόρτιση» (2004). Μέλος της TC301 Preservation of Historical Sites της International Society for Soil Mechanics and Geotechnical Engineering.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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



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5th May 2011, London, U.K.
www.britishgeotech.org.uk

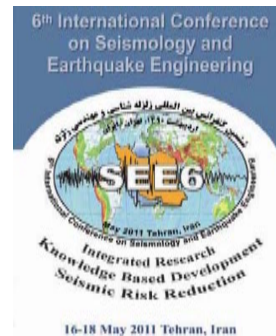
There have been many recent advances in technologies relevant to monitoring and instrumentations. For example, much progress has been made in miniaturisation, connectivity, laser monitoring, digital imaging and analysis, data storage, battery life, computerisation, software development, satellite and wireless technology. These have opened up new opportunities and potential for application to practical engineering. This free 1-day BGA symposium draws together knowledgeable contributors while offering the opportunity for ample free flowing discussion and contribution from attendees. The outcome of the workshop will be summarised as a downloadable file from the BGA website.

Coordinator BGA on 020 7665 2229
email: bga@britishgeotech.org.uk



13th International Conference of the International Association for Computer Methods and Advances in Geomechanics, 9-11 May 2011 Melbourne, Australia, iacmag2011.com

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



**6th International Conference
on Seismology and Earthquake Engineering**
16-18 May 2011, Tehran, Iran
www.see6.ir/index.php

Since the previous SEE conference in 2007, the world has experienced several severe earthquakes such as Sichuan, China in 2008; Padang, Indonesia in 2009; Port-au-Prince, Haiti and Santiago, Chile in 2010 which claimed thousands of lives and caused great damage to economies.

The population growth and enhancement of life quality has resulted in an increase in the number of buildings and civil infrastructures as well as rising the public demand which results in a high probability of direct and indirect loss due to the occurrence of big earthquakes.

Earthquake risks and the diversity of the related fields cause more challenge and initiate more applied and scientific research with the necessity of presenting new solutions and introducing innovative methods for decreasing such risks.

In this regard, based on its goals, strategies and tasks, IIEES holds an international conference every 4 years, the sixth of which will be held in May 2011 in Tehran, Iran. During the conference, national and international researchers and stakeholders involved in Seismology, Earthquake Engineering, and Earthquake Risk Management will discuss, share and exchange their latest achievements and state of the art.

The conference will cover the following topics:

Seismology

Seismotectonics and Paleoseismology
Seismology and Networking
Engineering Seismology and Strong Ground Motion
Earthquake Prediction and Early Warning

Geotechnical Earthquake Engineering

Earth Structures
Site Effect and SSI
Laboratory and Field Testing
Geotechnical Hazards

Earthquake Engineering

Research on the buildings, lifelines and special structures in the following topics:

Dynamic Modeling and Analysis of Structures
Seismic Design
Seismic Retrofit, Innovative Techniques and Technologies
Seismic Vulnerability Assessment, Seismic Loss Estimation
Codes and Regulations
Experimental Methods
System Identification and Health Monitoring
Seismic Control of Structures
Lessons from Recent Earthquakes
Seismic Retrofit of Historical Monuments

Seismic Risk Management

Development and Rehabilitation Based on Seismic Risk
Cultural and Socio-Economic Issues of Risk Management
Earthquake Risk Management in Urban and Rural Areas
Risk Communication, Public Education and Preparedness
Management of Emergency Response, Recovery and Reconstruction
Advanced Technologies in Risk and Disaster Management

Conference Secretariat Address: No. 21, Arghavan St.,
North Dibaji St., Dr. Lavasani St., Tehran, IRAN.
Email: secretariat@see6.ir
Optional email: see6_iiees@yahoo.com
Tel.: +98 21 22830830 - Fax: +98 21 22299479



Interdisciplinary Workshop on Rock Fall Protection 2011, 17
– 19 May 2011, Innsbruck-Igls, Austria,
www.rocexs2011.at

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 17 - 20 May 2011, Semarang,
Central Java, Indonesia, [reli-
ability.geoengineer.org/GEDMAR2011](http://reliability.geoengineer.org/GEDMAR2011)



Compacted fill is a major component of most construction works. Common problems associated with compacted fills can be categorised as strength and deformation related. These include bearing capacity problems associated with foundations and wetting induced collapse or swelling. The *Geotechnical Engineering Themed Issue 2011* on compacted fills has taken the initiative of disseminating the wealth of knowledge that academics and practitioners have developed on this subject. The themed issue publications will be available online *ahead of print* in March 2011 and will be published in the April and May 2011 issues, which comprise a total of fifteen articles from academics and practising geotechnical engineers around the world. The promoter of this themed issue seeks an opportunity to disseminate selected articles through one day symposium that will be held in Queen's University Belfast, Northern Ireland on 20th May 2011.

For more information contact Dr V Sivakumar, School of Planning, Architecture and Civil Engineering, David Keir Building, Queen's University Belfast, BT7 1NN
Email address: v.sivakumar@qub.ac.uk



WTC2011 Helsinki, AITES-ITA 2011 World Tunnel Congress and 37th General Assembly, 21-25 May 2011, Helsinki, Finland, www.wtc11.org

The 14th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering Hong Kong, China, 23 - 28 May 2011 www.cse.polyu.edu.hk/14arc

4th Japan - Greece Workshop Seismic Design of Foundations, Innovations in Seismic Design, and Protection of Cultural Heritage, May 26-27, 2011, Kobe, Japan
www.civil.tohoku-gakuin.ac.jp/yoshida/4JGW

COMPDYN 2011 – 3rd International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, 26-28 May 2011, Corfu, Greece,
www.compdyn2011.org



31 May – 1 June 2011, Doha, Qatar
www.undergroundfoundations.com

Underground Infrastructure and Deep Foundations Qatar will highlight the key solutions to the latest challenges in Qatar's underground infrastructure construction and deep foundation projects

This event will feature technical presentations from key experts, demonstrating best-practices in underground infrastructure implementation and construction.



Dams and Reservoirs under Changing Challenges, June 1 - 2, 2011, Lucerne, Switzerland, www.swissdams.ch

5^ο Διεθνές Συνέδριο Ασφαλικών Μιγμάτων και Οδοστρωμάτων, Θεσσαλονίκη, 1-3 Ιουνίου 2011,
<http://iconfbmp.civil.auth.gr>

15^ο Διεθνές Συνέδριο Γεωμορφολογίας 2011 "Fluvial and coastal systems in tectonic active areas" 1 έως 4 Ιουνίου 2011, Εθνικό & Καποδιστριακό Πανεπιστήμιο Αθηνών, Αθήνα, www.geomorphology2011.geol.uoa.gr

3rd International Symposium on Geotechnical Safety and Risk (ISGSR2011), Munich, Germany, 2 ÷ 3 June 2011,
www.isgsr2011.de

Short course on Reliability Analysis and Design in Geotechnical Engineering, June 1st 2011, Munich, Germany,
G.Braeu@bv.tum.de

2nd Annual Piling & Deep Foundations India Overcoming challenges in complex structures by strengthening foundations and innovative piling techniques, 13 – 15 June 2011, Hyderabad, India, www.pilingfoundationindia.com

2011 RETC Rapid Excavation & Tunneling Conference & Exhibit, June 19-22, 2011, San Francisco, California, USA, gary@smenet.org

"The Atlantis Hypothesis", 3rd International Conference, 25-26 June 2011, Santorini, Greece
<http://atlantis2011.conferences.gr>

GEORISK 2011 Risk Assessment and Management in Geoengineering, June 26 – 28, 2011, Atlanta, USA, <http://content.asce.org/conferences/GeoRisk2011>

Underground Construction, 29th and 30th June 2011, London, U.K., www.tunnellingshow.com

GeoProc 2011 Conference Cross Boundaries through THMC Integration, 6 – 9 July 2011, Perth, Australia,
www.mech.uwa.edu.au/research/geoproc



**International Symposium on
Backwards Problem in Geotechnical Engineering and Geotechnical Failure and Monitoring -
Towards ISO on Construction Control on Geotechnical Engineering
July 14 and 15, 2011, Nishi-ku, Osaka, Japan**

Backwards problem in geotechnical engineering is to identify the process to the final states of geotechnical phenomenon as the most likely scenario that is explained through geotechnical fact data. Backwards problem usually consists of three steps. The first step is to identify the problem of final results of success or failure in geotechnical phenomenon as well as the initial state and condition. The second step is to assume all possible processes of scenarios from the initial state to the final result. The final step is to select the most likely scenario(s) based upon such as evidence of tests and monitoring.

Terzaghi and Peck introduced Observational Procedure in Geo-engineering construction to fill the gap between the knowledge of site conditions and the assumed design conditions. Based upon the observational procedure, most projects have been successfully completed. Recently in the past decades, however, some of the geotechnical construction sites were reported in failure even with instrumentation for monitoring the process of construction. Forensic approach is a backwards problem where the final result is the given conditions and the process to the result is the question to be answered for.

The Symposium aims

1. to show the process of backwards problem from centrifugal experiments,
2. to identify the key factors in the failures including Nicol Highway and Can Tho Bridge in Vietnam.
3. to overview the backwards problem of the field projects including failures,
4. to identify reasons why the instrumented geotechnical project resulted in failure,
5. to discuss the plausibility or applicability of total or effective methods to different types of the geotechnical engineering.

6. to present technical and legal systems as preventive measures against failure,
7. to give recommendations to avoid geotechnical failure, and
8. to propose to take lead for creation of an ISO standard on "Construction Control of Geotechnical Engineering."

Organized by TC-302 Forensic Geotechnical Engineering, ISSMGE and ISO/TC182 Working Committee in Japan under the Auspices of Japanese Geotechnical Society and its Kansai Branch.

Contact : Yoshinori Iwasaki at yoshi-iw@geor.or.jp
Geo Research Institute, 4-3-2, Itachi-bori, Nishiku,
550-0012 Osaka, Osaka, Japan
• Phone: 81-9-8938-1191
• Fax: 81-6-6578-6255



15th African Regional Conference on Soil Mechanics and Geotechnical Engineering "Resources and Infrastructure Geotechnics in Africa: Putting theory into practice", Maputo, Mozambique, 18 – 21 July 2011, www.15arcsmqe-maputo2011.com

IGSH 2011 Fourth International Geotechnical Symposium Geotechnical Engineering for Disaster Prevention & Reduction, 26 – 28 July 2011, Khabarovsk, Russia, www.igsh4.ru

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

EYGEC 2011 21st European Young Geotechnical Engineers' Conference, 4 – 7 September 2011, Rotterdam, Netherlands, www.kiviniria.net/EYGEC2011

ICoVP-2011, 10th biennial International Conference on Vibration Problems, September 5-8, 2011, PRAGUE, Czech Republic www.icovp.org/index.asp



**International Training Course on Disaster Risk
Management of Cultural Heritage 2011
10-24 September 2011, Kyoto and Kobe (Japan)**
<http://www.ritsumeigcoe.jp/heritagerisknet.dmuch/itc/index.html>

The 6th International Training Course on Disaster Risk Management of Cultural Heritage will be held in Kyoto and Kobe, Japan from 10 to 24 September 2011.

Historic cities are irreplaceable and highly complex cultural resources that have evolved over time and contain various heritage components such as traditional housing, urban

spaces, ecological features and intangible components such as rituals and social activities.

However recent decades have seen unprecedented pace of urbanization. For the first time in human history, the world urban population has exceeded its rural population. Because of internal migration, from the countryside to cities, by 2030 more than 60% of the world's population is expected to live in cities, with record concentrations in large urban conglomerations and megacities in the developing world.

The uncontrolled and largely unplanned growth of historic cities have put increasing pressure on their urban infrastructure and has made heritage components highly vulnerable to natural hazards such as earthquakes, fire and floods. As a result, several urban disasters have taken place in recent years such as Mumbai floods of 2005, Hurricane Katrina affecting New Orleans in 2005, New Zealand Earthquake of 2010 and recent floods in Queensland in 2011 causing extensive damage to rich cultural heritage located in historic urban areas.

Therefore in order to proactively protect historic cities from disasters, mitigation measures need to be undertaken at policy, planning and technical levels through an integrated approach aimed at comprehensive risk management of urban cultural heritage. Moreover these should effectively engage various stakeholders at the city, national, regional as well as international levels for protecting cultural heritage in historic cities during such catastrophic situations.

Considering these issues, the theme of the 6th UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage would be **'Integrated Approach for Disaster Risk Mitigation of Historic Cities'**

If you are interested in participating in our training course 2011, please refer to the following documents:

- [ITC 2011 Guideline for Application <PDF/230kb>](#)
- [ITC 2011 Application form <Word/220kb>](#)

For further information, please contact us at:
dmuchitc@st.ritsumei.ac.jp



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

XV European Conference on Soil Mechanics & Geotechnical Engineering, Athens, September 12-15, 2011, Workshop on Education with the theme "Case histories in Geotechnical Instruction: Appropriate cases for each educational level", September 14, Wednesday pm. Organized by ERTC 16, Local host: Dr. Marina Pantazidou, mpanta@central.ntua.gr and manoliu@mail.utcb.ro

Slope Stability 2011 International Symposium on Rock Slope Stability in Open Pit Mining and Civil Engineering, 18-21 September 2011, Vancouver, Canada,
www.slopestability2011.ca



6th EFEE WORLD CONFERENCE
CORINTHIA HOTEL

LISBON
18th - 20th September 2011

<http://web.efee.eu/default.aspx>

The European Federation of Explosives Engineers, EFEE, hereby invites you to our next World Conference on Explosives and Blasting in Lisbon 18th – 20th September 2011.

Since 1988 EFEE has arranged 5 World Conferences with great success and we are fully convinced that our 6th Conference at the Corinthia Hotel in Lisbon will be the same and attract delegates from all over the World.

The Conference will be arranged together with the Portuguese Association of Studies and Engineering of Explosives, AP3E.

The EFEE World Conference has established itself as one of the key explosives forums both in Europe and Internationally. Our Budapest conference in 2009 was attended by over 400 delegates from 55 countries with 38 exhibitors.

The conference includes technical sessions, an exhibition, educational workshops, welcome drinks reception, gala dinner and partner programme. The event will draw attention from explosives users, manufacturers of explosive and equipment for drilling operations, researchers and professionals involved in construction and mining industry.

Conference Objectives

To bring together at this International Conference those whose disciplines are explosives and blasting techniques. The conference will provide us with an excellent forum to share the latest developments and technical practices combined with a fantastic opportunity to network with peers throughout the world.

Technical Sessions

The technical sessions will be divided into key themes. Authors will present their papers to an audience in a lecture style format with some time for questions from the audience. Each presentation will run for 20-25 minutes which will be overseen by the Program Committee. Those papers of high quality that cannot be presented due to the time constraints of the conference may be shown in a specific poster session adjacent to the exhibition area. The conference will focus on practical papers on the following themes:

- EU Directives and Harmonisation Work
- Health, Safety and the Environment
- Technical Development
- Shot Hole Development
- Blasting Covering Experiences from Projects
- Clearance & Decontamination
- Management Covering Blast Design
- Explosive Detection for Security
- New Applications & Training

Contact: Tyler Events Ltd
Hoton Hills Barn
82 Loughborough Road
Hoton

Leicestershire
LE12 5SF, ENGLAND
Tel. + 44 (0) 1509 631 530, Fax. + 44 (0) 1509 234 911
efee@tylerevents.co.uk



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, www.panam-cgc2011.ca



SARDINIA 2011

Thirteenth International Waste Management and Landfill Symposium

3 - 7 October 2011, S. Margherita di Pula, Cagliari, Italy

www.sardiniasymposium.it/sardinia2011

Waste management strategies and technologies are currently undergoing rapid development. The Sardinia Symposia were established in order to make knowledge and experiences in this field readily available. The Symposia have become the Reference Forum, where leading experts meet and present their research activities and experiences and discuss new concepts and technologies. The Symposia have witnessed and contributed worldwide to the development of modern waste management strategies such as the integrated waste management hierarchy, recovery of energy and sustainable landfilling. The twelfth Symposium was held in October 2009 in the traditional venue of the Forte Village Complex at S.Margherita di Pula (Cagliari), with an attendance of approximately 1000 delegates from approx. 80 different countries.

The Symposium will focus on innovative aspects of Sustainable Waste Management, presenting new technologies, describing the state of the art and related case studies, discussing controversial subjects, sharing experiences among different countries and evaluating social and economical balances.

The Symposium will include oral presentations, poster sessions, specialized sessions and specific workshops. Training courses will be offered by the IWWG under the supervision of international leading experts before the start of the Symposium.

Organisations, Associations and Companies are traditionally welcome to organise their internal meetings during the event, with the support of the Symposium Organisation. To increase the participations of Authors from public bodies in developing countries, the Symposium Organisation is encouraging offers of fellowships by Public and Private Sponsors.

Symposium Themes

The Symposium will last five days and will deal with municipal and commercial solid waste, hazardous waste and special waste including the following topics:

- Waste policy and legislation
- Waste management strategies
- Public participation and education
- Waste management assessment and decision tools
- Waste characterisation as a tool for waste management strategies
- New concepts for waste collection
- Waste minimisation and recycling
- Biological treatment
- Thermal treatment and advanced conversion technologies
- Mechanical biological treatment prior to landfilling
- Sanitary landfilling
- Integrated wastewater and solid waste management
- Waste management and climate change
- Waste management in developing and low income countries

Contact

Sardinia 2011 Organising Secretariat - Eurowaste Srl
Via Beato Pellegrino 23 - 35137 Padova (Italy)
E-mail: eurowaste@tin.it



The Second World Landslide Forum, "Putting Science into Practice", 3 – 9 October 2011, FAO Headquarters, Rome,
www.wlf2.org



GEOTEC HANOI 2011

6-7 October 2011, Hanoi, Vietnam

www.geotechn2011.vn

From 6th to 7th October 2011, the International Conference on Geotechnics for Sustainable Development GEOTEC will be held in Hanoi, Vietnam. It aims to celebrate 50th anniversary of the training and research on geo-engineering in Vietnam and is dedicated to better understanding of the geotechnics for sustainable development. It will serve as an excellent opportunity for engineers and researchers to share experiences and to stimulate further co-operations between different fields of expertise in geotechnical engineering and researches from Vietnam and different areas of the world.

The organizers look forward to receiving contributions of engineers and researchers from Vietnam, Asian region and worldwide with in-depth and expertise in geo-engineering and multi-disciplinary approaches to sustainable management and development.

PRELIMINARY SCIENTIFIC THEMES

1. Soft soil improvement and reinforcement

2. Foundation Engineering
3. Tunneling and Underground Spaces
4. Environmental Geotechnics and Sustainable Development
5. Modeling, Design and Monitoring
6. Case Histories

Contact

FECON FOUNDATION ENGINEERING AND
UNDERGROUND CONSTRUCTION JSC
15th Floor, CEO Tower, Lot HH2-1 Pham Hung road,
Tu Liem dist., Hanoi, Vietnam
Tel: (84-4)6.269.0481/82 Fax: (84-4)6.269.0484
Email: secretariat@geotechn2011.vn
Website: <http://www.geotechn2011.vn>



Landslides and Geo-Environment, Geotechnical Symposium
in Balkan Region, October 2011, Tirana, Albania, fa-tos.cenalia@gmail.com, erjon.bukaci@gmail.com

60th Geomechanics Colloquy, October 13th and 14th, 2011,
Salzburg, Austria, www.oegg.at/index.php?id=20&L=2

IBSBI 2011 International Conference on Bridges and Soil-
Bridge Interaction, 13-15 October 2011, Athens, Greece,
<http://ibsbi2011.ntua.gr>

2nd ISRM International Young Scholars' Symposium on
Rock Mechanics, Beijing, China, October 14-16, 2011,
www.isrm2011.com

Beijing 2011, 12th International Congress on Rock Mechan-
ics – Harmonizing Rock Mechanics and the Environment, 18
– 21 October 2011, Beijing, China, www.isrm2011.com

HYDRO 2011 "Practical Solutions for a Sustainable Future",
Prague, Czech Republic, 17-19 October 2011,
www.hydropower-dams.com

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



International Conference on Deep Foundations and Problems of Underground Space Development 18 - 19 October 2011, Perm – Ufa, Russia

The Organizing Committee invites you to participate in the international conference "*Deep Foundations and Problems of Underground Space Development*", which will be held in Perm State Technical University on October 18 – 19, 2011. This conference will carry on the tradition of holding conferences on the problems of pile foundation engineering (1986 – 2004) and the academic Bartolomey readings (2005-2007), held under the auspices of the Russian Society for Soil Mechanics, Geotechnics and Foundation Engineering. Perm State Technical University and Bashkir Scientific Research Institute for Construction as the organizers of the conference propose to enlarge the traditional subject area of conferences on piles taking into account current trends of underground space development, urban territory develop-

ment and widespread geosynthetic material implementation in construction. This conference is also organized under the auspices of the Russian IGS-Chapter.

The purpose of this conference is to share experience among scientific, surveying and design organizations of Russia, to study international experience, to adopt joint approaches to the problems of underground space development.

Conference Topics

- Features of engineering surveys and determination of physical and mechanical characteristics of soils for deep foundations and underground structures.
- Experimental and theoretical studies of deep foundations, pile foundations including.
- State-of-the-art technologies for deep foundations, foundation reinforcement and reconstruction of the underground elements of buildings and structures.
- Examples from underground space development of urban territories, deep foundation application and geotechnical monitoring.
- Experience in research and application of geosynthetic materials in construction.

For all further enquiries and information on paper submission, registration, etc. please contact: spstf@pstu.ac.ru



LANDFILL 2011

Waste Management Facilities – The New Order 18 - 20 October 2011, Durban, South Africa

The KwaZulu-Natal Landfill Interest Group (LIG) announces the Ninth Biennial Seminar on landfills, dedicated to capacity building and technology transfer in the science and practice of waste disposal by landfill. Landfill 2011 continues the highly successful series run over the last 18 years by the Landfill Interest Groups of the Institute of Waste Management of Southern Africa (the IWMSA). In 2011 this event has been made possible by a generous grant by Messrs Barloworld Equipment.

The prime focus of modern waste management lies in reducing waste that needs to be landfilled. Existing landfills are being scrutinised more closely and the development of new facilities is becoming increasingly challenging. However, landfilling and landfill treatment facilities are set to remain an important waste management option into the foreseeable future, and landfill facilities (now more appropriately known as 'waste management facilities') re-main characterised by many problems related to technology, including leachate and biogas emissions.

The LIG Landfill Seminar series is designed to create a low-cost forum where a high standard of technology transfer may be experienced – with the focus firmly on landfill issues rather than on waste management in general. Landfill 2011 will continue this tradition.

Conference Themes

- Design, construction, and operation of landfills on steep slopes, near aquifers or dolomitic strata, and other challenging environments.
- Landfill barrier design and performance.
- Landfill policy and legislation: National and Provincial guidelines; regulation and planning requirements.
- Sustainable landfill concepts for municipal and hazardous waste.

- Landfill processes and emissions; leachate and gas management.
- Waste mechanics.
- Landfill remediation, aftercare and reuse.
- Alternative technologies.

More Information

For all further enquiries and information on registration, exhibition, accommodation, etc., please contact:

John Parkin (Conference Chairman): JohnPa@dmws.durban.gov.za

Rod Claus (Exhibition Co-ordinator): rcl@fibertex.com



XI INTERNATIONAL CONFERENCE UNDERGROUND INFRA-STRUCTURE OF URBAN AREAS, 26-27 October 2011 Wrocław – Poland, www.uiua2011.pwr.wroc.pl

WCCE-ECCE-TCCE Joint Conference 2 SEISMIC PROTECTION OF CULTURAL HERITAGE, October 31 - November 1, 2011 Antalya, Turkey, www.imo.org.tr/spch

3^ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΟΔΟΠΟΙΙΑΣ Νοέμβριος 2011, Πάτρα, http://portal.tee.gr/portal/page/portal/INTER_RELATIONS/INT_REL_P/SYNEDRIA_EKDHLWSEIS/2011/3odopoiias

ICAGE 2011 International Conference on Advances in Geotechnical Engineering, 7th - 9th November, 2011 - Perth, Australia, <http://www.icage2011.com.au>

AP-UNSAT 2011 5th Asia-Pacific Conference on Unsaturated Soils, 14 - 16 November 2011, Pattaya, Thailand www.unsat.eng.ku.ac.th



SI11

**9th International Conference on
Shock & Impact Loads on Structures**
16 – 18 November 2011, Fukuoka, Japan
www.cipremier.com

On behalf of the Conference Committees, we are delighted to invite you to join us in Fukuoka, Japan, from 16–18 November 2011, to attend the 9th International Conference on Shock & Impact Loads on Structures (SI11). Fukuoka is one of the oldest cities in Japan, with a proud tradition and rich cultural heritage.

This Conference will provide you with great opportunities to share common interests in the effects of shock and impact, and to interact with like-minded professionals into the latest research and development into such effects on structures.

The conference committee encourages and welcomes your enthusiastic participation in Fukuoka to enjoy the warm hospitality that Japan and its people have to offer, and that you too will share in the knowledge and ideas that the conference will generate.

We look forward to seeing you in Fukuoka in November 2011.

Y Sonoda & TS Lok, Conference Chairmen

Inaugurated in January 1996 in Singapore, this highly successful Conference series has since travelled to Australia in 1997, 2005 & 2009 (Melbourne, Perth & Adelaide respectively). After a successful 8th conference in Adelaide, under the auspices of Prof Chengqing WU, University of Adelaide, Australia and resident Chairman A/Prof Tat-Seng LOK., from School of Civil & Environmental Engineering, Nanyang Technological University, Singapore, the conference is now brought to Japan for the first time. It will be hosted by Kyushu University under the Chairmanship of Prof Yoshimi SONODA, organized by the Japan Impact Committee of the Japan Society of Civil Engineers, and with the support of The Japan Society for Computational Engineering and Science.

The following themes are scheduled for discussions

- Earthquake Shock
- Impact problem of Rock Fall
- Impact problem of Debris Flow
- Dynamic Soil-Structure Interaction
- Missile Impact and Penetration Mechanics
- Shock and Wave Propagation
- Dynamic Behavior of Structural Elements & Design
- Explosion caused by High Explosives, Gas and Dust
- Blast Loading on Structures & Protective Technology
- Experimental Techniques at High Strain Rate
- Traffic Barrier Impacts and the Crass Worthiness
- Design of Explosion Containment Vessels
- Numerical Simulation and Modeling
- Special Sessions on Specific Topics

SI11-Conference Secretariat
CI-PREMIER PTE LTD
150 Orchard Road #07-14, Orchard Plaza,
Singapore 238841
Tel: +65-6733 2922 Fax: +65-6235 3530



2011 ICKGSS

**International Conference on
Sustainable Application of Geosynthetic Technology**
**Commemoration of 10th Anniversary of Korean
Geosynthetic Society Foundation**
23 - 24 November 2011, Seoul, South Korea

The ICKGSS (International Conference of Korean Geosynthetic Society) invites you to participate 2011 ICKGSS which will be held in the commemoration of 10th Anniversary of Korean Geosynthetic Society Foundation from November 23 - 24 2011. The objective of this conference is to provide a forum for dissemination and exchange of relevant scientific and technical ideas on up-to-date geosynthetic technology.

Conference Topics

- Coastal, Transportation and Underground Engineering
- Erosion Control and Hydraulic Engineering
- Geo-Environmental and Green Structure Application
- Testing, Standardization, Regulation and Reliability

- Geosynthetics Stabilized and Reinforced Soil Structure
- MQC/MQA and CQC/CQA of Geosynthetics

For more information, please contact: hyjeon@inha.ac.kr



International Symposium on Advances in Ground Technology and Geo-Information (IS-AGTG), 1-2 December 2011, Singapore, www.is-agtg.com

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

6th Colloquium "Rock Mechanics - Theory and Practice" with "Vienna-Leopold-Müller Lecture", 22-23 March 2012, Vienna, Austria, christine.cerny@tuwien.ac.at



GeoCongress 2012
State of the Art and Practice
in Geotechnical Engineering
Oakland, California, USA, March 25-29, 2012
www.geocongress2012.org

The Geo-Institute's 2012 annual congress focuses on the "State of the Art and Practice in Geotechnical Engineering" and will be held in the beautiful San Francisco Bay area. It will provide an unprecedented opportunity to review the geotechnical practice and research advances, as well as an exciting forum for the integration of practice, research and education in geotechnical engineering. This conference represents a unique opportunity for geotechnical engineers from around the globe to advance their professional career and goals and uncover the latest and most beneficial knowledge and technologies. Registrants should expect, as always, a comprehensive technical program, numerous networking and social events and an extensive Exhibit Hall, but also an outstanding selection of keynote State of the Art and Practice speakers on selected geotechnical topics. Panel discussion and seminar sessions will also be a part of this outstanding conference.

Technical Themes

- Deep Foundations
- Earth Retaining Structures
- Earthquake Engineering and Soil Dynamics
- Embankments, Dams, and Slopes
- Engineering Geology and Site Characterization
- Computational Geotechnics
- Geoenvironmental Engineering
- Geophysical Engineering
- Geosynthetics
- Geotechnics of Soil Erosion
- Grouting
- Pavements
- Risk Assessment and Management
- Rock Mechanics
- Shallow Foundations
- Soil Improvement
- Soil Properties and Modeling
- Underground Construction
- Offshore Geotechnics

- Unsaturated Soils
- Litigation/Forensics Engineering
- Business of Geotechnical Engineering

Conference Chair:

Dimitrios Zekkos, zekkos@geoengineer.org

Technical Program Chair:

Kyle Rollins, rollinsk@et.byu.edu



TERRA 2012 XIth International Conference on the Study and Conservation of Earthen Architecture Heritage, 22 – 27 April 2012, Lima, Peru, <http://congreso.pucp.edu.pe/terra2012/index.htm>

GEOAMERICAS 2012 II Pan-American Congress on Geosynthetics, Lima, Perú, 6 - 9 May 2012 www.igsperu.org

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

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

Fifth International Symposium on Contaminated Sediments: Restoration of Aquatic Environment, May 23 - 25 2012, Montreal, QC, Canada, www.astm.org/SYMPOSIA/filtrex40.cgi?+P+EVENT_ID+1857+/usr6/htdocs/astm.org/SYMPOSIA/callforpapers.frm

EUROCK 2012 - ISRM European Regional Symposium - Rock Engineering and Technology, 28 – 30 May 2012, Stockholm, Sweden, eva.friedman@svebefto.se



SECOND INTERNATIONAL CONFERENCE ON
PERFORMANCE-BASED DESIGN IN
EARTHQUAKE GEOTECHNICAL ENGINEERING
May 28-30, 2012, Taormina, Italy
www.assoziazionegeotecnica.it

Pseudo-static analysis is still the most used methodology for assessing the stability of geotechnical systems subjected to earthquake loadings. However, this methodology did not give any information on the deformations and permanent displacements induced by seismic actions. Moreover, it is questionable to use this approach when the geotechnical systems are affected by frequent and rare seismic events. By the way the peak ground acceleration have been increased from 0.2-0.3 g in the seventies to 0.6-0.8g at the present time. It is needed to shift from pseudo-static approach to performance based analysis.

In the most general sense, the performance of a geotechnical system can be defined in terms of:

- technical performance, usually quantified through displacement and/or capacity based design;

- economical performance, usually defined as the optimization of construction versus maintenance costs;

- environmental performance, which could be defined as the optimization of carbon emission versus cost of construction, maintenance and operational costs.

These topics have been debated in recent International conference and workshop such as the International conference on Performance-Based design held in Tokyo in 2008, the workshop on new trends of seismic geotechnical design based on performance and life cycle analysis held in Sacramento in 2008 and the Kyoto Seminar on 'Geotechnics/Earthquake Geotechnics towards Global Sustainability', held in Kyoto in 2010.

The Conference is mainly concerning the technical performance of geotechnical systems. However topics related to economical performance and environmental performance of geotechnical systems are welcome.

The main conference topics for Performance-Based Design (PBD) are:

- Case histories on ground motion and site effects;
- Soil investigation with field and laboratory testing;
- Dynamic Characterisation and modeling;
- Methodologies for PBD;
- Numerical analyses for PBD;
- Physical modeling by Shaking table and centrifuge test;
- PBD for liquefaction;
- PBD for slopes;
- PBD for embankments, landfills and dams;
- PBD for shallow foundations
- PBD for pile foundations;
- PBD for soil-structure interaction;
- PBD for retaining wall;
- PBD for earth reinforced retaining wall;
- PBD for underground structures;
- Recent developments in PBD and codes.

Special Sessions

- Academics Versus Practitioners: Recent Developments in PBD and Codes
- The 2011 New Zealand Earthquake
- The 2011 Tōhoku Earthquake and Tsunami
- Symposium in honour of Prof. Shamsheer Prakash May 30, 2012.

Contact Persons:

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INTERNATIONAL SYMPOSIUM & SHORT COURSES TC 211 IS-GI Brussels 2012 Recent Research, Advances & Execution Aspects of GROUND IMPROVEMENT WORKS 30 May – 1 June 2012, Brussels, Belgium www.bbri.be/go/IS-GI-2012

Technical Committee TC 211 "Ground Improvement" of the International Society for Soil Mechanics and Geotechnical Engineering ISSMGE has a major commitment towards collecting information concerning the design and execution of ground improvement.

The Committee has already organised workshops in Madrid (2007), Alexandria (2009) and Hong Kong (2011) and decided to organise an International Symposium in Brussels 2012.

THEMES

The themes of the Brussels Symposium, in line with the terms of reference of the TC 211 are:

- recent R&D activities and advances with regard to ground improvement methods
- the influence of the equipment used for ground improvement works, f.i. vibroprobes, HEIC,...
- the available control methods during the execution of ground improvement works
- the monitoring of improved ground
- the execution of ground improvement in particular soils, f.i. crushable sands, glauconitic sands, organic soils, hydraulically deposited mud (dredged or industrial)

PROGRAMME

International Symposium

During the symposium on 31 May – 1 June, sessions will be organised on the following subjects:

- VIBRO AND IMPACT COMPACTION
- PREFABRICATED VERTICAL DRAINS
- VACUUM CONSOLIDATION
- DEEP MIXING
- RIGID INCLUSIONS
- BIOGROUT AND OTHER GROUTING METHODS
- SOIL REINFORCEMENT

Each session will consist of a report on actual research and advances, and of individual presentations.

Short courses

On 30 May 2012 short courses will be organised on :

- vibro and impact compaction
- vacuum consolidation
- deep mixing
- rigid inclusions

Conference secretariat

Belgian Building Research Institute

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

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

International Conference on Geotechnical Engineering Education, 4-6 July 2012, NUI Galway, Galway, Ireland, bryan.mccabe@nuigalway.ie

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



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

Papers are invited for a Symposium on Dynamic Testing of Soil and Rock: Field and Laboratory to be held Thursday and Friday June 28-29, 2012. Sponsored by ASTM Committee D18 on Soil and Rock, the symposium will be held at the Sheraton San Diego in San Diego, CA, in conjunction with the standards development meetings of Committee D18.

The objectives of the symposium are to assess the state-of-the-art knowledge of methods of determining shear modulus, damping, and shear wave velocity for purposes of improving ASTM standards.

Authors are sought for presentation and a panel discussion on current methods for the dynamic testing of soil and rock. Topics of interest include but are not limited to the following:

- Comparison of insitu and laboratory testing
- Preparation of both soft and very stiff samples
- Insitu high level strain measurements
- Precision and bias of lab and insitu dynamic/cyclic methodologies
- Effect of soil fabric on cyclic and dynamic properties
- Testing of very soft materials insitu and in the laboratory
- Dynamic properties of unsaturated soils
- Testing of calcareous materials
- Interpretation of laboratory pulse-wave tests

For more information please email hsparks@astm.org.



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

Offshore geotechnical engineering has long been of interest to *Géotechnique* and its readership. The original focus on oil and gas applications has widened to renewable energy applications (such as offshore wind turbines) and other applications. Oil and gas sector attention is concerned with marginal field developments, novel foundation designs, harsher environmental conditions, deeper water developments and more subsea developments, including an increased emphasis on pipeline engineering. The past ten years has seen the emergence of a larger offshore renewable energy sector, led primarily by the design and construction of large numbers of offshore wind turbines. These developments are often spread over large sites and pose new challenges for design, site investigation, construction and installation. A special themed issue will address recent advances and papers are welcomed from all areas of offshore geotechnics with relevance to the industry including:

- New and improved foundation design methods such as for offshore wind turbines.
- Improved methods for pipeline modelling and design.
- Applications relating to ultra-deepwater exploration and development.
- The reporting and interpretation of data from field-monitoring schemes.
- Advances in site characterisation techniques such as required for soft deepwater soils or large sites.
- Geohazards research including slope stability problems and the effect of shallow gas / hydrates.
- Offshore seismic engineering design.

Abstracts to Craig Schaper (craig.schaper@ice.org.uk) by 31 May 2011; full papers by 31 October 2011; publication August 2012; conference session September 2012.



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

ICSE-6, 6th International Conference on Scour and Erosion, 27-31 August 2012, Paris, France, www.icse-6.com

2nd International Conference on Transportation Geotechnics, 10 – 12 September 2012, Sapporo, Hokkaido, Japan,

<http://congress.coop.hokudai.ac.jp/tc3conference/index.html>

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

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

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

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

32. Baugrundtagung with exhibition "Geotechnik", Mainz, Germany, 26 - 29 November 2012

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

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



Geotechnical Special Publication, ASCE Foundation Engineering in the Face of Uncertainty

Sponsored by the Geo-Institute, the ASCE will be publishing a Geotechnical Special Publication (GSP) volume titled "Foundation Engineering in the Face of Uncertainty" (and subtitled "Site Heterogeneity, Property Variability, Risk, and Reliability-Based Design") - Honoring Professor Fred H. Kulhawy, Ph.D., P.E., G.E., D.GE, Dist.M.ASCE. Mohamad H. Hussein, Kok-Kwang Phoon, and James L. Withiam will serve as Editors of this GSP. Abstracts for proposed papers dealing with topics related to the main theme, are now being sought for consideration. The following are possible topics:

- Geologic modeling for ground characterization
- Spatial variability (natural ground, modified ground)
- Test measurement errors (laboratory/field)
- Transformation uncertainties pertaining to design properties
- Soil/rock property statistics (distributions, correlations)
- Model/bias factors in design equations
- Probabilistic/reliability methods
- Random finite element methods
- Limit state design (ultimate, serviceability, economic, etc.)
- Reliability-based design (RBD)
- Simplified RBD (partial factor design, LRFD, MRFD, etc.)
- Bayesian updating (from quality control, load tests, monitoring, etc.)

- Risk assessment and management
- User-friendly design/analysis tools
- Role of field measurements and testing in improving reliability
- Case histories

Deadline for a 300 word (max.) abstract submission is June 30, 2011. Finished manuscripts are expected in July 2012, the GSP will be released at a specialty symposium during the G-I's 2013 annual meeting. All papers will be subjected to the standard ASCE technical papers review process. Please e-mail your abstract to Mohamad H. Hussein at: MHussein@pile.com.



Geotechnical Special Publication, ASCE SOUND GEOTECHNICAL RESEARCH TO PRACTICE

For more than 45 years Professor Bob Holtz, P.E., D.GE., Dist. M. ASCE, has made distinguished contributions to the assessment of fundamental soil behavior, soft ground construction and improvement, geosynthetic and steel reinforced soils, and geotechnical engineering education. Through his tenure at Purdue University and the University of Washington, Dr. Holtz has made a national and international impact through service in professional organizations such as ASCE, ASFE, ASTM, IGS, ISSMGE, Geo-Institute, and TRB, as well as numerous other institutions (e.g., the Swedish Geotechnical Institute, various consulting firms, and contractors). Dr. Holtz has also made a significant impact to the professional community in the Puget Sound region, helping build the connection between industry and the University of Washington.

Sound Geotechnical Research to Practice will comprise a collection of papers honoring the contribution of Robert D. Holtz in geotechnical research and practice. This volume will contain select papers by Bob Holtz, including his **2010 Terzaghi Lecture**, papers presented in honor of Bob Holtz at the 2007 Spring Seminar hosted by the ASCE Seattle Section Geotechnical Group, and other invited and solicited papers by professors, researchers, practicing geotechnical engineers, and contractors. Selected papers will be presented with release of the Proceedings at **GeoCongress 2013**.

Abstracts Due May 8, 2011. For more information and abstract submission, navigate to:

http://web.engr.oregonstate.edu/~armin/index_files/HoltzGSP



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

The investigation of the fundamental causes of failures during the life of buildings, tunnels, bridges, foundations, etc. is crucial in optimising the construction and management of our built environment.

The Fifth International Conference on Forensic Engineering is maintaining a 150 year tradition pioneered by Telford, Brunel and Stephenson by discussing how lessons learned from failures lead to the development of improved design, construction and management practice.

The presentation of peer reviewed papers on all aspects of the Forensic Cycle will provide a catalyst for discussion of how we can deliver a better and more sustainable infrastructure.

Topics

Forensic investigation case studies - techniques, procedures and requirements

- Structural failures from extreme events
- Identifying deterioration and risks of failure in existing assets
- Structures which are not fit for purpose or cost effective
- The influence of contract or other procedures on failure risks
- Risk management – identification of risk, legal issues and appropriate actions
- The role of engineers in dispute resolution and litigation
- Education and continuing professional development in forensic engineering

Contact

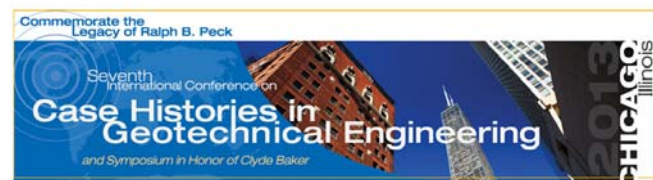
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Conference to Commemorate the Legacy of Ralph B. Peck, 7th International Conference on Case Histories in Geotechnical Engineering & Soil Dynamics and Symposium in Honor of Clyde Baker, Chicago, USA, April/May, 2013, <http://7icchg.mst.edu>



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

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



**EUROCK 2013
ISRM European Regional Symposium
Rock Mechanics for Resources, Energy and Environment
23-26 September 2013, Wroclaw, Poland**

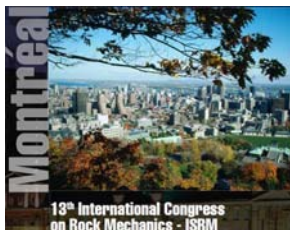
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ANDORRA 2014 14th International Winter Road Congress 2014, 4-7 February 2014, Andorra la Vella (Andorra), www.aipcrandorra2014.org

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





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

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

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McGill University
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E-mail: ferri.hassani@mcgill.ca

ΝΕΑ ΑΠΟ ΤΙΣ ΔΙΕΘΝΕΙΣ ΕΝΩΣΕΙΣ

INTERNATIONAL SOCIETY FOR HELICAL FOUNDATIONS

An international professional organization was established that is dedicated to improving the state-of-the-practice in Geotechnical Engineering related to the design and use of Screw-Piles, Helical Pier Foundations and Helical Anchors and Tiebacks. The ISHF is a professional organization consisting of Researchers, Engineers, Contractors, Manufacturers and other professionals interested in advancing the understanding and use of Screw-Piles, Helical Piers and Helical Anchors in civil engineering construction.

For more information on ISHF, contact:

Dr. Alan J. Lutenecker
Professor of Civil & Environmental Engineering
University of Massachusetts
Amherst, Ma. 01003
lutenegg@ecs.umass.edu

Brightwater drilling opens sinkhole in Bothell

For the second time during construction of the Brightwater sewage-treatment plant, a large sinkhole has opened up above the 13-mile tunnel being mined to carry treated waste to Puget Sound.

King County wastewater-treatment officials don't know when the new hole, up to 30 feet wide and more than 15 feet deep, opened up in a wooded area in Bothell. It was discovered this month after a neighbor reported to the city that a tree was leaning against a cable-TV line.



"It's so close to the Brightwater alignment that it's pretty reasonable to assume that it's related to Brightwater," said Annie Kolb-Nelson, spokeswoman for the county's Wastewater Treatment Division, which is building the \$1.8 billion plant and related pipelines.

Contractors have fenced off the sinkhole for safety and will fill it after they receive a city permit, Kolb-Nelson said.

The sinkhole is the latest problem in a deep-bore tunneling project that has been complicated by rapidly changing, sometimes unstable soils and the difficulty of maintaining and repairing machines under high air pressures.

The treatment plant is almost complete, and all but 1.5 miles of the 13-mile tunnel are finished. The sewage-treatment plant and pipelines are supposed to be fully operational by mid-2012.

A 30-foot-wide, 15-foot-deep sinkhole obliterated the driveway of a Kenmore resident after a Brightwater tunnel-boring machine passed below the house in March 2009. Officials said the machine excavated too much sandy soil.

Tunnel construction manager Judy Cochran said the Bothell sinkhole apparently was caused by an August 2008 construction mishap that also stirred up sediment in Horse Creek and the Sammamish River and temporarily altered the chemistry of the two waterways over a two-month period.

The state Department of Ecology issued King County a notice of violation and ordered tighter supervision of underground repairs on tunneling machines.

The problems occurred while compressed air was being used to hold back the soil during routine maintenance on the cutterhead of a boring machine 150 feet below ground. As workers were entering the excavation chamber, they discovered sand had poured into it and they retreated, closing the hatch behind them.

"They kind of left in a hurry," Cochran said. Repairs were postponed until the machine could reach a safer area.

The collapse of soil into the machine's excavation chamber apparently sent compressed air into Horse Creek several hundred feet away and created the sinkhole directly above the machine, Cochran said.

Because the sinkhole is in an area of brush and trees separated by a fence from a nearby condominium complex on 93rd and 94th avenues Northeast just west of Highway 527, it may have gone unnoticed for months, Cochran said.

"They're doing their best to correct it, I'm sure," said Jorge Landa, who owns the property with the sinkhole and the Delanda Dog Inn kennels. His main concern, he said, is that the well serving his kennel not be damaged again, as it was when the tunnel was bored beneath his land.

Residents along the tunnel route have complained of noise, a flood of sewage, cracked foundations and other problems.

Cochran said the county asked geotechnical engineers a couple of months ago to take a close look at excavation records for any indication there may be other "voids" that could lead to surface settling or sinkholes.

Problems on the Brightwater tunnel have led some critics to predict more serious problems in the planned replacement of the Alaskan Way Viaduct with a world-record 58-foot-diameter tunnel.

The state's tunnel contractors will try several tactics to prevent soil settlement that can cause sinkholes. These include grout injections in the soil around buildings, especially in the soft soils near Pioneer Square; laser-guided measuring devices at the rear of the tunnel machine to ensure soil isn't being removed too quickly; grout injections from the machine; and a \$20 million incentive payment to contractors if they succeed in avoiding settlement of buildings, known as "deformation."

The two boring machines blamed for the Bothell and Kenmore sinkholes were idled for most of 2009 and part of 2010 as their operator struggled to make major repairs without subjecting workers to extremely high air pressure. The contractor completed the Kenmore-to-Bothell tunnel segment last June and was replaced on the Kenmore-to-Lake Forest Park portion.

(Keith Ervin, The Seattle Times, March 28, 2011)

Παλαιά Μονή θα μεταφερθεί, λόγω... υδάτων

Το μοναστήρι Κοιμήσεως της Θεοτόκου Τορνικίου στα Γρεβενά, με ειδική τεχνική, αναμένεται να εγκατασταθεί 27 μ. ψηλότερα

Οκτακόσια χρόνια μετά την ίδρυσή του, ένα από τα πιο παλιά μοναστήρια της Μακεδονίας, η μονή Κοιμήσεως της Θεοτόκου Τορνικίου των Γρεβενών, ετοιμάζεται να διανύσει 127 μ. ανηφόρας πάνω σε ράγες για να εγκατασταθεί 27 μ. ψηλότερα και να γλιτώσει από τα νερά της τρίτης τεχνητής λίμνης του Αλιάκμονα που θα κατακλύσουν την περιοχή.



Τις επόμενες ημέρες, όπως ανακοίνωσαν οι αρμόδιοι της ΔΕΗ, θα ξεκινήσουν οι εργασίες στήριξης και τα χωματουργικά έργα για να μετακινηθεί ολόκληρο το διώροφο καθολικό του βυζαντινού μοναστηριού, βάρους 300 τόνων και ύψους 9 μ. Με μια ειδική τεχνική, δοκιμασμένη στο παρελθόν και σε άλλα σημαντικά μνημεία της Αθήνας και Θεσσαλονίκης, το θρυλούμενο κτίσμα του στρατηγού Ιωάννη Τορνικίου που είχε δοξάσει με τις νίκες του τον αυτοκράτορα Νικηφόρο Φωκά θα αλλάξει υποχρεωτικά θέση και το σημείο, εκεί που έστεκε για αιώνες στην όχθη του Αλιάκμονα, θα βρίσκεται σύντομα κάτω από τον ταμιευτήρα του υδροηλεκτρικού φράγματος Ιλαρίωνα που κατασκεύασε η Δημόσια Επιχείρηση Έξω από την Αιανή Κοζάνης.

Η λίμνη θα αρχίσει να γεμίζει από το καλοκαίρι του 2012. Η επιχείρηση διάσωσης της μονής Παναγιάς Τορνικίου, όπως και το έργο προστασίας της απόκρημνης σκλήτης του Οσίου Νικάνορα στο παρακείμενο μοναστήρι της Ζάβορδας, θεωρούνται ως τα σημαντικότερα από τα μνημεία που έχει αναλάβει να διασώσει η ΔΕΗ.

Το ΚΑΣ έχει δώσει προ καιρού την έγκρισή του για τη μετακίνηση. Η επιχείρηση διάσωσης του μοναστηριού υπολογίζεται ότι θα κοστίσει 850.000 ευρώ και θα έχει ολοκληρωθεί μέχρι το τέλος του καλοκαιριού. Το εγχείρημα έχει υψηλότερο ρίσκο από άλλα παρόμοια, καθώς για πρώτη φορά ένα τόσο παλιό κτίσμα με τέτοια αρχιτεκτονική ιδιομορφία θα μετακινηθεί με ανωφέρεια 24% προς την κορυφή του κοντινού λόφου. Διαθέτει όμως ως εγγύηση την εμπειρία του αρχιτέκτονα μηχανικού Δημήτρη Κορρέ, γνωστού από τη μεταφορά του ναυδρίου στην οδό Κηφισίας, των Αποστόλων Πέτρου και Παύλου στο αεροδρόμιο των Σπάτων, του παλιού κτιρίου του ΟΣΕ, ενός τζαμιού στη Θεσσαλονίκη κ.ά. «Η προετοιμασία έχει ξεκινήσει και τον Ιούλιο, υπολογίζουμε ότι θα αρχίσει η μεταφορά του καθολικού που θα διαρκέσει λίγες ημέρες. Η ανηφόρα προσθέτει μεγαλύτερη δυσκολία.

Ειδική μέριμνα

Η ολίσθηση στις ράγες θα γίνει με υδραυλικά έμβολα που θα είναι στερεωμένα πάνω στον ναό και θα μετακινείται μέτρο μέτρο. Ειδικός εξωτερικός σκελετός και ειδικά κατασκευή κάτω από τα θεμέλια θα προστατεύει το κτίσμα κατά τη μετακίνηση από τυχόν παραμορφώσεις. Την πρώτη μέρα θα

είμαστε ευτυχείς αν κάνει πέντε μέτρα...», δήλωσε στην «Κ» ο κ. Κορρές.

Εκτός από το καθολικό, θα μεταφερθεί το μεγαλύτερο μέρος του ξύλινου στέγαστρου και των τοίχων του πρόναου για να προστατευτούν τοιχογραφίες της πρόσοψης. Ειδική μέριμνα θα ληφθεί για τις σπάνιες τοιχογραφίες που χρονολογούνται το 1481-2. Άντεξαν τον μεγάλο σεισμό του 1995 κι έχουν ήδη συντηρηθεί και στερεωθεί (1999-2001) από συνεργεία της 11ης Εφορίας Βυζαντινών Αρχαιοτήτων. Στην κορυφή του λόφου θα προστεθεί κι ένα μέρος από τα υπόλοιπα κτίσματα του μοναστηριού που θα ανακατασκευαστούν με τα παλιά υλικά τους.

«Δεν μπορούμε να διανοηθούμε το χωριό μας χωρίς αυτή τη μονή. Είναι η ιστορία μας, όλο το παρελθόν της περιοχής», είπε στην «Κ» ο κ. Δημήτρης Σταβάρας, ένας από τους κατοίκους του χωριού Παναγιά Γρεβενών, που μέχρι πριν από λίγα χρόνια ονομαζόταν Τορνίκι. Ο 73χρονος, «ψάλλτης όλα τα χρόνια», θυμάται την τελευταία φορά που λειτούργησε «της Διακαινησίμου το 1954» και ξέρεi να διηγείται εντυπωσιακές ιστορίες για τους θρύλους. «...Είχε περάσει ο Πάπας από εδώ, κάποτε, μετά την Άλωση της Πόλης και λειτούργησε, αλλά οι μοναχοί δεν θέλησαν να ξαναχρησιμοποιήσουν τον ναό κι έκαναν από πάνω άλλο χώρο λειτουργίας... Έτσι εξηγείται που έχει δυο ιερές κόγχες το καθολικό...».

(Θανάσης Τσιγγανας / Η ΚΑΘΗΜΕΡΙΝΗ, 16.04.2011)



Υποκατάστατο φελιζόλ από... μανιτάρια

Ένα νέο υλικό από γεωργικά απόβλητα έρχεται να αντικαταστήσει το συνθετικό προϊόν

Τι κοινό έχουν τα κράνη, οι συσκευασίες των τηλεοράσεων ή των υπολογιστών, οι μονωτικές πλάκες των κτιρίων, ακόμη και τα φτερά των αεροπλάνων; Ότι περιέχουν φελιζόλ, ένα συνθετικό υλικό ευρείας χρήσης που παράγεται από το πετρέλαιο. Άλλωστε, το φελιζόλ (ή η διογκωμένη πολυστερίνη, όπως ονομάζεται επίσημα) συνδυάζει αρκετές χρήσιμες ιδιότητες, όπως ότι είναι ελαφρύ και ανθεκτικό στην υγρασία, έχει την ικανότητα να απορροφά τους κραδασμούς και παρουσιάζει εξαιρετική θερμομονωτική συμπεριφορά.



Οστόσο, η μεγάλη διάρκεια ζωής του, η οποία φτάνει έως και τα 10.000 χρόνια, το καθιστά επιβλαβές για το περιβάλλον, αφού, παρόλο που είναι ανακυκλώσιμο, μεγάλες ποσότητες του καταλήγουν τελικά στις χωματερές. Έτσι, σύμφωνα με την αμερικανική Υπηρεσία Προστασίας του Περιβάλλοντος, μόνο στις ΗΠΑ αντιστοιχεί στο 25% του συνολικού

όγκου των απορριμμάτων. Σύντομα όμως στις συσκευασίες των ηλεκτρονικών συσκευών και στις μονώσεις θα κάνει την εμφάνισή του ένα απόλυτα φυσικό υποκατάστατο το οποίο, όταν είναι πλέον άχρηστο και θαφτεί στο χώμα, διασπάται πλήρως παράγοντας λίπασμα. Το υλικό αυτό, το οποίο εφηύραν οι Αμερικανοί Eben Bayer και Gavin McIntyre, αποτελείται από γεωργικά απόβλητα –όπως φλοιούς ρυζιού, σιταριού ή βρώμης– και ρίζες... μανιταριών, που ενώνουν μεταξύ τους τα απόβλητα και προσδίδουν στο προϊόν την απαραίτητη συνοχή. Το εν λόγω υλικό συμπεριφέρεται όπως ακριβώς το φελιζόλ, παρουσιάζοντας μάλιστα και το επιπλέον πλεονέκτημα πως είναι πυρίμαχο. Γεγονός που έπεισε την εταιρεία Dell να ξεκινήσει να το χρησιμοποιεί πιλοτικά στα χάρτινα κιβώτια μεταφοράς των σέρβερ της, και την αυτοκινητοβιομηχανία Ford να συνεργαστεί με τους δύο Αμερικανούς ώστε να αντικαταστήσει την πολυστερίνη που υπάρχει σε κάθε Ι.Χ., κυρίως με σκοπό τη θερμομόνωση.

Για την κατασκευή του, οι Bayer και McIntyre σκέφτηκαν ήδη από την εποχή που φοιτούσαν στο Πολυτεχνικό Ινστιτούτο Rensselaer στη Νέα Υόρκη να αξιοποιήσουν το γεγονός ότι, κατά την ανάπτυξή τους, τα μανιτάρια δημιουργούν ένα τεράστιο δίκτυο από ρίζες. Έτσι υπέθεσαν πως αν φύτευαν σπόρους μανιταριών όχι σε χώμα αλλά σε ένα υπόστρωμα από αγροτικά απορρίμματα, τότε οι ρίζες θα έκαναν αυτό το υπόστρωμα εξαιρετικά συμπαγές, μετατρέποντάς το ουσιαστικά σε φυσικό φελιζόλ.

Όταν το 2007, σε ηλικία μόλις 24 ετών οι δύο μηχανολόγοι μηχανικοί ίδρυσαν την εταιρεία Ecovative Design για την εμπορική εκμετάλλευση της ιδέας, τα πειράματα τους δικαιώσαν και με το παραπάνω. Έχοντας σήμερα τελειοποιήσει την τεχνολογία, το υλικό τους παρασκευάζεται πλέον σε μόλις 10-14 ημέρες, αφού, μέσα σε αυτό το χρονικό διάστημα, τα μανιτάρια έχουν δημιουργήσει ρίζες συνολικού μήκους 800 μέτρων σε 1 τετρ. εκατοστό του υλικού. Το μόνο που χρειάζεται στη συνέχεια είναι να θερμάνουν το προϊόν στους 40-60 °C, με σκοπό να σταματήσει η ανάπτυξη των μανιταριών. Μάλιστα, στην πορεία αποδείχθηκε πως η τεχνολογία εξασφάλιζε ακόμη περισσότερα πλεονεκτήματα, αφού καταναλώνει το 1/8 της ενέργειας που χρειάζεται για την παραγωγή της συνθετικής πολυστερίνης, με συνέπεια το προϊόν της Ecovative να είναι ακόμη πιο φιλικό στο περιβάλλον, αλλά και πιο φθηνό.

Περισσότερο πάντως από το κόστος, καθοριστικό ρόλο στην απόφαση της Dell να χρησιμοποιήσει πιλοτικά το υποκατάστατο του φελιζόλ στις συσκευασίες των σέρβερ της έπαιξαν οι 8 μήνες δοκιμών που απέδειξαν πως το υλικό μπορούσε να προστατεύσει αυτές τις ευαίσθητες και ακριβές συσκευές, αν και το βάρος τους ξεπερνά τα 45 κιλά.

Για την κατασκευή του θα χρησιμοποιούνται τα υπολείμματα από τις βαμβακοκαλλιέργειες στο Austin του Texas, όπου βρίσκεται το εργοστάσιο της Dell. Στόχος της Ford, από την άλλη, είναι να ελαττώσει την περιβαλλοντική επιβάρυνση από τις πρώτες ύλες που χρησιμοποιεί στα μοντέλα της – τη στιγμή που κάθε αυτοκίνητο περιέχει 13 περίπου κιλά πολυστερίνης. Και το υλικό της Ecovative θα αξιοποιηθεί όχι μόνο για να αποτρέπει την ανταλλαγή θερμότητας ανάμεσα στο περιβάλλον και τους εσωτερικούς χώρους των οχημάτων, αλλά και στους προφυλακτήρες για την απορρόφηση των κραδασμών από τις συγκρούσεις.

Όπως είναι φυσικό, τα σχέδια της Ecovative δεν σταματούν εδώ: η εταιρεία έχει ήδη αναπτύξει ένα ανάλογο «πράσινο» προϊόν για τη μόνωση κτιρίων, αναζητώντας κατασκευαστές που θα αναλάβουν τη βιομηχανική παραγωγή του. Στο απώτερο μέλλον, οι Bayer και McIntyre υποστηρίζουν πως, χρησιμοποιώντας διαφορετικές πρώτες ύλες, θα καταφέρουν να παράγουν πάλι από μανιτάρια βιοδιασπώμενο πλαστικό από το οποίο θα μπορούν να κατασκευάζονται τηλεοράσεις, υπολογιστές και άλλες ηλεκτρονικές συσκευές.

Μαζική παραγωγή

Χάρis στις προοπτικές που ανοίγει, τα τελευταία τέσσερα χρόνια η τεχνολογία της Ecovative έχει κερδίσει βραβεία στους μεγαλύτερους διεθνείς διαγωνισμούς καινοτομίας, πριν καν παραγάγει το πρώτο της προϊόν. Εδώ και λίγους μήνες, μάλιστα, η εταιρεία λειτουργεί ένα πιλοτικό εργοστάσιο στη Νέα Υόρκη, το οποίο κάθε μήνα παρασκευάζει φυσικό φελιζόλ για 5.000 συσκευασίες, πείθοντας έτσι και τους πιο δύσπιστους ότι το υλικό μπορεί να παραχθεί σε μαζική κλίμακα. Έτσι, με τα 4 εκατ. δολ. που έχει εξασφαλίσει από την Dell, τη Ford και τις κρατικές επιχορηγήσεις, η Ecovative σύντομα θα ξεκινήσει να κατασκευάζει μία νέα μονάδα με πολλαπλάσια δυναμικότητα. Εξάλλου, για κάθε τέτοιο εργοστάσιο θα χρειάζονται σχετικά λίγα κεφάλαια, αφού ο απαραίτητος εξοπλισμός είναι αρκετά φθηνός. Παράλληλα, το κόστος λειτουργίας θα είναι αρκετά μικρό – για να «καλλιεργηθεί» το προϊόν της Ecovative, το μόνο που χρειάζεται είναι ευνοϊκές συνθήκες για την ανάπτυξη των μανιταριών, δηλαδή ήπιες θερμοκρασίες, υγρασία και σκοτάδι. Επομένως, τα εργοστάσια αυτά όχι μόνο δεν θα επιβαρύνουν τα τοπικά οικοσυστήματα, αλλά θα δώσουν και μία λύση για τη διαχείριση των γεωργικών αποβλήτων, αξιοποιώντας πρώτες ύλες που δεν μπορούν να χρησιμοποιηθούν ούτε καν για ζωοτροφές.

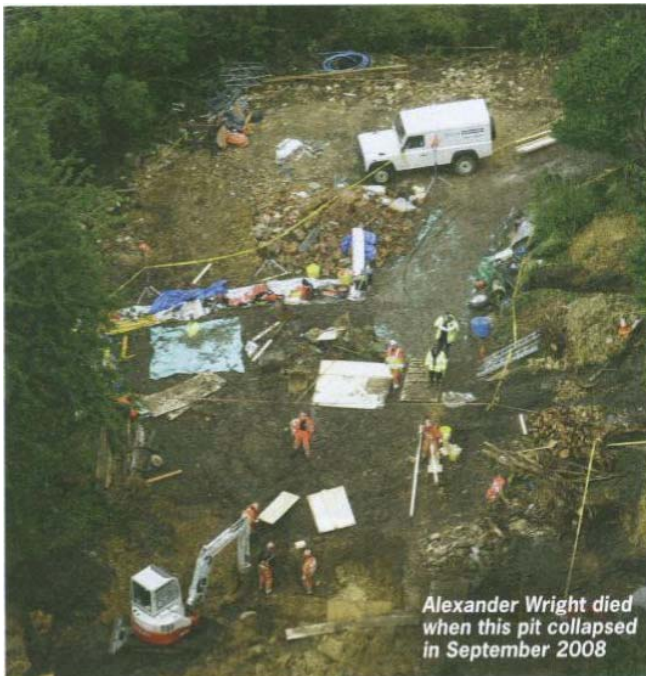
(Κώστας Δεληγιάννης / Η ΚΑΘΗΜΕΡΙΝΗ, 16.04.2011)

Corporate manslaughter verdict sends out strong H&S message

The first trial of a company for corporate manslaughter has ended with a guilty verdict for the site investigation firm Cotswold Geotechnical Holdings (CGH).

A fine of £325,000 has been imposed. Though less than the £500,000 maximum possible under the Corporate Manslaughter Act 2007, it is sufficiently large to be a severe warning to the construction industry of the perils of ignoring health and safety regulations, according to sentencing judge Justice Field.

It could be enough to bankrupt the relatively small company which must pay the money in annual installments over 10 years. Such a result would be "unfortunate", but was an unavoidable possibility of the "serious breach of duty revealed by the case".



The trial at Winchester Crown Court ended in mid-February when the firm was found to have caused the death of 27-year-old junior geotechnical engineer Alexander Wright in September 2008. The firm had denied the charge, but was found guilty by the jury after just an hour and a half of deliberation.

"[CGH director] Peter Eaton thought he knew better than the long-established guidance," said Justice Field. "In this he was gravely and culpably mistaken. It set a lamentable example for young geologists like Wright."

He said Eaton had also failed to heed a warning given to him by the Health and Safety Executive (HSE) in 2005, or to act on his pledge to the HSE to improve his way of working. "That assurance was never honoured," said Justice Field. "He continued in the same way."

Wright died of traumatic asphyxia on a site in Briscombe, Gloucestershire, when a 3.8m deep trial pit that he was working in collapsed, and the weight of the soil crushed his lungs. He was alone on site at the time of the accident.

The prosecution had accused the firm of failing to follow its own safety guidelines by having an unsupported trial pit over 1.2m deep and allowing an employee to enter it while alone on site (*Ground Engineering*, last month).

Richard Lissack QC, defending, told the court that Wright knew he should not enter a trial pit without supervision, and that he had sufficient training and experience to know that the pit could be dangerous. Lissack had claimed that Wright's death was due to his own "miscalculation" rather than to his company's working practices.

"Had this young man done as his company always did, there is a very good chance he would be alive," Lissack, defending, told the court.

"That talented young man miscalculated his activity that afternoon," he said. For that miscalculation he paid the most terrible price."

Lissack, also said CGH's practice of entering unsupported trial pits deeper than 1.2m was not down to CGH director Peter Eaton's way of working being "slapdash" or stuck in the past.

"It was because this was how things were done [in the industry]," Lissack said.

He said Eaton was not wrong to leave Wright alone on site, because - witnesses had agreed - there was no need for him to enter any of the pits. It had been agreed that the pits would be backfilled and boreholes used instead.

Lissack added that there was no reason why Eaton should have specifically told Wright to stay out of the pit, as Wright would have known it was dangerous and unnecessary.

In addition, the court heard, there was "no need for Mr. Eaton to have been there at all", because the quotation CGH had given to carry out the work was based on one excavator driver and one engineer, not two.

Lissack told the jury that CGH's way of working was "rather more commonplace", and the case was "not nearly as clear-cut", "as the prosecution would have you believe".

He argued that industry guidance, which says that workers should not enter unsupported excavations more than 1.2m deep, "gives best advice to a broad sector" rather than dictating a hard rule.

A more risk-based approach to health and safety has become common in recent years, Lissack said. "Some years before 2008, the absolutism had gone."

He had urged the jury not to base its decision on industry guidance. "You are not here to promote some national standards," he said.

Lissack accepted that CGH's way of operating was in some ways "genuinely deficient". However, he said CGH's failings were not causative of Wright's death nor deserving of the label "gross", and therefore the company should not be convicted under the 2007 Act.

The landmark case centered in the implementation of health and safety guidance, including British Standards BS6031: Code of practice for earthworks, BS5930: Code of practice for site investigations, and the ICE's Specification for Ground Investigation.

Mark Ellison QC, prosecuting, said that CGH failed to enforce its own health and safety rules and disregarded industry standards.

The jury heard detailed discussions about whether the pit in question should have been shored up or supported in some way; whether soil samples should have been taken from

ground level instead; whether CGH employees were made aware of health and safety rules; whether Wright should have been left alone on site with open pits.

It also heard opposing views about whether the industry standard that unsupported pits below 1.2m should never be entered was a hard rule or flexible guidance.

The trial could have serious implications for how health and safety guidance is enforced.

Standing Committee on Structural Safety (SCOSS) chairman John Carpenter said that the case could jolt engineering firms to review their health and safety arrangements. Too many companies establish health and safety measures but fail to enforce or document them, he said.

"It will be a massive wake-up call for companies. There are a lot of companies that have the procedures and then sit back and think that's taken care of. Unless they're being reviewed and audited, senior management don't know whether they're being enforced."

The Corporate Manslaughter Act 2007 was created to hold organisations to account if a workplace death is caused by serious managerial failures.

Legal firm Davies Arnold Cooper partner Fiona Gill said small companies should think about how a serious accident could affect their business. "Clearly, a conviction under the Corporate Manslaughter Act [2007] could threaten the future of small companies," she said.

SUMMARY OF THE TRIAL

28 January

Mark Ellison QC, prosecuting, told the court that Health & Safety Executive (HSE) officials had warned CGH in 2005 after a former employee expressed concern about having worked in trial pits without formal training. He said Eaton then told HSE that he would use shoring for all future trial pits, or make sure their sides were battered back.

The court heard that CGH's own health and safety rules, written by Eaton in 1992, agreed with British Standards and ICE guidance in saying "timbering or other support must be used" in trial pits over 1.2m deep, and that such pits should not be entered by employees when alone on site.

The court heard that Eaton was aware of British Standards regarding pits deeper than 1.2m. The court heard that on the day of the accident, Wright told site owner Mark Clubb that because CGH was a small firm he could enter unsupported trial pits, but if it were a larger firm "like Mowlem" it would not be allowed.

2 February

Former CGH employee Alex McIver, a colleague of Wright's, told the court he felt that unsupported trial pits were dangerous, but that Wright would have been a good judge of the risk.

8 February

The court was shown a DVD of police interviewing Eaton, who said he was "absolutely confident" Wright knew what he was doing. He said it was "absolutely essential" that workers did not enter pits when alone on site. Eaton said he had been using the same procedures to dig trial pits since 1971. Eaton said the 1.2m rule did not apply to engineers like Wright and himself, who had a practical knowledge of geotechnics.

9 February

Earth Science Partnership director John Campbell told the court it was "not surprising" to find a CGH employee inappropriately entering a pit, based on "how CGH conducted their business". Campbell said it would have been impossible to save a man from a pit collapse without immediate action by an excavator.

10 February

The defense read a statement by Eaton, saying Wright should not have entered the pit alone. He said he had made it clear that the pit in question was unsatisfactory and that a borehole would be used instead. The court heard that CGH had a rule that no-one should enter a trial pit without another person watching.

The court heard that Wright had sufficient knowledge and experience to assess risks. Lissack told the court that engineering geologists can make their own assessments of whether it is safe to enter a trial pit. The pit which killed Wright was dug in "firm to stiff clay all the way down", the court heard.

Eaton said that shoring was inappropriate where workers will usually only enter a trial pit for less than a minute as it was disproportionate to the risk. Consultant Simpson Associates partner Martin Partridge said Eaton's methods were no different from any other company doing site investigations with whom he had worked. He said it was typical for unsupported pits up to 2m deep to be entered, if the ground conditions were firm. The 1.2m rule is "a generic assessment", he said, and may be too cautious for firm soils. Plant hire contractor Barry Hawkins Contracting owner Frederick Hawkins said entry into unsupported pits deeper than 1.2m does still happen and he does it himself.

11 February

Ellison summed up the prosecution's case, arguing that the way CGH's trial pitting was managed was a cause of Wright's death. Of one former CGH employee he said: "he was never given any guidance, he was left to make his own decisions" about entering pits. Another former employee said that Eaton told him not to enter unsupported trial pits of greater than 1.2m when working on a site for Bovis because "they are pretty hot on health and safety", the court heard. This showed that Eaton moderated his behaviour dependent on who he was with, Ellison said.

14 February

Lissack summed up the defence's case saying the tragedy was caused by Wright's own error of judgment when he chose to enter the pit while alone on site, against CGH's rules.

15 February

Gutty verdict was returned after just 90 minutes.

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Ο καταστροφικώτατος σεισμός και το tsunami της 11^{ης} Μαρτίου στην Ιαπωνία και το σοβαρώτατο πυρηνικό ατύχημα που προκάλεσαν στο εργοστάσιο της Fukushima εξακολουθούν να απασχολούν όλα τα διεθνή μέσα ενημέρωσης και βεβαίως την επιστημονική κοινότητα. Δεκάδες άρθρα σχετικά με σεισμούς και tsunami και τρόπους αντιμετώπισης των προβλημάτων που προκαλούν δημοσιεύθηκαν τις ημέρες μετά το συμβάν και εξακολουθούν να δημοσιεύονται σε εφημερίδες, ηλεκτρονικές σελίδες και επιστημονικά περιοδικά, πολλά εξ αυτών εξαιρετικού ενδιαφέροντος. Στο Παράρτημα αυτό συνεχίζουμε την παράθεση δημοσιευμάτων και σχολίων σχετικά με τους σεισμούς στο Christchurch της Νέας Ζηλανδίας και στο Tohoku της Ιαπωνίας, ενώ στο κυρίως σώμα του τεύχους και στην ενότητα ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ παραθέτουμε δημοσιεύματα για τους σεισμούς γενικότερα.

A seismograph for ancient earthquakes

Earthquakes are one of the world's biggest enigmas — impossible to predict and able to wreak untold damage within seconds. Now, a new tool from Tel Aviv University may be able to learn from earthquakes of the ancient past to better predict earthquakes of the future.

Prof. Shmuel Marco of Tel Aviv University's Department of Geophysics and Planetary Sciences in the Raymond and Beverly Sackler Faculty of Exact Sciences and his colleagues have invented a new tool which he describes as a "fossil seismograph," to help geophysicists and other re-searchers understand patterns of seismic activity in the past.

Inspired by a strange "wave" phenomenon he studied in disturbed sediment in the Dead Sea region, Prof. Marco says the new tool, developed with input from geologists and physicists, is relevant to areas where earthquakes affect bodies of water, like the West Coast of the United States. It also can help engineers understand what's at risk when they plan new hydroelectric power plants. The new research was published in the journal *Geology*.

A geophysical yardstick for centuries past

"Current seismographical data on earthquakes only reaches back a century or so," says Prof. Marco. "Our new approach investigates wave patterns of heavy sediment that penetrates into the light sediments that lie directly on top of them. This helps us to understand the intensity of earthquakes in bygone eras — it's a yardstick for measuring the impact factor of earthquakes from the past."

Prof. Marco, his departmental colleague Prof. Eyal Hefetz, and doctoral student Nadav Wetzler took a highly technical look at layers of mud at the Dead Sea. The layers were originally stratified in a very stable manner, but now heavier sediment appears to have been pulled up into the lighter sediment.

The researchers propose that the physics governing the sediment patterns is similar to a phenomenon found in clouds and sea waves but in the case of rocks it was the earthquake shaking (rather than wind) that triggered the formation of waves. The scientists call it the "Kelvin-Helm-

holtz Instability," which describes a theory of turbulence in fluids. The Tel Aviv University team applied this theory to analyze the deformation of sediment caused by past earthquakes.

Earthquakes cause deformation in rocks and sediment. Using the basic principles of friction, the researchers considered the geometry of the shapes they found in the Dead Sea sediment and combined it with a number of other parameters found in physical science to calculate how earthquakes from the past were distributed in scale, time and place.

The bigger geological picture

Prof. Marco and his colleagues found that the deformation begins as moderate wave-like folds, evolves into complex recumbent folds, and finally exhibit instability and fragmentation. The deformation process advances depending on the earthquake size — the stronger the earthquake, the more intense the deformation.

The seismological record for fault lines like those near Jerusalem and Los Angeles simply isn't old enough to predict when the next quake might strike. "We've expanded the window of observation beyond 100 years, to create, if you will, a 'fossil seismograph,'" says Prof. Marco. He adds that the tool is only relevant in earthquake zones that intersect with bodies of water such as lakes or the sea.

But it could be very relevant to geologists studying earthquake patterns in areas like the Salton Sea in Colorado. The Salton Sea, only 100 years old, is located directly on the San Andreas Fault in California's Border Region.

American Friends of Tel Aviv University (www.aftau.org) supports Israel's leading, most comprehensive and most sought-after center of higher learning. Independently ranked 94th among the world's top universities for the impact of its research, TAU's innovations and discoveries are cited more often by the global scientific community than all but 10 other universities.

Internationally recognized for the scope and groundbreaking nature of its research and scholarship, Tel Aviv University consistently produces work with profound implications for the future.

(ScienceBlog, March 14, 2011)



Making buildings safer with earthquake shock absorbers

NEW YORK (CNNMoney) -- As Japan recovers from its devastating earthquake, one small company in upstate New York is hoping its innovative technology could help make the country's buildings safer from future quakes.

Taylor Devices, a 100-employee manufacturer based in North Tonawanda, N.Y., sells patented earthquake shock-absorbers, which stabilize buildings, bridges, and elevated freeways during temblors to help prevent them from falling.

Although it will be a while before Japan starts to rebuild, when it does, the company's devices could help create more stable buildings, says CEO Douglas Taylor.

Cold War military technology: Among other things, Taylor Devices sells dampers, or shock absorbers, which diss-

pate the energy of the earthquake before it bends or damages a building, explained Taylor.



Douglas Taylor, CEO of Taylor Devices, stands next to earthquake shock absorbers used on the Sutong Bridge in China, a 4.7-mile long cable suspension bridge.

The technology increases the earthquake resistance of a building by threefold, he said. Dampers are based on technology first developed by the military to protect U.S. missile silos against Russian attacks during the Cold War.

Taylor's father started the company in 1955, and through the Cold War, the only customer was the U.S. government. The company still manufactures all of its products in upstate New York.

Because Taylor Devices started developing the patented technology earlier than many of its competitors, it has been able to build strong customer bases in other countries.

Seventy percent of the company's sales are made outside the country, 40% of total sales are from Asia, and 10% from Japan. Taylor Devices has worked on more than 350 building and bridge projects worldwide, including the Guggenheim Museum in New York and the Seattle Mariners' baseball stadium. Generally, its technology is used in large commercial buildings.

Right now, eight of its employees are in a sales office in Yokohama, close by Tokyo; the company has installed its devices in 22 buildings and bridges in Japan. All 22 sites seem to have survived the earthquake without suffering any damage, Taylor said.

The recession trimmed the company's sales last year by 15%, but exports to Asia grew, according to company documents. And Taylor expects exports to continue rising.

"Other Asian countries will look at this and say: 'Oh my gosh! If it happened in Japan, it could happen here! What are we going to do to be sure this doesn't happen to us?'" Taylor said.

The company, which added employees and manufacturing capacity last year, is prepared to expand more if demand warrants, Taylor says.

He isn't the only one betting on the company's ability to make Japan's buildings safer. Investors sent the company's stock surging as much as 33% higher during Friday morning trading but lost half its gains by Friday's close. Monday shares ended at \$5.70, up just 1%.

(Catherine Clifford, CNNMoney.com March 15, 2011)

California "big one" expected to pale next to Japan quake

When the seismic "big one" hits California, scientists doubt it will be quite as powerful as the earthquake that struck Japan last week although it could do plenty of damage.

The colossal California quake considered inevitable and long overdue is most likely to strike along the southern end of the famed San Andreas Fault and register a magnitude of 7.5 or greater, many times less powerful than the 9.0 temblor that rocked Japan on Friday, geologists say.

Still, an earthquake damage forecast prepared in 2008 for the U.S. Geological Survey by geophysicists and engineers envisions a calamity that would leave 2,000 people dead, 50,000 injured and 250,000 homeless.

That scenario is based on the premise of a magnitude 7.8 quake rupturing the San Andreas in the desert east of Los Angeles and radiating with catastrophic fury into the nation's second-largest metropolitan area.



The skyline of San Francisco and the Golden Gate Bridge appear above the evening fog as the sun sets on the Marin Headlands in Sausalito, California April 18, 2009.

Such a quake could be expected to topple 1,500 buildings, badly damage another 300,000 and sever highways, power lines, pipelines, railroads, communications networks and aqueducts. Property losses of more than \$200 billion are projected.

The hypothetical quake also would ignite about 1,600 fires, some growing into conflagrations that would engulf hundreds of city blocks.

Experts predict the biggest long-term economic disruption would come from damage to water-distribution systems that would leave some homes and businesses without running water for months.

"The lesson is you don't need a magnitude 9 to cause extensive damage," said USGS spokeswoman Leslie Gordon.

The quake scenario for the southern San Andreas does not foresee damage to the nearest of the state's two nuclear power plants, the Southern California Edison-owned San Onofre station between Los Angeles and San Diego.

Both Edison and Pacific Gas & Electric, owner of the Diablo Canyon plant to the north at San Luis Obispo, say their facilities are built to withstand quakes far greater than nearby faults are capable of producing.

And unlike Japan, California faces little if any risk of tsunamis from its own quakes.



But substandard construction poses a bigger problem in California, said Lucy Jones, a USGS geologist who co-authored the agency's quake scenario.

"The Japanese have done a better job than we have done of retrofitting older buildings," she said on Tuesday.

SEISMIC ODDS

USGS studies put the probability of California being hit by a quake measuring 7.5 or more in the next 30 years at 46 percent, though the extent of damage will depend on where in the state it occurs. The likelihood of a 6.7 quake, comparable in size to the temblors that rocked San Francisco in 1989 and Los Angeles in 1994, is 99 percent statewide.

The Los Angeles basin is especially vulnerable to violent shaking from earthquakes because the area is heavily populated and built on motion-sensitive sediment that runs four miles deep before hitting bedrock, USGS geologist Erik Pounders said.

The 9.0 quake that struck Friday off Japan's northeast coast, unleashing a deadly tsunami and a nuclear power crisis, was the biggest in that island nation's modern history. The death toll is expected to surpass 10,000, and the quake ranks as the fifth most powerful in the world for the past century.

Its force was roughly equivalent to the power of 30 quakes like the one imagined in the 2008 USGS scenario.

Geologists believe a 9.0 quake is virtually impossible along the San Andreas, a network of "strike-slip" faults smaller and more fragmented than the great chasm that exists where two continent-sized plates of the Earth's crust meet along the Japanese islands.

This subduction zone beneath the Pacific, where one tectonic plate is thrust up over another, is capable of producing the biggest quakes on Earth, on an order of magnitude higher than any recorded in California.

Offshore quakes generated from subduction zones, also found along Alaska's Aleutian Islands chain, can produce tsunamis because of the tremendous volume of water they suddenly displace on the sea floor.

The horizontal ruptures of California's seismic faults, even those offshore, displace little or no water, and thus pose no tsunami threat, except in cases when they trigger underwater landslides. Even those tsunamis, however, are small compared with the ones caused by subduction quakes at sea.

At the high end of quake magnitudes considered possible in California was the massive rupture of the San Andreas Fault in northern California which caused the devastating 8.3 quake that laid waste to San Francisco in 1906.

The last "big one" of equivalent size to strike south of the San Gabriel Mountains, near Los Angeles, was some 300 years ago, and the average interval between such quakes in that region is 150 years.

(Steve Gorman, Reuters / Robert Galbraith, Wed Mar 16, 2011)



California has failed to identify thousands of buildings vulnerable to quakes

Earthquakes in Japan and New Zealand have focused attention on quake safety and the vulnerability of brittle concrete buildings. But efforts to identify and retrofit them have stalled because of the high cost.

California has failed to identify and retrofit thousands of brittle concrete buildings despite years of warnings from scientists that the structures are highly vulnerable to collapse during a major earthquake.

Officials have known as far back as the 1971 Sylmar quake that such buildings can collapse, but efforts to address those weaknesses have stalled because of the high cost of retrofitting the buildings.

Experts estimate that between 25,000 to 30,000 concrete buildings were erected before building codes were strengthened in the mid-1970s, including some heavy clusters in downtown Los Angeles and along Wilshire and Hollywood boulevards.



Patients at the Veterans Administration Hospital in San Fernando wait to be evacuated to other facilities after the Sylmar earthquake destroyed the hospital in February 1971. (Los Angeles Times)

The devastating earthquakes in Japan and New Zealand have focused more attention on the vulnerability of such buildings.

For California, the quake in Christchurch was particularly relevant because it served as a fresh reminder of the major weaknesses in so-called non-ductile concrete buildings. Numerous concrete structures failed in New Zealand during the Feb. 22, magnitude-6.3 earthquake, including the six-story Canterbury Television building, where 100 people were believed to have been buried, including many TV station employees and 60 students.

The collapse of the CTV building, which housed a local TV station, clinic and English-language school, was particularly shocking. It was built in 1986, 15 years after the Sylmar earthquake, and after codes had been changed in New Zealand and California to improve buildings' ability to withstand shaking. Yet the CTV building collapsed in a manner consistent with a brittle concrete building, said Thomas Heaton, professor of engineering seismology at Caltech.

Experts both in Christchurch and Los Angeles said such buildings are worrisome because it's so difficult for people inside to survive if large slabs of concrete fall on top of them.

"They're killers. In my opinion, they could take many thousands of lives in a Southern California earthquake, especially one inside the Los Angeles Basin," Heaton said. "When they fail, the failures are just unsurvivable. You just end up with a pile of floor slabs, one on top of another."

Identifying potentially unsafe buildings is crucial, Heaton said, because being in a building designed to withstand major shaking is a "big part of your survivability in an earthquake," Heaton said. "If you choose poorly, you're definitely in harm's way."

In the last decade, the Los Angeles City Council has considered a plan to identify brittle concrete buildings. But the plan's author, Councilman Greig Smith, was forced to shelve the plan as support evaporated and the recession left little money to address the risk.

The California Seismic Safety Commission has also recommended that the state identify brittle buildings, both public and private, and figure out a way to reduce the risk. But lawmakers have taken little action.

"Given the economic situation now, no one has got any money to do it," said Richard McCarthy, the commission's executive director.

Many of the larger buildings in question were constructed in the 1950s, '60s, and '70s, during the post-World War II building boom in which bigger was better, and companies throughout a growing California needed larger, multistory buildings that could house many more employees and residents, and larger parking structures that could hold more cars.

But in creating taller, slender buildings, engineers unknowingly took greater risks, and some buildings carried a fatal flaw. Made out of a concrete frame or walls but lacking sufficient reinforcing steel, these buildings were found to be brittle during an earthquake, as if the frame was built out of saltine crackers. When shaken during an earthquake, the floors and columns can snap, collapsing the entire building.

And they did.

During the 1971 Sylmar earthquake, the first floor of the just-built six-story Olive View Hospital was pulverized, killing three people. The nearby Veterans Administration hospital all but disintegrated into a pile of rubble. Forty-seven people died there.

California has made efforts to improve the safety of some structures since the Northridge earthquake in 1994, focusing on freeways and hospitals. But some hospitals have struggled to comply with state law that they be quake-resistant. In 2013, 258 buildings at 84 hospitals will remain at significant risk of collapsing in an earthquake, according to data supplied by hospitals to the state. California has 426 hospitals.

Identifying problem buildings requires a review of design records and on-site inspections.

"You cannot go out and look at the building real quickly and in all cases be able to say, 'This is dangerous,' or 'This is not,'" said Craig Comartin, a structural engineer who is former president of the Oakland-based Earthquake Engineering Research Institute.

Fixing those buildings is even more costly. One solution is to wrap the concrete columns with carbon-fiber mesh. The idea is to hold the concrete column together when the building is shaken, like wrapping a bag around a pile of toy marbles.

"The only problem is you have to tear everything out to get to the column," Comartin said. Some business groups who

have opposed retrofitting said that in some cases it can be almost as expensive as erecting a new building.

Once vulnerable buildings are identified, officials face a difficult question: Should people who work or live in them be told about the risks?

Heaton said he would like to see it possible in California for workers and residents to know if their buildings are vulnerable in quakes. Placards are required for unreinforced brick buildings in California, but most other buildings aren't labeled.

Because of the lack of information, "it just sounds to the public as if there's nothing they can do about it; that it's all just fate, that it's too hard to build a building that's earthquake-resistant," Heaton said. "In fact, choosing the wrong building can really put you in jeopardy. And if you're in the right building — you can have all kinds of earthquakes — and it's not going to collapse."

The debate over warning signs is also occurring in New Zealand. Graeme Beattie, a former president of the New Zealand Society for Earthquake Engineering, said a temporary placard system is being used in Christchurch to alert residents of potentially dangerous buildings. The system uses green, yellow and red cards to indicate risk levels.

But Beattie said the cards are a short-term solution only because they are based on an "educated guess" by engineers who must evaluate buildings at a rapid pace. Part of the discussion now is about whether a broader and more permanent system should be in place in New Zealand to notify residents of vulnerable buildings.

"There are quite a lot of engineers, including me, who would like to see that done so that the public could see what risk they were taking in going to buildings," Beattie said. "But you have to balance technical issues with the political issues that could be involved."

(Rong-Gong Lin II and Sam Allen, Los Angeles Times, March 17, 2011)



California plans new research on tsunami dangers

Within the next three years, the state of California plans to produce statewide land use planning maps of tsunami risk that will help coastal communities, harbor masters and port officials better prepare for dangerous waves.

The state released tsunami inundation maps in December 2009 that show potential flooding along the coast in a worst-case scenario, including from events that might occur only once in thousands of years, like tsunamis spurred by undersea landslides.

The new maps will show the risk from events likely to happen within the next few hundred years, said Rick Wilson, engineering geologist with the California Geological Survey.

In most cases, that will mean less extreme flood scenarios. For instance, the current inundation maps show water potentially reaching as far as two miles inland in Huntington Beach and Newport Beach. But for events likely to occur every 500 years or less, wave action would likely stop within 100 feet of the oceanfront, Wilson said.

The worst-case inundation maps are intended to be used to prepare for evacuations. Local communities might use the planning maps, on the other hand, to decide where to put schools, hospitals, police and fire stations, Wilson said.

The maps will also show where hazard zones lie within harbors and ports, and safe areas offshore where boats can be taken when a tsunami is imminent. That could limit economic losses in future events.

While harbor masters were generally well prepared for the surges that came from Japan, Wilson said there is a need for more public education about tsunami risks. For instance, some people were piloting their boats to or from shore when the surges hit.

"We could have had many more casualties during this event," Wilson said. (The only reported death was a man in Crescent City who was swept away while attempting to photograph the waves).

California receives about \$1 million a year from the federal government through the National Tsunami Hazard Mitigation program to use for public education, preparation and research. The law authorizing the money sunsets in 2012.

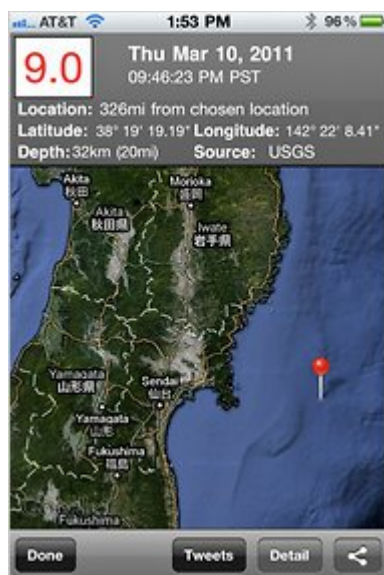
(Los Angeles Times/L.A. Now blog, March 21, 2011)



App Smart Extra: Earthquake Apps

Earthquake-related information is freely available from the Web site of the United States Geological Survey, but as is often the case with government data, it's much better viewed through a mobile app.

Take, for example, Earthquake Lite, which is free for [Apple](#) or Android. The software displays global seismic activity in a nicely designed format, and offers lists of events that you can filter by location, magnitude and time.



The Earthquake Lite app.

Those who pay for the iPhone app can receive notifications of any tremor registering 6.0 or more on the Richter scale. Reviewers on iTunes have complained about alerts arriving in the middle of the night, though, so until the developer tweaks the app to allow you to silence the notifications – an

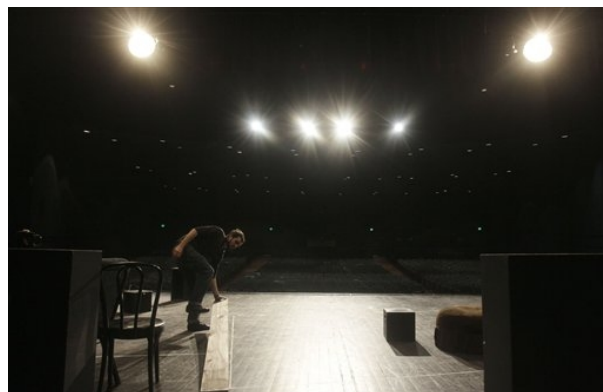
upgrade that the company said would arrive next week – you'll do well to skip it.

(Bob Tedeschi, The New York Times, 22 March 2011)



Japan Quake Serves As Reminder for Californians

The devastating earthquake in Japan has served as a painful reminder of the fact that California has struggled on a number of fronts to protect the state from the next big one, namely when it comes to bolstering at-risk buildings.



Casey Fern, an after school program consultant, paints a line on the stage in the auditorium at Oakland Technical High School in Oakland, Calif., Friday, March 18, 2011. Each time California is struck by a disastrous quake_ such as the 1989 Loma Prieta temblor and the 1994 Northridge quake_ government officials press for tougher standards and construction. But the costs and complexity of making buildings, roadways, dams and levees safer sap political will or slow down projects that could spell the difference between death and survival when the Big One hits.

California's five-year-old program for helping cash-strapped public schools seismically retrofit their most vulnerable buildings has so far disbursed only a tiny portion of the \$200 million set aside under the effort. The San Francisco-Oakland Bay Bridge, damaged in the 1989 earthquake, still hasn't been replaced. Thousands of old hospitals and apartment buildings remain despite being at serious risk in a quake.



Casey Fern, an after school program consultant, is interviewed in the backstage area of the auditorium at Oakland Technical High School in Oakland, Calif., Friday, March 18, 2011.

"Everybody owns risk if you live in earthquake country," said David Bonowitz, a structural engineer. "And individuals have to be responsible for their own risks just like public policymakers and city officials have their own responsibilities."

Since the 1989 Loma Prieta earthquake in San Francisco Bay area and the 1994 Northridge temblor near Los Angeles, billions of dollars have been spent on retrofitting thousands of unreinforced brick buildings, roads, bridges and university buildings.

Still, experts say thousands of potentially dangerous concrete school buildings, high-rise apartments and hospitals that were built before California changed its building code in 1976 have not even been identified. The especially vulnerable buildings were made with "non-ductile" concrete, which was used in older structures and did not hold up well after the recent quake in New Zealand.



A class meets in the auditorium building at Oakland Technical High School in Oakland, Calif., Friday, March 18, 2011.

Craig Comartin, a former president of the Earthquake Engineering Research Institute, said the state has 25,000 to 30,000 non-ductile concrete buildings.

Bonowitz said the main mistake planners have made in the state's approach to preparedness is thinking everything can be addressed before the next disaster. Earthquake safety experts now realize the focus should be on shoring up structures that will help a community rebound quickly — hospitals, large apartment buildings and schools.

"Go after buildings the community will need after the earthquake that are key to community resilience," Bonowitz said. "Structural problems are important, but we need to know the occupancy and use of the building too."



Students walk past the auditorium at Oakland Technical High School in Oakland, Calif., Friday, March 18, 2011.

Meanwhile, \$7.2 billion will be spent to replace the San Francisco-Oakland Bay Bridge, which is scheduled to be opened to traffic by the end of 2013, and has become the largest public works project in state history.

But California has still not met its preparedness goals for school buildings.

The \$199.5 million Seismic Mitigation Program, which was approved by voters in 2006 to help schools pay for retrofits, has struggled to find projects that qualify under its strict guidelines. It has awarded just \$4.7 million to three districts, according to the state Office of Public School Construction.

The state has identified dozens of school buildings it believes are in danger of collapse in a strong quake, but most continue to be used with no plans of retrofitting, according to documents and interviews.

"This is just one more example of things we're not doing to make sure our children are safe and educated," said Carol Kocivar, president of the California PTA. "It's terrible when the safety of children is an afterthought."

Protecting school buildings from earthquakes has been an enduring debate over the years in California.

In 1999, California's Legislature passed a law that required the state to conduct an inventory of all public school buildings made of concrete that were constructed before modern earthquake safety standards were enacted in 1976.

In 2003, the state Department of General Services, which oversees the program, identified thousands of school buildings using old blueprints, and estimated that billions of dollars were needed to fund retrofit projects — a tall order for many districts already struggling to fund basic school services.



In this photo taken Thursday, March 17, 2011, construction being done on the new Bay Bridge is seen from Treasure Island in San Francisco. As strong temblors in Japan and New Zealand have brought renewed scrutiny to earthquake preparedness, the quake prone state has struggled on a number of fronts: old concrete school, hospital and apartment buildings remain while more than \$7 billion and decades of planning have still not resulted in a replacement to the quake damaged San Francisco-Oakland Bay Bridge.

So in 2006, voters approved the program, meant to provide a pool of cash to help schools cope with the costs.

But the program has been plagued by myriad problems: Much of the data needed to identify the most dangerous buildings relied on old blueprints. The result was an inaccurate list of buildings containing information on structures either no longer in use or ones that had been demolished.

In addition, financially struggling districts that actually have unsafe buildings on the list were unwilling to take on the costs and uncertainty of a long retrofit project, even with state help.

"Funding ... to address the most serious public school seismic issues has been languishing with only three projects approved to date," the state's Office of Public School Construction wrote in a draft report obtained by The Associated Press.

The report was delivered to the California Seismic Safety Commission on March 10, the day before a 9.0-magnitude quake struck Japan.

To improve the program, officials have provided grants to districts that have buildings identified as the most dangerous in the state.



In this photo taken Thursday, March 17, 2011, visitors look at construction being done on the new Bay Bridge from Treasure Island in San Francisco.

"One of the biggest challenges we were hearing from districts was the seismic evaluation that is required before they could come forward for the funding," said Eric Lamoreaux, the acting deputy director of the state Department of General Services. "So the Office of Public School Construction worked to get this grant to go out and get engineers at school districts to get evaluations."

Of the 16 school districts in California with at-risk buildings, nine chose to participate in the evaluation process.

On Friday afternoon at Oakland Technical High School, dozens of music and theater students attended class in the auditorium, an aged concrete structure on the state's list. The cavernous concrete building, which is also used for after-school programs and neighborhood meetings, is located near the Hayward fault.

Oakland received a nearly \$30,000 structural engineering assessment grant from the state to help identify unsafe buildings and estimate costs of repair. The assessment identified five buildings in the Oakland Unified School District that needed seismic upgrades, with an estimated total cost of \$3.6 million to \$7.2 million.

The free assessment did little to help: Oakland has no plans to do retrofits anytime soon, said Troy Flint, a spokesman for the district.

"We barely have the resources to even do our core mission of instruction, let alone take on one of these major facilities projects," Flint said. "It's really symptomatic of the ... denigration of California's public education system and its financial status as a whole."

Another evaluation grant recipient was the Aromas-San Juan Unified School District in Monterey County, where a \$17,000 assessment found that seven 1960s-era concrete buildings at San Juan Middle School, located near the San Andreas fault, are susceptible to collapse.

Last summer, a structural engineer found the school needed \$900,000 to \$1.8 million in work. The district has been told it qualified for a hardship grant to cover the entire cost, but is still waiting to hear from state officials with details.

After years of seismic work in California, much remains to be done just to identify the thousands of dangerous buildings where thousands of residents attend school and live.

"The tough thing about these concrete buildings is that it's not obvious which are dangerous," said Comartin. "If I analyze a building built before (code changes), I have to look at drawings and do calculations before I know whether it's safe or not."

(Jason Dearen, Associated Press, March 22, 2011)



System protects historic buildings from earthquakes

UK-based engineers are helping to protect the world's historic buildings from earthquakes with a new anchoring system.

A team from Bath University and Newport-based company Cintec have developed the device, which dissipates vibrations from earthquakes, as part of the European NIKER project, which was set up to find ways of protecting cultural heritage from seismic activity.

The system also includes a monitoring sensor that collects information about a building's reaction to an earthquake and which may one day function as a form of early-warning system.

Recent events in Japan and New Zealand have highlighted the severe threat earthquakes pose to historic buildings — as well as to human life — while the 2009 quake in L'Aquila in Italy showed how Europe's cultural monuments are also at risk.

Bath University PhD student Sara Paganoni said the project applied established energy-dissipation principles to historic buildings.

"It's a similar idea to what we use at the moment for dissipative systems, for example concrete or steel frames, which are common in Japan and the US," she told *The Engineer*.

"Because we are dealing with heritage buildings, which are quite sensitive in terms of aesthetics, we have to do something small scale."

The technology combines a so-called black-box dissipation system with Cintec's existing anchoring mechanism, which the company has used to reinforce historic buildings all over the world, including Windsor Castle and Egypt's Red Pyramid.

Cintec's anchor works as a load carrier at points of intersection between walls or points of known weakness. It comprises a steel bar surrounded by a fabric sock that expands

to fill the hole it's placed in and is held in place by micro concrete.

The system adds a patented device that uses friction between surfaces inside the box to absorb the energy from earthquake vibrations. This allows the structure to safely move by up to 25mm during an earthquake.

The effectiveness of the system varies according to the building specifications and the strength of the earthquake.

'Anything you do in the way of seismic activity is only mitigation. You can't say for sure what you can do,' said Cintec's managing director, Peter James. 'The bottom line is it gives you far more protection from a major earthquake and probably saves lives.'

The team will be testing the system at a church in L'Aquila over the next six months. The trial will enable the team to calibrate the monitoring sensor to give information about the connection where each anchor is placed and how the whole building behaves.

'This will give us a compact monitoring system that doesn't need designing every time but can be bought as an off-the-shelf system,' said Pagonini.

'We hope, depending on the data and analysis, to be able to use this system as an early warning as well.'

Cintec estimates that the system will cost less than £100,000 to develop over the three years of the project, which began at the start of 2010.

The NIKER project has a total budget of €3.5m (£3m), including €2.7m from the European Commission. It involves 18 institutes and commercial partners from across Europe.

(Stephen Harris, The Engineer, 24 March 2011)



Τα ντόμινο που στήνει ο Εγκέλαδος δεν πηγαίνουν μακριά

Οι μεγάλοι σεισμοί, όπως αυτός που χτύπησε πρόσφατα την Ιαπωνία, μπορούν να πυροδοτήσουν άλλους ισχυρούς σεισμούς σε απόσταση μέχρι 1.000 χιλιόμετρα, όχι όμως και στην άλλη άκρη της Γης. Το καθησυχαστικό συμπέρασμα προκύπτει από την ανάλυση δεδομένων για δεκάδες χιλιάδες δονήσεις τις τελευταίες δεκαετίες.

«Έπειτα από έναν κύριο σεισμό, ο κίνδυνος άλλων μεγάλων σεισμών αυξάνεται σε τοπικό επίπεδο, όχι όμως σε παγκόσμιο» καταλήγει η δημοσίευση στο περιοδικό Nature Geoscience.

Η ομάδα του Τομ Πάρσονς, σεισμολόγου στην αμερικανική γεωλογική υπηρεσία (USGS), εξέτασε δεδομένα από σεισμογράφους σε όλο τον κόσμο για μια περίοδο 30 ετών, μέχρι το 2009. Στο διάστημα αυτό καταγράφηκαν 205 μεγάλοι σεισμοί, έντασης τουλάχιστον 7 βαθμών, καθώς και 25.222 σεισμοί μέτριας έντασης, 5 έως 7 βαθμών.

Οι ερευνητές εξέτασαν το κατά πόσο οι ισχυροί σεισμοί συνδέονταν με άλλους μεγάλους ή μέτριους σεισμούς σε διάστημα 24 ωρών μετά την εκδήλωσή τους.



Ο σεισμός της Ταϊλάνδης (σ.σ. Magnitude 6.8 – MYANMAR, 2011 March 24, 13:55:12 UTC) δεν φαίνεται να ήταν αποτέλεσμα του σεισμού στην Ιαπωνία

Η ανάλυση έδειξε αύξηση των μέτρων σεισμών, όχι όμως σε απόσταση άνω των 1.000 χιλιομέτρων. Στις περισσότερες περιπτώσεις, μάλιστα, το φαινόμενο ντόμινο περιοριζόταν σε αποστάσεις μικρότερες των 600 χιλιομέτρων, και συνήθως αφορούσε διαφορετικά σημεία του ίδιου σεισμικού ρήγματος.

Ενδείξεις για φαινόμενα ντόμινο που καλύπτουν αποστάσεις χιλιάδων χιλιομέτρων δεν βρέθηκαν στο αρχείο των μετρήσεων.

Εξάλλου, ένα τέτοιο φαινόμενο θα είχε ήδη γίνει αντιληπτό, επισήμανε ο Πάρσονς: Κάθε χρόνο συμβαίνουν στον κόσμο μόνο επτά σεισμοί έντασης άνω των 7 βαθμών, κατά μέσο όρο, οπότε θα ήταν εύκολο για τους σεισμολόγους να αντιληφθούν την ενδεχόμενη σχέση τους.

Τα αποτελέσματα της μελέτης βρίσκουν εξάλλου σύμφωνους τους περισσότερους ειδικούς, επισήμανε ο Κλάους Τζέικομπ του Πανεπιστημίου Κολούμπια, ο οποίος δεν συμμετείχε στην έρευνα. «Είναι θετικό που αυτό επιβεβαιώνεται με μια ενδελεχή μελέτη» σχολίασε για τα συμπεράσματα του Πάρσονς.

Το φαινόμενο ντόμινο ήταν το θέμα και μιας άλλης έρευνας που είχε δημοσιεύσει ο Πάρσονς το 2009. Στη μελέτη εκείνη εκτιμούσε ότι ο σεισμός που προκάλεσε το τσουνάμι της Σουμάτρας το 2004 είχε επηρεάσει το ρήγμα του Αγίου Ανδρέα στην Καλιφόρνια, σε απόσταση 8.000 χιλιομέτρων. Η δημοσίευση έκανε τότε λόγο για αύξηση του κινδύνου μικρών σεισμών, όχι όμως και μεγάλων δονήσεων.

Σύμφωνα με τον ίδιο τον ερευνητή, η νέα μελέτη δεν διαψεύδει την προηγούμενη, αλλά απλώς την συμπληρώνει.

Ο Πάρσονς διαβεβαιώνει επίσης ότι ο σεισμός των 9 βαθμών που κατέστρεψε τη βορειοανατολική Ιαπωνία δεν έδωσε καμία ένδειξη για φαινόμενο ντόμινο σε μεγάλες αποστάσεις -ο σεισμός των επτά βαθμών που χτύπησε την Ταϊλάνδη μερικές μέρες αργότερα δεν ήταν παρά σύμπτωση, εκτιμά ο ερευνητής.

Η τρομακτική φυσική καταστροφή στην Ιαπωνία «βρίσκεται σε συμφωνία με ό,τι είχαμε δει και παλαιότερα» αναφέρει.

(Newsroom ΔΟΛ, με πληροφορίες από Associated Press, 28 Μαρ. 2011)



Report: US Not Earthquake-Ready

The United States has not suffered a devastating earthquake for more than 100 years, and a new report says Americans wrongly believe they are earthquake-ready. The report from the National Research Council, an advisory body to the U.S. government, says recent events have revealed vulnerabilities.

The study's authors say Hurricane Katrina, which devastated New Orleans and the U.S. Gulf Coast in 2005, showed the United States is not resilient enough to bounce back quickly from a major natural disaster in an urban area.

The study, which was compiled by a dozen seismic experts, says earthquakes in the United States have been moderate to strong in recent decades, or have occurred in sparsely populated areas. The panel cited a recent earthquake exercise in Los Angeles, which showed that a magnitude 7.8 quake would result in staggering losses.

Most of the report was written prior to Japan's March 11 earthquake of magnitude nine, but panel chair Robert Hamilton says events there show how one problem can trigger another.

"In Japan, the earthquake triggered a tsunami and the tsunami knocked out the power, and the power being out made the nuclear reactor vulnerable," noted Hamilton. "And so a lot of times, when people plan for these events, they do not anticipate a compound event made up of cascading problems that build up."

The report recommends an 18-point plan for implementing the U.S. Strategic Earthquake Hazards Reduction Program, which was established by Congress in 1977. The report calls for better public education, creating short-term forecasting and early warning systems, improving building design for earthquake resilience and devising better techniques to retrofit old buildings. It also calls for enhanced earthquake simulations and evaluation of critical infrastructure, including electricity, highways and water systems.

Chairman Hamilton says the nation also needs to expand its focus beyond earthquake-prone states like California.

"For example, in the central Mississippi Valley area, there were three magnitude-eight earthquakes in 1811 and 1812," added Hamilton. "And there has not been a high level of activity ever since then. So there is a real complacency about addressing the earthquake threat in that area, and there are just a lot of vulnerable buildings."

He says parts of the eastern United States are also vulnerable. For example, Hamilton says in the United States, building codes and land-use plans are implemented and enforced at the local level, and local communities are reluctant to spend on a problem that occurs every one or two centuries.

"They have a lot of other things to worry about, and money is scarce and it is hard to convince people that they should put money into something that may not happen in their lifetime," Hamilton explained. "But still, the vulnerability exists."

Seismic experts say history teaches us to expect the unexpected.

The committee's proposals span 20 years. The report notes some measures are being implemented already, and it recommends the United States spend \$300 million per year during the next five years to become more earthquake-resilient.

(Mike O'Sullivan / Voice of America News.Com, 30 March 2011)



Earthquake-prone regions trade bricks for earthbags a sustainable building method

"The Ring of Fire" is a 25,000-mile hotbed of seismic activity

stretching north from New Zealand through East Asia and then returning south down the coasts of the Americas. Host to 90 percent of the world's seismic activity and over 81 percent of the world's most devastating earthquakes, this horseshoe-shaped area has shaken the countries that lie along its clashing tectonic plates.



Earthbag construction needs only to overcome cultural barriers in order to take off in the developing world.

Many of the countries located on the Ring of Fire are also developing countries, where the main modes of construction are still adobe clay or brick, neither of which are resilient against any type of seismic tremor.

In places like Pisco, Peru, a 7.9 magnitude earthquake like the one that struck in 2007, has the power to leave an entire city trapped beneath rubble. But, a new form of building, known as earthbag construction, is proving to be durable, sustainable, and environmentally friendly. So why isn't it more prevalent in the global south?

Pisco's recent history highlights the need for new building methods within the countries on The Ring of Fire. The 2007 earthquake destroyed over 80 percent of this coastal city. 500 Peruvians were killed and 15,000 were left homeless. Aid flooded into the city from all corners of the world for about six months, but global attention quickly turned to other matters, and Pisco was left to fend for itself.

Nearly four years later, the city is still in a state of chaos. Shantytowns are a way of life, buckets serve as bathrooms and families live under tarps where, with no walls or doors, they are frequent victims of robbers, targeting what little they do have.

Yet, as locals reconstruct their homes, they use the same unreliable building techniques of brick and clay that their ancestors used.

"This [brick and adobe construction] is what locals know, it's what they're used to, but another earthquake will hit,

it's inevitable," Navin Mayani, project manager for a local non-profit organization called Pisco Sin Fronteras (PSF) told **MediaGlobal**. "If they don't change the way they build their homes, the outcome will be the same as it was in 2007: more lives lost and more Piscoeans left homeless."

The idea of earth-filled bags as a stable building mechanism is not new. Over a century ago the idea was practiced during warfare to keep bunkers from flooding over. But more recently, an Iranian architect, Nader Khalili, perfected the idea as a method for building homes. Though his original intent was to build earthbag homes on the moon for NASA, the idea has since been employed around the world with unprecedented success.

The first earthbag home prototype was constructed in Guatemala in 1978. Since then the idea has taken off throughout the world from Uganda to Mexico, its most recent success being Haiti's Sun House, an earthbag building that successfully withstood the 2010 earthquake that left most of the country in ruin.

The science behind this method of construction is quite simple. Plastic bags of varying size, depending on the structure being built, are filled with sand, earth, or a simple earth-concrete mixture. They are stacked to form the foundation and walls of the building, and held in place by barbed wire, rebar, and mortar.

The method's advantages are overwhelming. First is the concept of sustainability, as all materials can be purchased for less than it would cost to build the same structure of brick or adobe earth. A cost analysis report carried out in Pisco found that for roughly \$2,500 you could construct an earthbag home from foundation to rooftop, the same price it would cost to construct a home of brick or cement.

Second, learning the craft of earthbag building is simple. Carson Lehman, the current earthbag project leader at PSF, told **MediaGlobal**, "It's a very simple construction technique, it doesn't require a lot of tools and it isn't a very technical building technique. A family can do this with a bit of guidance and can pretty much learn all there is to know in three or four days."

Finally, and perhaps most importantly, earthbags are earthquake proof. The geo-textile construction which comprises earthbag structures allows them to bend and flex with both seismic activity and hurricane-force winds. Bricks and cement lack this flexibility and therefore crumble when tremors arrive. And because earthbag homes have less thermal mass, they overheat less in hot climates and balance humidity levels more efficiently.

So why has this golden child of sustainable construction not taken off? "There are some cultural boundaries," said Lehman. "Aesthetically, local people aren't used to the look of an earthbag home. Here in Pisco, our first earthbag project, the community center, has the typical organic rounded shape of an earthbag structure and people are wary of it. They seem hesitant to learn the craft, much less implement it."

"I think eventually it will gain its own momentum, but for the foreseeable future, PSF is going to have to keep blowing the horn of the earthbag building. We'll need to have Peruvians training, and we can expand from there. As families build their own homes they're spreading knowledge, it's a lot of effort, but if it's a community process it could work."

Despite the cultural difficulties, earthbag buildings are slowly gaining recognition and sparking curiosity in Pisco.

"People may not be lining up to learn the craft yet, but they're at least asking questions about the method now," said Lehman. "I think the impact is yet to come; my vision

here is not for PSF to build 15 earthbag houses, but to teach enough Peruvians to do it so that 300 will go up. The ultimate goal is to save lives. The devastation is still evident here if you take time to look at the families. That's what we're trying to prevent, we want to prevent the loss of life."

The Ring of Fire's plate tectonics are an inevitable source of hardship and destruction; it is vital that safer and more sustainable forms of construction be adopted in countries victim to these shifting plates.

(Amanda Wheat / MediaGlobal, 4th April 2011)



California Looks to Update Quake Plans

If a 7.8-magnitude quake ripped the earth open along the southern San Andreas Fault this afternoon, it would cut a swath of destruction from the eastern desert to the Los Angeles basin.

It would pull down buildings, kill 1,800 people and ignite 1,600 fires, according to a scenario worked up by a team of scientists and used for the region's emergency-preparedness drills. Major roads, water pipes and power lines around Los Angeles and Orange counties would be severed, cutting off the region and slowing recovery and evacuation efforts.

In quake-prone California, the disaster forensics have begun—again.

The recent earthquakes in Japan and New Zealand have prompted officials in Los Angeles, San Francisco and elsewhere to re-examine their own building codes, disaster-response measures and recovery plans. In particular, the Japanese quake and tsunami have raised fresh concerns about California's two nuclear plants, which sit near fault lines that run through the central and southern parts of the state. The San Andreas is believed to be the most likely source of a big quake in southern California.

Local emergency planners are scouring for more information on Japan's situation so they can update their disaster procedures. "We will learn things, and we will make changes," said Jen Tucker, emergency planning officer for San Clemente, a city three miles from the San Onofre Nuclear Generating Station. The plant, built to withstand a 7.0-magnitude quake, sits on the Pacific coast within five miles of two fault lines, girdled by a 30-foot-high tsunami wall.

After each major quake around the world, L.A. sends city officials to assess the disaster response for lessons, said Deputy Mayor Eileen Decker. When they visited Chile after the 2010 earthquake there, they learned that tourists were especially vulnerable because they were unaware of evacuation procedures. As a result, Los Angeles aims more public-service announcements at its own tourists and has beefed up relations with hotel operators.

One immediate lesson from the Japan quake, Ms. Decker said, was how much more prepared the Japanese are than Californians. In Japan, preparedness means having hard hats and flat shoes at work desks and obeying evacuation orders, she said. In Los Angeles, it can be hard to talk people out of "wearing three-inch heels," in case they have to rush down many flights of stairs, Ms. Decker said.

Another common problem: persuading residents to leave their homes during disasters. "Every [wildfire] season we

have difficulty with individuals that insist on staying in their residences," she said.

Los Angeles County now will publicize its assessment of the risk to residents from nuclear disasters elsewhere as well, said Jonathan Fielding, director of the county's Department of Public Health. After Japan's damaged nuclear plants spread radiation, some Californians rushed to buy protective iodine tablets for fear the radiation could cross the Pacific.

In the Northern California counties of San Francisco, San Mateo and Santa Clara, too, officials are waiting for information on how well response plans worked in Japan and New Zealand before re-examining their own.

Since the 1989 Loma Prieta earthquake in the Bay Area, San Francisco's building code has been updated eight times, incorporating "knowledge obtained from every major seismic event" world-wide, said Vivian Day, director of the city's Department of Building Inspection. Still, an estimated 17% of San Francisco's buildings would be destroyed or made unsafe to occupy by a 7.2-magnitude earthquake, and 200 to 300 people would be killed, according to a 2010 report commissioned by the city.

The report considered a quake of that magnitude because among the "pool of possible large earthquakes that might affect San Francisco in the next 30 years, this is the scenario which gives the strongest amount of shaking," said Jack Boatwright, a U.S. Geological Survey geophysicist. He added that in the most extreme case, a rupture along the San Andreas Fault could cause a quake of up to 8.3 in magnitude—exponentially more powerful than a 7.2.

Of particular concern are thousands of old wood-frame buildings in San Francisco, many of which have significant structural weaknesses because their ground floors have few interior walls and large openings in exterior walls for garage doors and storefronts, according to the report. An effort to mandate seismic retrofits of them lost steam last year after officials failed to determine a way to help property owners finance the work.

Another wake-up call for San Francisco came in a scathing Civil Grand Jury report in 2003 that called the city's emergency planning a "catastrophe." Since then, San Francisco has overhauled its disaster-response plans twice and renovated its emergency operations center, officials said. A 2008 Civil Grand Jury report said the city "has made substantial progress in its preparation for disasters."

But San Francisco officials admit they have undertaken far less planning for what to do after an earthquake to ensure that residents are resettled and buildings are reconstructed quickly. Rob Dudgeon, deputy director of the city's Department of Emergency Management, said the issue was driven home by the slow pace of rebuilding New Orleans after Hurricane Katrina in 2005, adding "there's not a city in the United States" prepared for such recovery.

In 2008, then-city administrator Edwin Lee, who now is interim San Francisco mayor, began heading an effort to increase the city's focus on recovery planning. Since then, San Francisco has tapped experts at Harvard University's Kennedy School of Government and the San Francisco Planning & Urban Research Association. "We don't want to lose our people" to other cities by not rebuilding quickly enough, said Sarah Karlinsky, deputy director of the non-profit think tank.

One aim is to find ways to ease bureaucracy after a catastrophe, such as the city's cumbersome building-permitting process, Mr. Dudgeon said. He said officials also intend to develop proposals that the city's Board of Supervisors could approve immediately after a disaster, to streamline decision making about issues such as whether to demolish the re-

mains of historic buildings and rebuild on unstable land—processes that often take years.

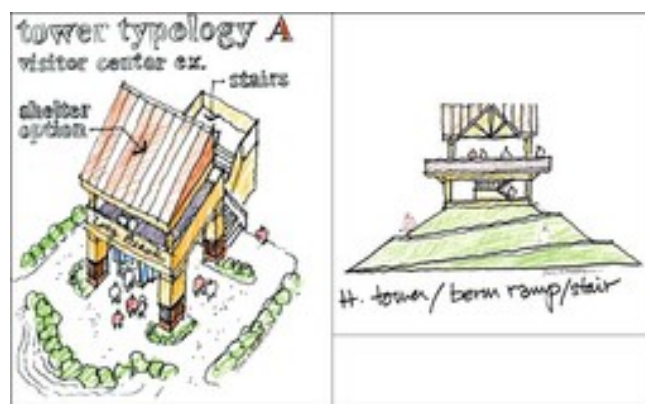
San Francisco, he said, is in the "toddler stages" of that effort.

(C.TUNA & T.AUDI/The Wall Street Journal, April 1, 2011)



Japanese Tsunami Heightens Interest In Elevated Safe Havens

If you're near the coastline and a major earthquake strikes, the advice as always is to scramble for higher ground. But sometimes, high ground is far away -- for example, if you're in downtown Seaside, Oregon or Ocean Shores, Washington.



Artist's rendering of possible tower safe haven in Long Beach, Wash. -- Courtesy of Project Safe Haven

In such places, the best option could be to head for the rooftop of a sturdy building. That is, if there is one.

The horrible and gripping images of destruction from the Japanese earthquake and tsunami are still top-of-mind in the string of beach towns that run along the Oregon and Washington coasts.



The roof of this building in Minamisanriku, Japan was a designated safe haven, but it proved insufficiently high. Around ten people managed to cling to life there, but twenty others were swept away. -- By Asian Disaster Reduction Center

I'm in one of them now, Westport, Washington. I'm on what passes for high ground here -- one of three long lines of low beach dunes. If the worst came to pass, I think I'd want to be a little bit higher and I'm not the only one.

Linda Orgel: "You look at some of those pictures and you could just picture Westport or Grayland, the same thing. It would just sweep right across the peninsulas."

Retiree Linda Orgel is one of hundreds of coastal residents spurred to become better prepared. That interest is being channeled into planning and design meetings for a possible string of manmade refuge towers.

Westport apartment manager Harold Gray assumes when the Big One hits, the roads leading inland or to the hills will be impassable.

Harold Gray: "We live down toward the docks. You wouldn't have the time to get to high ground. It just wouldn't happen. This gives us another option, which is what we need because high ground is far away."

A four-year federal grant to Washington State's Emergency Management Division is paying for conceptual design work on so-called "vertical evacuation structures."



People who ran to the fourth floor of this apartment building in Minamisanriku, Japan survived the tsunami. -- Asian Disaster Reduction Center

Examples could include a tower that doubles as a bird viewing or whale-watching platform. Another possibility is to build a tall earthen berm along a sports field. You could put bleachers on it.

The University of Washington is helping to facilitate community brainstorming in low lying towns along the outer coast.

UW hazard mitigation expert Bob Freitag says the structures need to have multiple uses.

Bob Freitag: "These towers really can't be single purpose to have any lasting effect. They would be ignored. They'll be an eyesore. They have to be part of the community."

In Southwest Washington's Pacific County, meeting-goers decided they wanted 13 berms, five towers and two parking garages spaced along the coastline to give people the means to shelter from a tsunami.

The only place in the world that's actually done this sort of thing is Japan. Last month's tsunami provided the first real world test of manmade tsunami evacuation structures.

Coincidentally, a University of Washington tsunami researcher was in northern Japan at the time.

Professor Jody Bourgeois says fleeing up a reinforced concrete building seems to have worked -- most of the time.

Jody Bourgeois: "In some cases the building was not as high as the tsunami, which was larger than the design was."

Bourgeois says in the town of Minamisanriku, the tsunami overtopped a three story office building. It was designated as a safe haven, but around 20 people were swept away.

Jody Bourgeois: "I would say if you're going to build a vertical evacuation structure, the major cost would be in the structure itself. Adding another floor is not the major cost. So I guess after this event I would say, add another floor. Make it higher."



This is an artist's rendering of the proposed tsunami shelter/new city hall that officials hope to build in Cannon Beach, Ore. -- Courtesy of Ecola Architects, PC

None of the Northwest beach towns thinking about this has the money to build a tsunami safe haven. But first things first, says Washington Emergency Management's John Schelling.

John Schelling: "In my experience, it is really difficult to obtain any kind of resources or funding without having a plan. That is really what this project is designed to do."

In vulnerable Seaside, Oregon, officials are discussing whether the roof of an expanded convention center could double as a tsunami refuge.

Cannon Beach, Oregon needs a new city hall. Some residents are pressing to elevate the new building on sturdy concrete stilts so that it could potentially shelter one thousand or more visitors and locals from a tsunami.

But choosing a more rugged design roughly doubles the cost from the \$1 to \$2 million range to the \$3 to \$4 million range, according to an architect and former mayor.

As for Japan, a more detailed survey of what worked and what didn't awaits an "all clear" from emergency responders. They haven't yet finished looking for bodies in the rubble there.

(Tom Banse / Oregon Public Broadcasting News, April 7, 2011)



Κίνδυνος για τσουνάμι στον Κορινθιακό

Υπαρκτός είναι ο κίνδυνος να προκληθεί τσουνάμι στις ακτές της βόρειας Πελοποννήσου, που βρέχονται από τον Κορινθιακό Κόλπο, ενώ ήδη έχει καταγραφεί τέτοιο φαινόμενο τον Φεβρουάριο του 1963 στις Καμάρες Αιγιαλείας. Όπως εκτιμάται, σε περίπτωση που συμβεί τώρα τσουνάμι, οι καταστροφές θα είναι μεγάλες, λόγω της πυκνής δόμησης πάνω στον αιγιαλό. Μάλιστα, σύμφωνα με τις ίδιες εκτιμήσεις, αν το τσουνάμι εκδηλωθεί κατά τη διάρκεια του καλοκαιριού, τότε είναι πιθανόν να υπάρξουν θύματα από νιγμούς. Σε αυτό το συμπέρασμα κατέληξε έρευνα που πραγματοποίησε το Εργαστήριο Θαλάσσιας Γεωλογίας και Φυσικής Ωκεανογραφίας του Τμήματος Γεωλογίας του Πανεπιστημίου Πατρών και μέλος του δικτύου Εργαστηρίων «Ωκεανός».

Όπως ανέφερε στην «Κ» ο καθηγητής Γεωλογίας του Πανεπιστημίου Πατρών κ. Γιώργος Φερεντίνος, το εργαστήριο έχει μελετήσει τα χαρακτηριστικά των τσουνάμι που μπορεί να προκληθούν στο Κορινθιακό Κόλπο. Σύμφωνα με τις μέχρι σήμερα έρευνες, έχει υπολογισθεί ότι το ύψος ενός τσουνάμι στον Κόλπο δεν μπορεί να υπερβαίνει τα 4 μ. με 4,5 μ. στο σημείο γένεσής του και θα φθάσει τις ακτές σε 2 έως 18 λεπτά. Απαντώντας στο ερώτημα, αν ο πληθυσμός μπορεί να σωθεί από ένα πιθανό τσουνάμι απάντησε: «Ναι, αν κάποιος είναι εκπαιδευμένος» και πρόσθεσε: «Μέχρι τρία λεπτά έχει στη διάθεσή του. Ένας άνθρωπος που περπατάει γρήγορα και βρίσκεται πάνω στον αιγιαλό, από τη στιγμή που θα ειδοποιηθεί για να πάει 300 μ. πίσω, θέλει περίπου τρία λεπτά». Σε αυτό το σημείο, ο κ. Γ. Φερεντίνος παρουσιάζει στοιχεία για τις σημαντικές διαβρώσεις που έχουν προκληθεί στις ακτές της Αιγιαλείας από τις σεισμικές, αλλά βίαιες κατολισθήσεις, οι οποίες συνδέονται με την εκδήλωση τσουνάμι. Συγκεκριμένα, η ακτή από την Άκρα Γύφτισσα στο Αίγιο έως το Διακοπτό υπέστη κατολισθήσεις μετά τον σεισμό του 1861 και καλύφθηκε από τη θάλασσα οπισθοχωρώντας από 100 μ. έως 200 μ. Μετά τον σεισμό τον Ιούνιο του 1995, η ακτή των Νικολαϊκών στην Αιγιαλία καλύφθηκε από τη θάλασσα και οπισθοχώρησε από 20 μ. έως 60 μ. Όμως η πιο χαρακτηριστική περίπτωση είναι τα όσα συνέβησαν στις Καμάρες της Αιγιαλείας τον Φεβρουάριο του 1963. Έγινε κατολίσθηση σε πλάτος 800 μ. και η ακτή οπισθοχώρησε κατά 100 μ. έως 200 μ. προκαλώντας τσουνάμι ύψους 5 μ. Όμως, οι καταστροφές ήταν ελάχιστες, αν και το τσουνάμι εισήλθε στην ακτή από τις Καμάρες έως τον Λόγγο και το Αίγιο από 100 μ. έως 400 μ. Σύμφωνα με τον κ. Φερεντίνος, τα μέχρι τώρα στοιχεία δείχνουν ότι θα πρέπει να εκτελεστούν σύντομα οι κατάλληλες έρευνες για την ορθή διαχείριση όχι μόνο των ακτών της Αιγιαλείας, αλλά και ολόκληρου του Κορινθιακού Κόλπου.

της επέλασης της θάλασσας στην ξηρά, λόγω ανόδου της στάθμης της. Μάλιστα, όπως τονίζει ο καθηγητής, τα επόμενα 50 έως 100 χρόνια η στάθμη της θάλασσας θα ανέβει κατά ένα μέτρο, με αποτέλεσμα να μπει στην ξηρά μέχρι και 100 μ., ανάλογα πάντα με την κλίση της ακτής. Στην έρευνα συμμετείχαν τα μέλη του Εργαστηρίου Γ. Παπαθεοδώρου, Μ. Γεραγά, οι συνεργάτες Γ. Γκιώνης, Α. Στεφάνος, Μ. Χαραλαμπίδης, Δ. Χριστοδούλου, οι μεταπτυχιακοί φοιτητές Μ. Ιατρού, Η. Φακίρης, Σ. Κορδέλα και Μ. Πρεβενιός.



Στο 46%, η διάβρωση ακτών της Αιγιαλείας

Τα τελευταία 20 χρόνια, η Αχαΐα έχασε περίπου 2.500 στρέμματα, τα οποία έγιναν βυθός εξαιτίας της διάβρωσης των ακτών. Σύμφωνα με τα στοιχεία που παρουσιάστηκαν σε ημερίδα του ΤΕΕ Δ. Ελλάδος, το 46% των ακτών από το Δερβέني ως το Αίγιο, έχει υποστεί διάβρωση, το 40% παραμένει αναλλοίωτο και μόνο στο 13% έχει γίνει πρόσθεση εδαφικού υλικού. Η διάβρωση σύμφωνα με τον καθηγητή κ. Γ. Φερεντίνος από τα κύματα είναι αποτέλεσμα ανθρώπινων παρεμβάσεων, όπως λιμάνια, μαρίνες αλιευτικά καταφύγια, τα οποία χωροθετήθηκαν χωρίς μελέτες, καθώς και η διευθέτηση της κοίτης των ποταμών και η αμμοληψία από αυτούς. Σύμφωνα με όσα αναφέρθηκαν στην ημερίδα, απαιτείται διαρκής παρακολούθηση του φαινομένου, συνολική αντιμετώπιση, μετατόπιση της ανθρώπινης δραστηριότητας προς την ενδοχώρα. Όπως επισημάνθηκε, γίνονται κινήσεις σε λάθος βάση, για την αντιμετώπιση του φαινομένου. Βρίσκονται σε εξέλιξη δύο έρευνες για τη διάβρωση, η μία για τον Κορινθιακό και το Ρίο και η άλλη τη Δ. Αχαΐα. Οι εισηγητές είπαν ότι «το πρόβλημα δεν μπορεί να αντιμετωπίζεται τοπικά», πρέπει κανείς να συνηγορήσει τι συμβαίνει σε όλον τον Πατράϊκό και τον Κορινθιακό.

(Ηλίας Κάνιστρας / Η ΚΑΘΗΜΕΡΙΝΗ, 16.04.2011)



Οι έρευνες αυτές πρέπει να περιλαμβάνουν μελέτη της διάβρωσης των ακτών από τα κύματα, εντοπισμό πιθανών θέσεων που μπορεί να υποστούν κατολίσθηση, μελέτη της δημιουργίας και διάδοσης κυμάτων τσουνάμι και υπολογισμό

Scanning Antiquity Underfoot

TAU researcher develops geological tool to see what's below the ground's surface

According to rough estimates, there are some 20,000 undiscovered archaeological sites in Israel waiting to be explored. Currently buried under highways or beneath cities, some could reveal historic monuments from the biblical past and give us clues to the expansion and settlement of modern man as he made his way through the Fertile Crescent.

But where to begin? Who decides which sites should be "dug" — at considerable financial cost — and which should remain unexplored until a later date? A new tool from Prof. Lev Eppelbaum of Tel Aviv University's Department of Geophysics and Planetary Sciences at the Raymond and Beverly Sackler Faculty of Exact Sciences may provide the answer.

Prof. Eppelbaum's new tool combines advanced analyses from many geophysical methods and provides the most conclusive evidence ever produced about what's below the ground's surface. His tool is already being applied at many archaeological sites in Israel — and it's ready to be used in the United States and at other sites around the world.

An overland use for nuclear submarines

Reported recently in the journal *Advances of Geosciences*, Prof. Eppelbaum's new tool gathers data from a number of sources — including radio transmitters used to communicate with nuclear submarines and detailed magnetic field observations — and applies an original algorithmic approach to the measurements to make sense of what lies below the earth's surface at depths of up to several dozen yards. His tool can help people "see" meaningful objects, artefacts or civilizations — and lay them out in a four-dimensional chart.

While methods exist for scanning sites of potential archaeological and geological importance, such tools produce significant background noise or inconclusive readings, Prof. Eppelbaum says.

"Inspired by Israel, where we have so many archaeological records underfoot, my tool can also help Americans locate old native burial grounds, and determine minerals and elements several yards below the surface," he continues.

A faster road into the past

His tool can be used to evaluate the possible archaeological significance of any given area under scrutiny. Providing rapid results within days or even hours, the algorithm can "read" extensive data before any digging or exploration begins. Financially, technically and ecologically, this tool offers an optimal way to localize and classify ancient buried objects and estimate the potential of the further archaeological investigations, he says.

Prof. Eppelbaum's solution is called the "multi-PAM," which stands for "physical – archaeological models." The tool first interprets what it "sees" by recognizing image targets; then the interpretation can be used to develop a four-dimensional model which can be presented to archaeologists hoping to explore a particular region.

Placed in a small unmanned airplane hovering several yards off the ground and scanning wide tracts of land along the earth's surface, Prof. Eppelbaum says, the tool can reveal unexplored sites of historical and archaeological significance.

(American Friends of Tel Aviv University, Tuesday, March 8, 2011)



Team claims it's found Atlantis

A - for once - reputable team of scientists believes it may have found the fabled lost city of Atlantis, saying it appears to have been destroyed by a tsunami.

While other, earlier references to the city exist, it was most famously described by Plato: "In front of the mouth which you Greeks call, as you say, 'the pillars of Hercules,' there lay an island which was larger than Libya and Asia together; and it was possible for the travelers of that time to cross from it to the other islands, and from the islands to the whole of the continent over against them which encompasses that veritable ocean," he says.



And the team from the University of Hartford says it has indeed found something at a site which could be described as lying beyond the Pillars of Hercules - generally accepted to refer to the Straits of Gibraltar. But it's not out in the Atlantic, where most people have tended to look, but in a marshland, the Doña Ana Park, near Cadiz.

For two years, the team surveyed the area using electrical resistivity tomography, deep-ground radar and digital mapping, uncovering evidence of a city which, like Plato's, was designed to a circular format and which dates back 4,000 years.

Findings include what appears to be a communal oven, a network of canals and statuary that looks very different from other European Bronze-age artifacts.

But even stronger evidence, says the team, was the discovery of a series of 'memorial cities' 150 miles further inland, and mimicking the circular shape of Atlantis itself. These would have been built by survivors of the tsunami, says lead researcher Richard Freund.

"We found something that no one else has ever seen before, which gives it a layer of credibility, especially for archeology, that makes a lot more sense," Freund told Reuter.

The team is planning further excavations both at the site they believe to be Atlantis itself and at the 'memorial cities'.

(Kate Taylor, TG Daily, Mar 14th 2011)

Was Lost City of Atlantis Found in Spanish Marsh?

Crime solvers follow the money, but experts searching for the lost city of Atlantis? In archaeology, "you should follow the stones," Richard Freund said.

Freund, a University of Hartford professor, believes he and his research team have found the legendary island-city described by Plato in about 360 B.C. as having "in a single day and night ... disappeared into the depths of the sea."

Using satellite photography, ground-penetrating radar, underwater technology and some old-fashioned reasoning, Freund said his team pinpointed the city in a vast marsh in southern Spain that dries out one month a year. Their findings are featured in a National Geographic special premiering tonight, "Finding Atlantis."

"Follow the stones' means that you have to find the artifacts," he told AOL News in a telephone interview today. "And certain types of stones give you clues about where certain types of things came from."

His team's search began in 2008 with a space satellite photograph showing what looked to be a submerged city in Spain's Dona Ana Park. In 2009 and 2010, Freund's researchers worked with Spanish archaeologists and geologists to explore beneath the mud flats using radar and imaging.

The discovery was clinched, Freund said, with the later find of "standing stones" and a series of memorial cities in central Spain built in the image of Atlantis.

"We found something that no one else has ever seen before, which gives it a layer of credibility, especially for archaeology, that makes a lot more sense," Freund told Reuters.

The memorial sites are significant to Freund's theory because refugees from the lost city would have built smaller-scale versions in tribute. And so when a Spanish scientist led him to ancient sites surrounded by concentric moats -- and a museum featuring standing stones with a symbol similar to Plato's drawing of Atlantis -- Freund was convinced these were commemorations of the destroyed city.

"There are more than 100 of them, and they come from all different places in the area," Freund told AOL's local news site Canton Patch.

"In crime, you follow the money," he told Patch. "In archaeology, you follow the stones."

His team also found ancient wood dating back to 440 B.C. A core sample taken at the marsh showed a layer of methane -- an indication to Freund that a lot of living things all died at once.

"Finding this one layer of methane is a very telltale sign of a society that is destroyed in one fell swoop," he told the Hartford Courant. "This was in the middle of nowhere, and there was no methane layer found in the area except where we were working."

Explorers looking for Atlantis previously have focused on the Mediterranean Sea as well as the Atlantic, Pacific and Indian oceans. The lost city has been "found" many times over the years, including by Russian scientists who pinpointed a ruined town in the Black Sea; an American who found man-made walls a mile deep in the Mediterranean; and Swedish researchers who found it in the North Sea.

The lost city even was proclaimed found when people searching Google Earth spotted lines resembling a city street grid in the ocean off the coast of Africa. Google squelched the revelation when it explained the lines actually were left by a boat collecting data.

Researchers plan more excavations at the Spanish site, and Freund agreed his current findings won't put a definitive end to the debate.

"It's never like finding the Titanic. It's never like finding Tutankhamun's tomb. That's the way, in the best of all circumstances, that you find something intact," Freund told the Courant.

"You'll not be able to convince all the people all the time," he said.

(Lisa Holewa / AolNews.com, Mar 13, 2011)

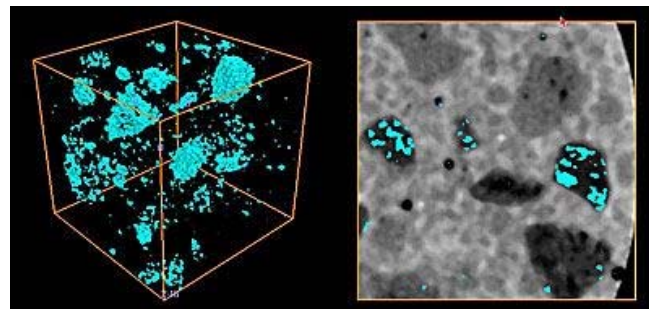


Internally cured concrete revives ancient building "technology"

Internally cured concrete dates back to Roman times and is the secret to the strength of the freestanding Pantheon, which is built of unreinforced concrete. The old "technology" is finding new life in the building of bridges, pavements, water tanks and rail yards. The concrete internally cures with water-filled lightweight aggregates that release water as needed to hydrate cement particles. Internally cured concrete bridges are estimated to have a life of 40 years versus 22 years for conventional concrete.

(ASCE SmartBrief, March 16, 2011)

High-tech concrete technology has a famous past



X-ray microtomograph (left) shows pores (blue) that remain within lightweight aggregates (LWAs) after water has migrated from the pre-wetted materials during the first day of hydration. In the two-dimensional image (right), the emptied pores are superimposed over the original microstructure (hydrating cement paste is white, sand is light grey, and LWA is dark grey), illustrating the detailed pore structure of LWA particles. Credit: NIST

(PhysOrg.com) -- In the business of concrete making, what's old -- even ancient -- is new again.

Cement making machines - Cement mill, ball mill & rotary dryer in the Cement production line! - www.zonedining.com

Almost 1,900 years ago, the Romans built what continues to be the world's largest unreinforced solid concrete dome in the world—the Pantheon. The secret, probably unknown to the Emperor Hadrian's engineers at the time, was that the lightweight concrete used to build the dome had set

and hardened from the inside out. This internal curing process enhanced the material's strength, durability, resistance to cracking, and other properties so that the Pantheon continues to be used for special events to this day.

But it is only within the last decade or so that internally cured concrete has begun to have an impact on modern world infrastructure. Increasingly, internally cured concrete is being used in the construction of bridge decks, pavements, parking structures, water tanks, and railway yards, according to a review of the current status of the new (or old) concrete technology just published by the National Institute of Standards and Technology.

The virtues of internally cured concrete stem from substituting light-weight, pre-wetted absorbent materials for some of the sand and/or coarse aggregates (stones) that are mixed with cement to make conventional concrete. Dispersed throughout the mixture, the water-filled lightweight aggregates serve as reservoirs that release water on an as-needed basis to nearby hydrating cement particles.

According to one study cited in the review, bridge decks made with internally cured, high-performance concrete were estimated to have a service life of 63 years, as compared with 22 years for conventional concrete and 40 years for high-performance concrete without internal curing.

"As with many new technologies, the path from research to practice has been a slow one, but as of 2010, hundreds of thousands of cubic meters" of the lighter and more durable material have been successfully used in U.S. construction, write the report's co-authors, NIST chemical engineer Dale Bentz and Jason Weiss, Purdue University civil engineering professor.

Compared with conventional varieties, internally cured concrete increases the cost of a project by 10 to 12 percent, Bentz and Weiss estimate on the basis of bridge-building projects in New York and Indiana. The increased front-end cost, they write, must be evaluated against the reduced risk of cracking, better protection against salt damage, and other improved properties that "should contribute to a more durable structure that has a longer life and lower life-cycle costs," they write. "Further, this could have substantial benefits in a reduced disruption to the traveling public, generally producing a more sustainable solution."

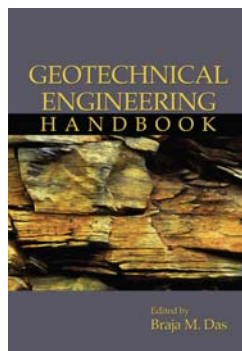
The 82-page report summarizes the current practice and theory of internal curing, reviews project experiences and material performance in the field, and describes opportunities for research that could lead to enhancements in the material.

More information: D.P. Bentz and W.J. Weiss. *Internal Curing: A 2010 State-of-the-Art Review* (NISTIR 7765). Feb. 2011. Available at: [http://www.nist.gov ...ub_id=907729](http://www.nist.gov...ub_id=907729)

Provided by National Institute of Standards and Technology

(Mark Bello, PhysOrg.com, March 16, 2011)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Geotechnical Engineering Handbook

Braja M. Das

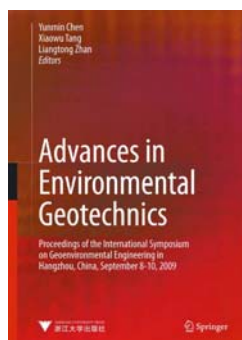
This one-of-a-kind, definitive reference offers expansive coverage of geotechnical engineering for civil engineering professionals. Each of the 15 chapters is the work of an engineering expert — putting at your disposal a vast source of engineering experience.

The Geotechnical Engineering Handbook brings together essential information related to the evaluation of engineering properties of soils, design of foundations such as spread footings, mat foundations, piles, and drilled shafts, and fundamental principles of analyzing the stability of slopes and embankments, retaining walls, and other earth-retaining structures. The Handbook also covers soil dynamics and foundation vibration to analyze the behavior of foundations subjected to cyclic vertical, sliding and rocking excitations, environmental geotechnology, and foundations for railroad beds.

Comprehensive coverage, logical organization, and clear discussions make this the tool of choice for both experienced engineers and those just embarking on their careers.

Key Features:

- Presents state-of-the-art applications for geotechnical engineers
- Features numerous illustrations including charts, drawings, and diagrams to illuminate the applications and theory
- Offers numerous worked-out problems
- Includes up-to-date coverage of environmental geotechnology



Advances in Environmental Geotechnics

Proceedings of the International Symposium on Geoenvironmental Engineering in Hangzhou, China, September 8-10, 2009

Yunmin Chen, Liangtong Zhan

and Xiaowu Tang

The International Symposium on Geoenvironmental Engineering (ISGE 2009) was held on September 8-10, 2009 in Hangzhou, China. ISGE 2009 was organized by MOE Key Laboratory of Soft Soils and Geoenvironmental Engineering, Zhejiang University, Chinese Institution of Soil Mechanics and Geotechnical Engineering (CISMGE), and Chinese Chapter of International Geosynthetics Society (CCIGS), under the auspices of ISSMGE TC5, sponsored by K. C. Wong Education Foundation, and National Natural Science Foundation of China, as well as Zhejiang University Zeng Guo-Xi Lecture Fund.

Issues associated with Environmental Geotechnics continue to be a major preoccupation for governments, public and private organizations and the general community worldwide. The Chinese Government has been putting great effort on environmental issues including sanitary disposal of solid waste, reuse of industrial wastes, remediation of contaminated land, prevention of groundwater contamination, environmental risk assessment, ecological techniques, etc. China also has much to share on the opportunities, challenges and responsibilities for environmental geotechnics with other countries, especially the developing countries.

Under the conference theme, "Reclamation of the Past and Toward a Sustainable Geoenvironment", 168 abstracts in total were received and 125 papers in total were reviewed and accepted for publication in this proceeding. This proceeding encloses 2 Zeng Guo-Xi Lectures, 26 Invited Lectures and 97 papers. The topics covered include basic and advanced theories for modeling of geoenvironmental phenomena, testing and monitoring for geoenvironmental engineering, municipal solid wastes and landfill engineering, sludge and dredged soils, geotechnical reuse of industrial wastes, contaminated land and remediation technology, applications of geosynthetics in geoenvironmental engineering, geoenvironmental risk assessment, management and sustainability, ecological techniques and case histories. This proceedings include papers authored by core members of ISSMGE TC5 (International Society of Soil Mechanics and Geotechnical Engineering - Environmental Geotechnics) and geoenvironmental researchers from more than 23 countries and regions (i.e., Albania, Austria, Bengalese, Brazil, Canada, China, France, German, Hong Kong, India, Iran, Indonesia, Japan, Korea, Macau, Malaysia, Portugal, Russia, Taiwan, UK, USA, Uzbekistan, Vietnam).

It is our desire that the proceedings of International Symposium on Geoenvironmental Engineering (ISGE2009) provide an opportunity for the exchange of views among academic researchers, practical engineers and administration officers. "Advances in Environmental Geotechnics" presents the latest development in this interdisciplinary field.

(Springer, 2010)



Geotechnical Characterization, Field Measurement, and Laboratory Testing of Municipal Solid Waste

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

Geotechnical Special Publications (GSP) 209

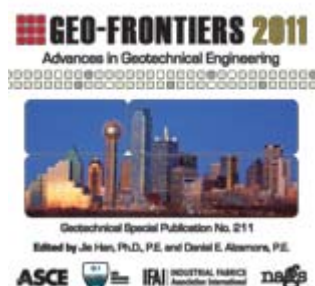
Developed from papers and discussions presented at the International Symposium on Waste Mechanics, held in New

Orleans, Louisiana, March 11-13, 2008. Sponsored by the Geo-Institute of ASCE.

Geotechnical Special Publication No. 209 integrates current knowledge of the properties of municipal solid waste and the challenges it presents with adequate guidance for researchers and practitioners who work directly with issues related to waste behavior. This collection broadens understanding of waste mechanics and improves waste disposal practices both domestically and internationally. The first section is a review of the state of the art in some of the most critical properties of municipal solid waste. The next group of papers attempts to reach some consensus or provide some minimum requirements or recommended procedures for waste characterization. The collection includes five opinion papers submitted by the invited panelists from the United Kingdom, Brazil, Canada, Japan, and the United States.

This volume will be valuable to researchers and practicing engineers in the field of waste mechanics.

(ASCE, 2011)



Geo-Frontiers 2011

Advances in Geotechnical Engineering

Jie Han, J. & Alzamora, D.

A. (Editors)

Geotechnical Special Publications (GSP) 211

Proceedings of Geo-Frontiers 2011, held in Dallas, Texas, March 13-16, 2011. Sponsored by Geo-Institute of ASCE; Industrial Fabrics Association International; North American Geosynthetics Society; Geosynthetics Materials Association.

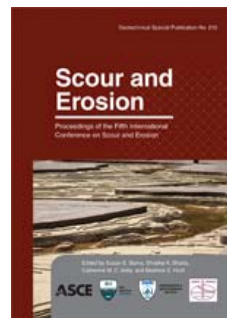
This collection contains 496 peer-reviewed papers that describe advances in research and the practical application of geotechnologies, especially including geosynthetics. Papers from a memorial session to honor Bernard Myles for his contributions to the geosynthetics industry are also collected in this volume.

Topics include:

- foundations and ground improvement;
- geoenvironmental engineering;
- geohazards (earthquakes, landslides, erosion);
- geosynthetics;
- geotechnical testing and site characterization;
- slopes, embankments, and earth-retaining structures;
- soil-rock mechanics and modeling; and
- transportation materials and pavements.

These papers will be of interest to geotechnical researchers and practicing engineers, especially those working with geosynthetic materials.

(ASCE Publications, 30.03.2011)



Scour and Erosion

Edited by Susan E. Burns;
Shobha K. Bhatia; Catherine M.
C. Avila; Beatrice E. Hunt

Geotechnical Special Publications (GSP) 210

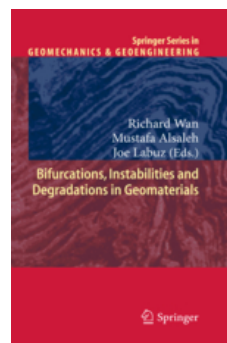
Proceedings of the 5th International Conference on Scour and Erosion, held in San Francisco, California, November 7-10, 2010. Sponsored by the Geo-Institute of ASCE; Environmental and Water Resources Institute of ASCE; International Society for Soil Mechanics and Geotechnical Engineering.

This collection contains 113 papers on scour and erosion, which constitute some of the most critical threats to maintaining infrastructure and quality of life throughout the world. As the human population expands, the responsibilities of engineers, scientists, and designers continue to increase. The demand for a creative approach to effective control of scour and erosion also becomes more pressing, requiring cross-disciplinary synthesis of information from the fields of hydraulic and geotechnical engineering. The papers presented in this book examine the scour and erosion of hillside, fluvial, estuarine, and coastal environments at the interface of water, soil, and rock.

Topics include:

- bridge scour;
- erosion of soils;
- scour and erosion of dams and levees;
- scour of offshore platforms and underwater pipelines;
- numerical modeling;
- physical model tests;
- rock scour;
- case histories, management, and field studies;
- monitoring;
- countermeasures, stream stability, and erosion of slopes; and
- FHWA equations and design standards.

This proceedings will be valuable to anyone working in the fields of geotechnical or environmental engineering.



Bifurcations, Instabilities and Degradations in Geomaterials

Springer Series in Geomechanics and Geoengineering

Wan, Richard; Alsaleh, Mustafa;
Labuz, Joe (Eds.)

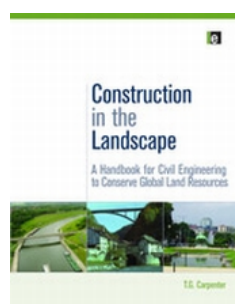
Geomaterials exhibit complex but rich mechanical behaviour with a variety of failure modes ranging from diffuse to localized deformation depending on stress, density, microstructure, and loading conditions. These failure modes are a result of an instability of material and/or geometric nature that can be studied within the framework of bifurcation theory. Degradation is another related phenomenon arising

from cyclic loading, ageing, weathering, chemical attack, and capillary effects, among others. The methodology of analyzing the various types of instabilities is crucial in the adequate modelling and safe design of numerous problems in geomechanics.

The present volume contains a sampling of enlarged versions of papers presented at the *International Workshop on Bifurcation and Degradations in Geomaterials* (IWBDG 2008) held in Lake Louise, Alberta, Canada, May 28-31, 2008. These papers capture the state-of-the-art in the specialized field of geomechanics and contemporary approaches to solving the central issue of failure. Some engineering applications are presented in the areas of energy resource extraction and soil-machine interaction.

Keywords: Bifurcation - Degradation - Geomaterials - Geomechanics - Instability - Petroleum Geomechanics - Soil-Machine Interaction

(Springer, 2011)



Construction in the Landscape: A Handbook for Civil Engineering to Conserve Global Land Resources

Tom Carpenter

Construction in the Landscape describes the impact of construction on the land and landscape where it takes place. Geographical coverage is necessarily global to reflect the great variation both in people's economic and social needs and in the shortage or abundance of natural resources.

Part I introduces both land resources, whether used for agriculture, human settlement or mineral extraction or conserved as scenery, wildlife habitat or for the undefined needs of future generations; and construction, its products, skills, processes and impacts on land resources.

Part II describes specific forms of civil engineering - from landform adaptation, through dams and river control works, coastal construction and transport infrastructure to particular types of structure such as bridges, towers and power stations, or the layout of complete settlements.

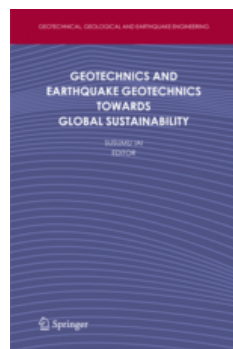
Part III deals with regional planning of construction and land use in different geographical circumstances - from fine scenery, through rural countryside to city and suburban development - and to the sort of land arrangements that may be sustainable for an increased but hopefully more civilized human population a century hence.

Contents

- Land Resources
- Land Features
- The Impact of Construction
- Man-Made Forms and Structures
- Landforms and their Modification
- Earthworks for Structures
- Mines and Quarries
- Dams and Other Hydraulic Structures
- Coastal and Estuarial Construction
- Transport Routes and Infrastructure
- Bridges and Crossings

- Military and Industrial Construction
- Towers
- Buildings and Settlements
- Planning Construction in Various Landscapes
- Construction in Scenic Country
- Construction in Flat Open Country
- Construction in Urban Landscapes
- Built Landscapes in the Future
- Subject
- Index
- Index of Places and Projects

(ICE Bookshop, 30.01.2011)



Geotechnics and Earthquake Geotechnics Towards Global Sustainability

Geotechnical, Geological and Earthquake Engineering, Vol. 15

Iai, Susumu (Ed.)

This book is part of a bold, new initiative towards global sustainability and development that draws on the disciplines of geotechnical engineering and earthquake geotechnics.

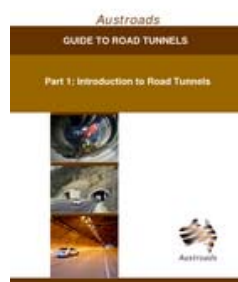
It contains contributions from fifteen of the world's leading experts who met in Kyoto in early 2010 to discuss a range of issues related to the ways geotechnics can help us face the challenges ahead, from the technical to the social, from geo-hazards to megacities, from global warming and coastal protection to the conservation of world heritage sites.

We hope these contributions will stimulate the debate over the role geotechnics has to play in achieving a more sustainable future for the world.

This book will be of interest to advanced levels of researchers and practicing engineers in the fields of geotechnics and earthquake geotechnics for global sustainability: the greatest long term challenge of our time.

Keywords: Earthquake Geotechnics - Geotechnics - Global sustainability - Lifecycle - Natural Hazards

(Springer, 2011)



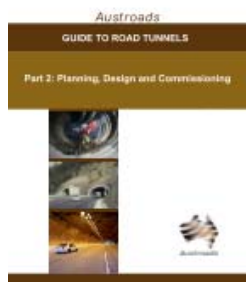
A Guide to Road Tunnels Part 1: Introduction to Road Tunnels

AGRT01-10

This Austrroads Guide provides a comprehensive introduction to planning for road tunnels and describes important issues and considerations relating to implementation, general planning, regulation, structural and geometric design, drainage, geology, the environment as well as operation, construction and maintenance. It also

covers critical considerations such as flood protection, fire and life safety, ventilation and risk management.

(Austroads Publications, 2011 - Austroads Support [austroads@infoservices.com.au])



Guide to Road Tunnels Part 2: Planning, Design and Commissioning

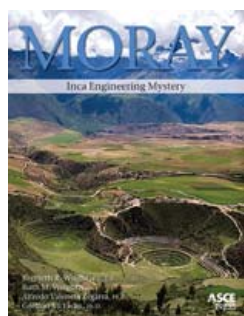
AGRT02-10

This Part discusses all aspects of the planning, design and commissioning of road tunnels including structural and geotechnical requirements, fire and life safety, ventilation, lighting, traffic monitoring and control, plant monitoring and control, electrical power supply and the requirements for associated building structures.

It also discusses the expected approach to the design of the elements of the tunnel project and where appropriate defines acceptable standards for those elements. Emphasis is placed on adopting a risk management approach to the design of the elements, stressing the importance of considering the interaction of the various components and the effect of the total combination of the elements. This Part defines the requirements for commissioning of road tunnels, the effect this has on design and the documentation required to ensure that all systems are functioning appropriately before operation commences.

Part 2 of the Guide does not deal with the refurbishment of existing tunnels nor of the retro-fitting of components to existing tunnels. However, for projects of that nature, the discussions in this part of the Guide may be of assistance in deciding on the appropriate design to adopt having regard to the factors involved and the economy of the possible solutions.

(Austroads Publications, 2010 - Austroads Support [austroads@infoservices.com.au])



Moray: Inca Engineering Mystery

Inca Engineering Mystery

K. R. Wright, R. M. Wright, A. V. Zegarra, G. McEwan

Halfway between Machu Picchu and the city of Cuzco, Peru, lies a civil engineering wonder that has captivated and puzzled researchers and travelers since it was first photographed in 1931. Situated on a plateau, the ancient Inca site of Moray consists of many terraced circular depressions in the earth, the largest of which is 30 meters (98 feet) deep. The difference in temperature between the top and the bottom of the circles can be as much as 15 °C (27 °F).

What are the mysterious concentric circles? What do they mean? Was this a religious site? An agricultural research station? *Moray: Inca Engineering Mystery* reports the results of an exhaustive investigation into the surveying work

underlying the site's construction, as well as the engineered systems for collecting and delivering water. Ken Wright and his team take the reader on a tour of Moray, describing the geography and geology of the area. They explain their field evidence that led to solving the Inca mystery and resolving decades of speculation.

The book includes a walking tour and map to guide visitors through Moray's significant features.

Profusely illustrated and written in nontechnical language, *Moray* will appeal to civil engineers interested in earthworks, water supply systems, and engineering history, as well as the tourist and armchair traveler.

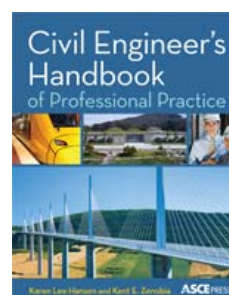
Kenneth R. Wright, P.E., L.S., is founder and chief engineer of Wright Water Engineers, Inc., a Denver consulting firm specializing in water resources and municipal utility design. He is author of *Machu Picchu: A Civil Engineering Marvel* (ASCE Press, 2000) and *Tipon: Water Engineering Masterpiece of the Inca Empire* (ASCE Press, 2006).

Ruth M. Wright, J.D., is co-author of the best selling *The Machu Picchu Guidebook* published in 2001 and revised in 2004. She is an award-winning photographer with photos appearing in numerous publications, including *National Geographic Magazine*. Her photo-essay *Machu Picchu Revealed* was published in 2008.

Alfredo Valencia Zegarra, Ph.D., was a professor at the Department of Anthropology and Archaeology at Cusco and a registered professional archaeologist with the Instituto Nacional de Cultura de Peru. He spent several years as the Machu Picchu resident archaeologist and was coauthor of *The Machu Picchu Guidebook* and *Machu Picchu: A Civil Engineering Marvel*.

Gordon McEwan, Ph.D., is a professor at Wagner College on Staten Island in New York. As an Andean scholar, he has led archaeological research projects in Peru over the course of 23 field seasons at Pikillacta and Chokepukio.

(ASCE Press, 2011)



Civil Engineer's Handbook of Professional Practice

Karen Hansen & Kent Zenobia

To be competitive at an international level, civil engineers are coming to see that they must build on their traditional strengths in technology and science by acquiring greater mastery of the business of civil engineering, the "softer" skills of management, teamwork, ethics, leadership, and communication. These skills have been defined as essential to the successful practice of civil engineering by the ASCE Body of Knowledge Task Force and can be gained through formal education or experience.

This book will be the first to take the practical skills defined by the ASCE BOK and provide illuminating techniques, quotes, case examples, problems, and information to assist the reader in addressing the many challenges facing civil engineers in the real world. From the challenge of sustainability to the rigors of problem recognition and solving, the book provides an essential tool for working as a practicing civil engineer.

(ASCE Press, 2011)



<http://www.issmge.org/web/page.aspx?refid=733>

Κυκλοφόρησε το 1^ο Τεύχος του 5^{ου} Τόμου του ISSMGE Bulletin με ενδιαφέροντα νέα από την διεθνή γεωτεχνική κοινότητα, παρουσιάσεις case studies για Deep Mixing for the New Orleans East Back Levee (USA) και Use of Piezo Drive Cone for evaluation of subsoil settlement induced by seismic liquefaction και εκτεταμένη αναφορά στο πρόσφατο 6^ο Πανελλήνιο Συνέδριο Γεωτεχνικής και Γεωπεριβαλλοντικής Μηχανικής.



INTERNATIONAL JOURNAL OF GEOENGINEERING CASE HISTORIES

<http://casehistories.geoengineer.org>

Κυκλοφόρησε το Τεύχος 2, του Τόμου 2 του **International Journal of Geoengineering Case Histories**, επίσημου περιοδικού της International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).



www.geoengineer.org

Κυκλοφόρησαν τα Τεύχη #75 και #76 του **Newsletter του Geoengineer.org** (Μάρτιος και Απρίλιος 2011) 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 Society for Rock Mechanics

newsletter



No. 13 - March 2011

http://www.isrm.net/adm/newsletter/ver_html.php?id_newsletter=60&ver=1

Κυκλοφόρησε το Τεύχος 13 / Μάρτιος 2011 του Newsletter της International Society for Rock Mechanics.



www.piarc.org



<http://www.piarc.org/library/aipcr/9/3214,Newsletter24-EN-March2011.pdf>

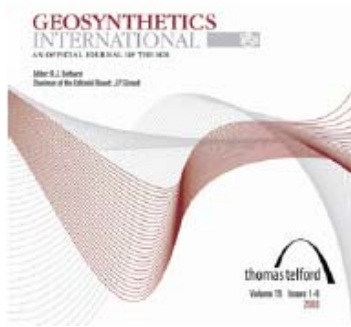
Κυκλοφόρησε το Τεύχος No. 40 (Μάρτιος 2011) του **Newsletter της World Road Association (PIARC)** και το Τεύχος No. 24 (Μάρτιος 2011) του Newsletter των PIARC National Committees.



www.geosyntheticssociety.org/Resources/Newsletters/2011-03-IGS-News-d.pdf

Κυκλοφόρησε το Τεύχος 1, Volume 27 των IGS News





Geosynthetics International

www.thomastelford.com/journals

Κυκλοφόρησαν τα τεύχη αρ. 6 του 17^{ου} τόμου (Δεκέμβριος 2010) και αρ. 1 του 18^{ου} τόμου (Φεβρουάριος 2011) του περιοδικού Geosynthetics International. Πρόσβαση μέσω ιστοσελίδων www.icevirtuallibrary.com/content/issue/gein/17/6 και www.icevirtuallibrary.com/content/issue/gein/18/1 αντίστοιχα.



Geotextiles & Geomembranes

www.geosyntheticssociety.org/journals.htm

Κυκλοφόρησε το τεύχος αρ. 1 του 29^{ου} τόμου (Φεβρουάριος 2011) του περιοδικού Geotextiles & Geomembranes. Πρόσβαση μέσω της ιστοσελίδας www.sciencedirect.com/science/journal/02661144.

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