ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Αρ. 17 – ΟΚΤΩΒΡΙΟΣ 2008

Τα Νέα της Ε Ε Ε Ε Γ Μ

17

Το ερχόμενο μήνα θα διεξαχθούν δύο πανελλήνια συνέδρια με πολύ μεγάλο ενδιαφέρον για τους γεωτεχνικούς μηχανικούς και τους λοιπούς γεωεπιστήμονες. Πρόκειται για τα

3° Πανελλήνιο Συνέδριο
ΑΝΤΙΣΕΙΣΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ ΚΑΙ ΤΕΧΝΙΚΗΣ ΣΕΙΣΜΟΛΟΓΙΑΣ

5 – 7 Νοεμβρίου 2008

Ξενοδοχείο Caravel, Αθήνα

1° Πανελλήνιο Συνέδριο
ΜΕΓΑΛΩΝ ΦΡΑΓΜΑΤΩΝ

13 – 15 Νοεμβρίου 2008

Ξενοδοχείο Classical Imperial, Λάρισα

Φωτογραφία: Navajo, Wraz, Ηνωμένες Πολιτείες.

(συνέχεια στην σελίδα 3)

SIMSG ISSMGE

ΠΕΡΙΕΧΟΜΕΝΑ

Στη «δύση» του καλοκαιριού και των διακοπών σας... Σας ευχόμαστε μια καλή και δυναμική επιστροφή στις εργασίες σας!

3ο Πανελλήνιο Συνέδριο
ΑΝΤΙΣΕΙΣΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ ΚΑΙ ΤΕΧΝΙΚΗΣ ΣΕΙΣΜΟΛΟΓΙΑΣ

elena.civil.ntua.gr/3-PCEEES/index.htm

Τα τελευταία τριάντα χρόνια η ανάπτυξη της αντισεισμικής μηχανικής και σεισμολογίας στην Ελλάδα υπήρξε αλματώδης. Ρόλο καταλύτη έπαιξαν και οι σεισμοί της Θεσσαλονίκης (1978), των Αλκυονιδών (1981), της Καλαμάτας (1986). Η πρόοδος που συντελέσθηκε κάλυψε πολλές πτυχές του διεπιστημονικού αυτού κλάδου – από την θεωρητική και και εφαρμοσμένη έρευνα ως την πρακτική εφαρμογή. Μερικές ενδείξεις προόδου : η καθιέρωση σύγχρονου αντισεισμικού κανονισμού, η καθοριστική συμμετοχή Ελλήνων Μηχανικών στην σύνταξη του αντισεισμικού ευρωκώδικα, η διοργάνωση διεθνών συνεδρίων, η ενεργός συμμετοχή Ελλήνων τεχνικών / επιστημόνων στο διεθνές επιστημονικό γίγνεσθαι (δημοσιεύσεις, διακρίσεις, ευρωπαϊκά ερευνητικά προγράμματα), η πρωτοποριακή δημοσίευση του κανονισμού επεμβάσεων, η επέκταση και αναβάθμιση των δικτύων επιταχυνσιογράφων, και – ίσως το σπουδαιότερο – η μελέτη και κατασκευή δυσχερών έργων (γέφυρες Εγνατίας, Ρίου – Αντιρρίου, Αττικής Οδού, δεξαμενές LNG, γέφυρες Μαλιακού και Ισθμού της Κορίνθου, Ολυμπιακά έργα, μεγάλες λιμενικές αποβάθρες, κτιριακά συγκροτήματα).

Οι πιο πρόσφατοι σεισμοί, και ιδίως της Αθήνας το 1999 (όπως και οι σεισμοί Northridge 1994, Kobe 1995, Νικομήδειας 1999), έδωσαν πρόσθετη ώθηση στην εφαρμογή νέων τεχνολογιών για την ενίσχυση / αναβάθμιση πάσης φύσεως δομημάτων, ενώ συνέβαλαν στην ποσοτική κατανόηση νέων φαινομένων. Παράλληλα, η εκρηκτική ανάπτυξη λογισμητοποιημένων υπολογιστικών μεθόδων επέτρεψε την Μελέτη και Έρευνα δυσχερών προβλημάτων (Μηχανικού και Σεισμολόγου) με ρεαλισμό και οικονομία χρόνου.

Το 3ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας έρχεται κατά κάποιο τρόπο να επισφραγίσει την πρόοδο αυτή, σηματοδοτώντας το πέρασμα του κλάδου στην φάση της ωριμότητας. Πρωταρχικοί, ανάμεσα στους σκοπούς του συνεδρίου:

- η διάχυση της γνώσης και εμπειρίας στον Μηχανικό της πράξης
- η ανταλλαγή απόψεων σε θέματα που παραμένουν αμφιλεγόμενα
- ο διάλογος μεταξύ Μηχανικών και Σεισμολόγων
- η πιθανή ανάδειξη μελλοντικών κατευθύνσεων στην έρευνα και εφαρμογή

Η ανταπόκριση στην πρόσκληση του Συνεδρίου υπήρξε πολύ ικανοποιητική (ο αριθμός των ήδη εγγραφέντων υπερέβη τους 1000, τα δε τελικώς υποβληθέντα και εγκριθέντα άρθρα πλησιάζουν τα 300). Τονίζουμε ιδιαιτέρως την τεράστια προσπάθεια 120 περίπου Μηχανικών, Σεισμολόγων και Γεωλόγων που ανέλαβαν την διπλή ανεξάρτητη και ανώνυμη κρίση κάθε υποβληθέντος άρθρου, συμβάλλοντας αποφασιστικά στην ποιότητα του Συνεδρίου.

Θ.Π. Τάσιος	Ι. Αλαβάνος	Γ. Γκαζέτας
ΕΜΠ / ΕΤΑΜ	ΤΕΕ	ΕΜΠ ΕΤΑΜ

Το συνέδριο θα διεξαχθή από τις 5 έως τις 7 Νοεμβρίου στο ξενοδοχείο Caravel στην Αθήνα με το παρακάτω θεματολόγιο:

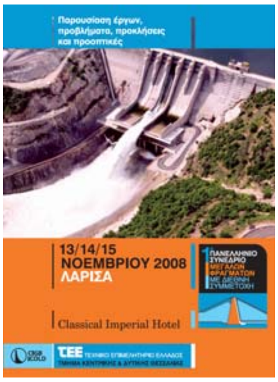
- Αντισεισμική Ανάλυση και Σχεδιασμός Κατασκευών
- Παρατήρηση Συμπεριφοράς Κατασκευών σε Σεισμούς
- Ανάλυση Σεισμικών Αστοχιών
- Γεωτεχνική Σεισμική Μηχανική
- Αλληλεπίδραση Εδάφους - Κατασκευής
- Τεχνική Σεισμολογία
- Νεώτεροι Κανονισμοί
- Σεισμική Μόνωση των Κατασκευών
- Νέες Τεχνολογίες Αναβάθμισης
- Μηχανική / Ανακυκλική Συμπεριφορά Δομικών Υλικών
- Εμπειρίες από τους Σεισμούς της τελευταίας 30-ετίας στην Ελλάδα

Προβλέπονται επίσης οι παρακάτω Ειδικές Συνεδρίες με θέματα μεγάλου πρακτικού ενδιαφέροντος:

- Αντισεισμικές Επεμβάσεις και Αντισεισμική Αναβάθμιση Κατασκευών
  - Προσεισμικός Έλεγχος
  - ΚΑΝΕΠΕ/ΕΠΑΝΤΥΚ
  - Η (μετασεισμική) εμπειρία του Σεισμού της Πάρνηθας
- Νομικά Θέματα Αντισεισμικής
  - Ευθύνη Μηχανικού
  - Παραγραφή
  - Ορθές Πραγματογνωμοσύνες
  - Πρόβλημα Επεμβάσεων

Κατά την διάρκεια των εργασιών του συνεδρίου έχουν προσκληθή να ομιλήσουν οι διακεκριμένοι ξένοι επιστήμονες του χώρου:

- Alain Pecker: "Non linear soil structure interaction: a requirement for performance based design of foundations», Geodynamique et Structure, France.
- Raul Madariaga: "Study of seismic source processes of a large subduction zone earthquake using near field accelerograms", Director, Laboratoire de Géologie, École Normale Supérieure, France.
- Thomas D. O' Rourke, Cornell University, USA.
- Giorgio Macchi: "Controversial criteria for the seismic safeguard of large monumental buildings", University of Pavia, Italy.
- Michelle Calvi: "Displacement based seismic design of concrete structures", Director EUCENTRE, University of Pavia, Italy.
- Michael Constantinou: "Seismic Protective Systems – An Overview of State of the Art and Practice", SUNY Buffalo University \, USA
- Attila Ansal: "Damage to Water and Sewage Pipeline Systems in Adapazari During 1999 Kocaeli Earthquake", Istanbul Technical University, Turkey.
- John Makris: "Geophysical Modeling of Earth Parameters and their Implication in Assessing Seismic Hazard", University of Hamburg, Germany.
- Jacques Combault: "The Rion Antirrion Bridge", President International Association of Bridge and Structural Engineering, France.
- Zerva, Drexel University, School of Civil Engineering, USA.



1ο Πανελλήνιο Συνέδριο
ΜΕΓΑΛΩΝ ΦΡΑΓΜΑΤΩΝ

portal.tee.gr/portal/page/portal/teelar/EKDILWSEIS/damConference

Το συνέδριο θα διεξαχθή από τις 13 έως τις 15 Νοεμβρίου στο ξενοδοχείο Classical Imperial Hotel στην Λάρισα.

Βασικοί στόχοι του συνεδρίου είναι:

- Η ανάδειξη του ρόλου των φραγμάτων στους τομείς εξασφάλισης υδατικών πόρων, υδροηλεκτρικής ενέργειας, διαχείρισης πλημμυρών κλπ.
- Η παρουσίαση έργων από τον Ελληνικό χώρο και η άντληση εμπειρίας από παραδείγματα επιτυχημένων η μη έργων.
- Ο προβληματισμός γύρω από τις αδυναμίες του Ελληνικού συστήματος σχεδιασμού, κατασκευής και εκμετάλλευσης φραγμάτων (διαφορετικότητα των φορέων υλοποίησης, συχνά ανυπαρξία των φορέων λειτουργίας) .
- Η συμβολή στην επίτευξη ενός υψηλού επιπέδου ποιότητας σε όλες τις φάσεις υλοποίησης των έργων.
- Η συμβολή στην αποφυγή άστοχων επενδύσεων με την προβολή τεχνικοοικονομικών κριτηρίων υλοποίησης νέων φραγμάτων για τη διασφάλιση βέλτιστης σχέσης κόστους/οφέλους για κάθε έργο.
- Η ανάδειξη της σοβαρότητας της περιβαλλοντικής διάστασης και της κοινωνικής συνιστώσας για κάθε έργο, ώστε να λαμβάνονται υπόψη και να κοστολογούνται από τα αρχικά στάδια του σχεδιασμού.
- Η παρουσίαση της σύγχρονης διεθνούς τεχνογνωσίας που αφορά στην μελέτη, κατασκευή και την ασφαλή λειτουργία των φραγμάτων.
- Η παρουσίαση του θεσμικού πλαισίου που υπάρχει σε άλλες χώρες και η διατύπωση προτάσεων βελτίωσης της ασφάλειας των έργων με στόχο την σύνταξη εθνικού κανονισμού ασφάλειας φραγμάτων.
- Η συζήτηση συγκεκριμένων αποδοτικών έργων που θα δώσουν βέλτιστες λύσεις στο πρόβλημα περιοχών όπως η Θεσσαλία

Το θεματολόγιο του συνεδρίου διαμορφώθηκε ως εξής:

1. Φράγματα και Περιβάλλον

- Περιβαλλοντικός σχεδιασμός μεγάλων Φραγμάτων, Αειφόρος Ανάπτυξη.
- Εμπλουτισμός - αποκατάσταση υπόγειων υδροφορέων, δημιουργία υγροβιότοπων αντιπλημμυρική προστασία κ.λ.π.
- Περιβαλλοντικές επιπτώσεις από την κατασκευή και λειτουργία φραγμάτων - Μέτρα αντιμετώπισης
- Παραδείγματα (θετικά και αρνητικά) από την ελληνική και διεθνή πραγματικότητα.

2. Φράγματα & Ενέργεια

- Σημασία των φραγμάτων στον ενεργειακό σχεδιασμό
- Φράγματα και υβριδικά συστήματα παραγωγής ενέργειας

3. Φράγματα και Ολοκληρωμένη διαχείριση Υδατικών πόρων

- Τα Φράγματα ως έργα διαχείρισης Υδατικών Πόρων πολλαπλού σκοπού
- Συμβολή στην αποφυγή άστοχων επενδύσεων με την προβολή τεχνικοοικονομικών κριτηρίων υλοποίησης νέων φραγμάτων για τη διασφάλιση βέλτιστης σχέσης κόστους/οφέλους για κάθε έργο.
- Φράγματα και ολοκληρωμένος σχεδιασμός λεκανών απορροής
- Λεκάνη Θεσσαλίας και βέλτιστες λύσεις υλοποίησης Φραγμάτων

4. Διακινδύνευση και Ασφάλεια

- Προβληματισμός γύρω από τις αδυναμίες του Ελληνικού συστήματος σχεδιασμού, κατασκευής και εκμετάλλευσης φραγμάτων (διαφορετικότητα των φορέων υλοποίησης, συχνά ανυπαρξία των φορέων λειτουργίας)
- Συστήματα παρακολούθησης της συμπεριφοράς των έργων
- Διατύπωση προτάσεων βελτίωσης της ασφάλειας των έργων με στόχο την σύνταξη εθνικού κανονισμού ασφάλειας φραγμάτων.
- Παρουσίαση συμβάντων ή περιστατικών συγκεκριμένων έργων από την Ελλάδα ή το εξωτερικό

5. Εξελίξεις στις Μεθόδους σχεδιασμού & κατασκευ-ής

- Συμβολή στην επίτευξη ενός υψηλού επιπέδου ποιότητας σε όλες τις φάσεις υλοποίησης των έργων
- Υλικά κατασκευής Φραγμάτων
- Μέθοδοι κατασκευής, νέες τεχνικές
- Υδραυλικές κατασκευές Φραγμάτων
- Αντισεισμικός σχεδιασμός

6. Γεωλογία και Φράγματα

- Προβλήματα και αντιμετώπισή τους
- Σύγχρονες μέθοδοι έρευνας

ΑΡΘΡΑ

Το ακόλουθο άρθρο αποτελεί συμμετοχή του μέλους της ΕΕ της ΕΕΕΕΓΜ στο πρόσφατο *11th Baltic Sea Geotechnical Conference "Geotechnics in Maritime Engineering", 15 – 18 September 2008, Gdansk, Poland.*

European Geotechnical Standards

B. Schuppener, BAW - Federal Waterways Engineering and Research Institute, Karlsruhe, Germany

A. Anagnostopoulos, National Technical University of Athens, Greece

W. Linder, Germany

ABSTRACT: The paper presents of the European geotechnical Standards for geotechnical design (TC 250/SC 7), geotechnical investigation and testing (TC 341) and for the execution of special geotechnical works (TC 288)

1 Introduction

Die politische Einigung Europas ist mittlerweile so weit fortgeschritten, dass nicht mehr nur der Euro als Währung unser tägliches Leben beeinflusst. Auch unser Berufsleben wird in zunehmendem Maß von der europäischen Einigung bestimmt werden. Das betrifft insbesondere unsere Normen: statt der nationalen Normungsinstitute hat das Europäische Komitee für Normung (Comité Européen de Normalisation, CEN) die Planung und Steuerung von Normungsaufgaben übernommen, statt nationaler Normen-Ausschüsse erarbeiten Technische Komitees des CEN auf europäischer Ebene Normen und unsere Normen werden nicht mehr DIN-Normen, sondern DIN EN-Normen genannt.

Trotzdem bleibt auf nationaler Ebene eine Fülle von Aufgaben, denn die europäischen Normen müssen nicht nur in den baurechtlichen Rahmen der Staaten eingepasst werden. Wichtiger noch ist die Einpassung in das vorhandene technische Regelwerk der Länder, denn die nationalen Normen enthalten einen großen Erfahrungsschatz, der erhalten werden muss und auch nach europäischem Recht erhalten werden kann.

Erwähnen, dass es vier Gruppen von geotechnischen Normen gibt:

- geotechnical investigation and testing (CEN TC 341 and ISO/TC 182/SC 1))
- execution of special geotechnical works (CEN TC 288)
- geotechnical design (CEN TC 250/SC 7).

2 Standards for geotechnical investigation and testing

2.1 Identification and classification of soil and rock and laboratory tests

The first international standards on geotechnical testing were prepared by an ISO-Committee (ISO/TC 182/SC1). They deal with the identification and classification of soil and rock (see Table 1). As there are great differences in the concepts for the identification and classification for soils and rocks only a first step of harmonisation was achieved by defining common principles. Although these ISO-standards have been translated in the language of most member countries all member countries will still maintain their national standards for identification and classification.

Table 1: Standards for identification and classification of soil and rock

Standard Number	Short title	Publication	Remarks
EN ISO 14688-1	Identification of soil	2002	Review 2007
EN ISO 14688-2	Classification principles of soil	2004	
ISO 14688-3	Electronic data exchange - soil		Under development
EN ISO 14689-1	Identification of rock	2003	Review 2008
ISO 14689-2	Electronic data exchange - rock		Under development

The European Technical Committee (ETC 5) of the International Society for Soil Mechanics and Geotechnical Engineering drew up 12 recommendations for routine laboratory tests on soil, published by DIN/ISSMGE (1998). These recommendations were editorially revised to agree with the format of CEN-standards and were then published as Technical Specifications (see Table 2). All of them were sent out for review-enquiry and TC 341 decided to form a new Working Group, CEN/TC 341 WG6 "Laboratory tests on soils", to revise the drafts of the TS taking into account the comments received by the review-enquiry.

Table 2: Standards for laboratory tests on soils

Number	Short title	Remark
CEN-ISO/TS 17892-1	Water content	All will be revised taking into account the comments received by the review-enquiry.
CEN-ISO/TS 17892-2	Density of fine grained soils	
CEN-ISO/TS 17892-3	Density of solid particles	
CEN-ISO/TS 17892-4	Particle size distribution	
CEN-ISO/TS 17892-5	Oedometer test	
CEN-ISO/TS 17892-6	Fall cone test	
CEN-ISO/TS 17892-7	Compression test	
CEN-ISO/TS 17892-8	Unconsolidated triaxial test	
CEN-ISO/TS 17892-9	Consolidated triaxial test	
CEN-ISO/TS 17892-10	Direct shear test	
CEN-ISO/TS 17892-11	Permeability test	
CEN-ISO/TS 17892-12	Atterberg Limits	

Note: TS: Technical Specifications, for which the future development will be decided by CEN/TC 341 members and ISO.

2.2 Standards for drilling and sampling methods and groundwater measurements

TC 341 was established in 2000 when the progress in drafting the Eurocode on geotechnical design showed that standards for sampling, field and laboratory tests were a compelling prerequisite for a European harmonisation of geotechnical design.

The drilling and sampling methods and groundwater measurements are dealt with in Working Group 1 of CEN/TC 341 "Geotechnical Investigation and Testing".

Table 3: Standards for drilling and sampling methods and groundwater measurements

Standard Number	Short title	Publication	Remarks
EN-ISO 22475-1	Sampling - Principles	2006	
CEN-ISO/TS 22475-2	Sampling - Qualification criteria	2006	
CEN-ISO/TS 22475-3	Sampling - Conformity assessment	2007	
EN-ISO 22282-1	General rules	2010	All at enquiring stage
EN-ISO 22282-2	Permeability tests using open systems	2010	
EN-ISO 22282-3	Water pressure tests	2010	
EN-ISO 22282-4	Pumping tests	2010	
EN-ISO 22282-5	Infiltrometer tests	2010	
EN-ISO 22282-6	Permeability tests using closed systems	2010	

2.3 Standards on field tests

Working Group 2 of TC 341deals with the standardisation of vane tests and cone penetration tests, Working Group 3 deals with dynamic probing and Standard Penetration tests (see Table 4) and Working Group 5 deals with borehole expansion tests (see paragraph 2.5).

Table 4: Standards on vane tests and cone penetration tests

Standard Number	Short title	Remarks
EN-ISO 22476-1	Electrical cone penetration test	Formal Vote stage, reactivation is pending
EN-ISO 22476-2	Dynamic probing	Published 2005
EN-ISO 22476-3	Standard penetration test	Published 2005
EN-ISO 22476-9	Field vane test	Reactivation is pending
EN-ISO 22476-12	Mechanical cone penetration test	Formal Vote stage
CEN-ISO/TS 22476-10	Weight sounding test	Adopted as TS in 2005, review in 2008.

2.4 Standards on testing of geotechnical structures

Pile load tests, testing of anchorages, nailing and reinforced fill is the assignment of Working Group 4 "Testing of geotechnical structures". The programme is very ambitious (See Table 5). For five of the 7 standards the work has stopped but for the most important items, test on axially loaded piles in compression and testing of anchorages, we will have European standards in the coming years. For anchorages some of the problems arose from the fact that three committees were involved: TC 250/SC 7 for the design, TC 288 for the execution and TC 341 for the testing of anchorages. As TC 288 was the first committee to deal with anchorages in EN 1537 it had also adopted in its annexes provisions for the design (Annex D) and testing (Annex E) of anchorages. In 2007 it was decided by the three committees that with the revision of EN 1537 these annexes will be deleted and the design of anchorages will be covered in Eurocode 7 "Geotechnical design" and testing of anchorages will be dealt by WG 4 of TC 341 in EN-ISO 22477-5 "Testing of anchorages". The three committees will agree on common definitions and symbols.

Table 5: Standards on testing of geotechnical structures

Number	Short title	Remarks
EN-ISO 22477-1	Pile load test – stat. axially loaded compression	Under preparation for formal vote.
EN-ISO 22477-2	Pile load test – stat. axially loaded tension	No progress
EN-ISO 22477-3	Pile load test – stat. transversally loaded	No progress
EN-ISO 22477-4	Pile load test – dyn. axially loaded compression	No progress
EN-ISO 22477-5	Testing of anchorages	Comments of enquiry received
EN-ISO 22477-6	Testing of nailing	No progress
EN-ISO 22477-7	Testing of reinforced fill	No progress
EN-ISO 22476-13	Plate loading test	No progress
EN-ISO XXXX	Rapid axially loaded compression test	New work item

2.5 Borehole expansion tests

Working Group 5 of TC 341 deals with borehole expansion tests (see Table 6).

Table 6: Standards on Borehole expansion tests and the weight sounding

Number	Short title	Remarks
EN-ISO 22476-4	Menard Pressuremeter	Under preparation for formal vote.
EN-ISO 22476-5	Flexible dilatometer	Sent for second enquiry
EN-ISO 22476-6	Self-boring pressuremeter	First draft will be circulated
EN-ISO 22476-7	Borehole jack	Sent for second enquiry
EN-ISO 22476-8	Full displacement pressuremeter	First draft will be circulated
EN-ISO/TS 22476-11	Flat dilatometer test	Adopted as TS in 2005, review in 2008.
CEN-ISO/TS 22476-X	Phicometer shearing test	Work item standard is pending

3 Standards for the execution of special geotechnical works

In enger Zusammenarbeit mit dem Subkomitee 7 (CEN/TC 250/SC 7), das den Eurocode 7, "Entwurf, Berechnung und Bemessung in der Geotechnik bearbeitet", wurde 1991 auf Initiative der EFFC (Abkürzung für?) vom CEN das Technische Komitee „Ausführung von besonderen geotechnischen Arbeiten (Spezialtiefbau)" (CEN/TC 288) eingerichtet. Die Arbeitsgruppen dieses Komitees haben in sehr kurzer Zeit eine große Zahl von Norm-Entwürfen erarbeitet (see Table 7).

National Application Documents

Table 7: Standards of CEN Committee TC 288 – Execution of Special Geotechnical Works

Document	Title	Remark
EN 1536:1999	Bored Piles	Next review 2007
EN 1537: 1999	Ground Anchors	Next review 2007
EN 1538:2000	Diaphragm Walls	Next review 2007
EN 12063:1999	Sheet Piling	Next review 2010
EN 12699:2000	Displacement Piles	Next review 2010
EN 12715:2000	Grouting	Next review 2010
EN 12716:2001	Jet Grouting	Next review 2011
EN 14199:2005	Micro Piling	Next review 2011
pr EN 14490:2005	Soil Nailing	Disbanded 2005, revived 2006
EN 14475:2006	Reinforcement of Fills	Next review 2011
EN 14679:2005	Deep mixing	Next review 2010
EN 14731:2005	Deep vibration	Next review 2010
EN 15237:2007	Vertical drains	Next review 2012

4 EN 1997 Eurocode 7: Geotechnical design

4.1 General

EC 7-1 was ratified by the CEN Members States and published by CEN in November 2004 when the two-year calibration period started during which each National Standards Body (NSB) has to write its National Annex (NA) to EC 7-1. The NA makes EC 7-1 operable and serves as a link between EC 7-1 and the national standards. After the calibration period and a further 3-year coexistence period EC 7-1 will become mandatory in all EU Member States in around 2010. National standards covering the same items as EC 7-1 will then have to be withdrawn.

In May 2006, EC 7-2 was unanimously ratified by the CEN Members and will be implemented in the EU Member States by the same procedure and a similar timetable. A National Annex has to be written to make EC 7-2 operable and to provide a link to the national standards covering additional items for ground investigation and testing. For the history of EC 7 see Schuppener & Frank (2006).

4.2 Contents of Eurocode 7

4.2.1 Part 1: General rules

EC 7-1 (CEN, 2004) includes sections

– on the basis of geotechnical design of different types of foundations and earthworks including spread foundations, pile foundations, anchorages, retaining structures and embankments, on hydraulic failure and overall stability as well as

– on geotechnical data, supervision of construction, monitoring and maintenance, on fill, dewatering, ground improvement and reinforcement.

It should be used for all the problems involving the interaction of structures with the ground (soils, rocks and groundwater) through foundations or retaining structures. It addresses not only buildings but also bridges and other civil engineering works. It permits the calculation of the geotechnical actions on the structures, as well the resistances of the ground subjected to the actions from the structures. It also includes all the provisions and rules for good practice required to conduct the geotechnical side of a structural design properly or, more generally speaking, to carry out a purely geotechnical project.

EC 7-1 is a rather general document – an umbrella code - giving only the principles for geotechnical design within the general framework of Limit State Design (LSD). These principles are relevant to the calculation of the geotechnical actions on structures (buildings and civil engineering works) and to the design of the structural elements themselves in contact with the ground (footings, piles, basement walls, etc.). Detailed design rules or calculation models, i. e. precise formulae or charts, are only given in informative Annexes. The main reason is that the parameter assessment and design models in geotechnical engineering differ from one country to another and it was not possible to reach a consensus, especially when many of these models still need to be calibrated and adapted to the LSD approach.

That is why Annex A only gives recommended values for the partial factors for verifications of the Ultimate Limit State (ULS) in persistent and transient design situations ('fundamental combinations') as well as correlation factors for the characteristic values of pile bearing capacity. The actual values may be set by the Member States in the NA. Moreover, EC 7-1 has provided the option of three alternative design approaches for the verification of geotechnical ultimate limit states in persistent and transient design situations ("fundamental combinations").

4.2.2 Part 2: Ground investigation and testings

The role of EC 7-2 (CEN, 2006), which is devoted to laboratory and field testing, is primarily to cover the planning of the tests, their evaluation and, finally, the derivation of values of geotechnical parameters which are the basis for the characteristic values to be determined by EC 7-1 as input to design models. It complements the requirements of EC 7-1 in order to ensure safe and economic geotechnical designs. It provides the link between the design requirements of EC 7-1, in particular the section on geotechnical data, and the results of a number of laboratory and field tests. It does not cover the standardization of the geotechnical tests themselves. (Another Technical Committee (TC) on Geotechnical investigation and testing has been created by CEN specifically to address this matter (TC 341)). In this respect, the role of EC 7-2 is to elaborate on the application of the test results which serve as input to characteristic values for design, referring to the detailed rules for test standards covered by TC 341. EC 7–2 includes sections on

- planning of ground investigations,
- soil and rock sampling and groundwater measurements,
- field tests in soils and rocks,
- laboratory tests on soils and rocks and
- the ground investigation report.

EC 7-2 also includes a number of informative Annexes with examples of methods to determine de-rived values of geotechnical parameters and coefficients commonly used in design. Some of these annexes give guidance on the use of the sample calculation models in the annexes of EC 7-1. Although the Annexes are informative, they present a clear picture of the approaches existing in Europe for the use of field or laboratory test results in the design of geotechnical structures. For details see SCHUPPENER & FRANK (2006).

4.3 Provisions for the implementation in the member states

Under the Public Procurement Directives of the European Commission (EC, 2004), it will be mandatory for the Member States to accept designs to the EN Eurocodes. Therefore, EN Eurocodes will be-come the standard technical specifications for all public works contracts. It will not be mandatory to design to the EN Eurocodes in a particular Member State, but a designer proposing to use alternative design standards will have to demonstrate that the alternative is technically equivalent to an EN Eurocode solution.

Three basic principles that have to be adhered to when harmonizing European standards have been set out by the European Commission in Guidance Paper L - Application and use of Eurocodes (2003a). The principles are as follows:

- Eurocodes must be introduced in all EU Member States by the National Standards Bodies.
- National standards in the technical fields in which European standards exist must be withdrawn after a transitional period but
- national standards in the technical fields not covered by European standards are permitted as long as they do not conflict with the Eurocodes.

The three language versions of Eurocode 7: Geotechnical design - Part 1: General rules (EC 7-1) were published by CEN Management Centre in November 2004. This is the official Date of Availability and from now on the European Member States have a period of two years - known as the National Calibration Period - in which to prepare the national versions of EC 7-1. These will comprise

- a national title page and national foreword,
- the full text of the Eurocode with all annexes and
- a National Annex.

The National Annex (NA) is needed as a link between the Eurocode and the national standards of the Member States. One of the most important principles for drafting and implementing the Eurocodes is stated in clause 2.1 National Provisions for the structural design of works of Guidance Paper L:

2.1.1 The determination of the levels of safety of buildings and civil engineering works and parts thereof, including aspects of durability and economy, is, and remains, within the competence of the Member States.

That is why the Eurocodes only state recommended values of the partial factors; the actual values may be set by the Member States in the NA. Moreover, Guidance Paper L states that the national competence to determine the level of safety may also comprise the use of alternative design methods (see 2.1.2). EC 7-1 has made use of this option of alternative design approaches for the verification of geotechnical ultimate limit states (GEO). To make EC 7-1 operational in the Member States, the NA will therefore

- define the values of the partial safety factors,
- select the national design approaches and
- draw up specifications on the use of the informative annexes of EC 7-1.

Then there are two more important rules for writing a national annex. Guidance Paper L also stipulates the following:

2.3.4 A National Annex cannot change or modify the content of the EN Eurocode text in any way other than where it indicates that national choices may be made by means of Nationally Determined Parameters.

That is why the foreword of each Eurocode includes a list of those paragraphs in which national choice is allowed. No other changes or modifications are permitted:

2.1.6 National Provisions should avoid replacing any EN Eurocode provisions, e.g. Application Rules, by national rules. ... When, however, National Provisions do provide that the designer may deviate from or not apply the EN Eurocodes or certain provisions thereof, then the design will not be called "a design according to EN Eurocodes.

To make EC 7-1 operational in the Member States, the National Annex will therefore

- give specifications on the use of the informative annexes of EC 7-1,

– define the values of the partial safety factors and correlation factors,

– select the national design approaches for different geotechnical structures and

– give references to national standards.

National standards will still be used as EC 7-1 is an umbrella code; however, the national standards have to be adapted to the format of the Eurocodes.

As a result of these basic provisions, we will have the following hierarchy of Eurocodes as illustrated in Figure 1 for Germany and its national DIN-standards for waterway engineering: At the top of the hierarchy, we have the Eurocode: Basis of design and Eurocode 1: Actions on structures with several parts and annexes. They are the basis for structural design all over Europe.

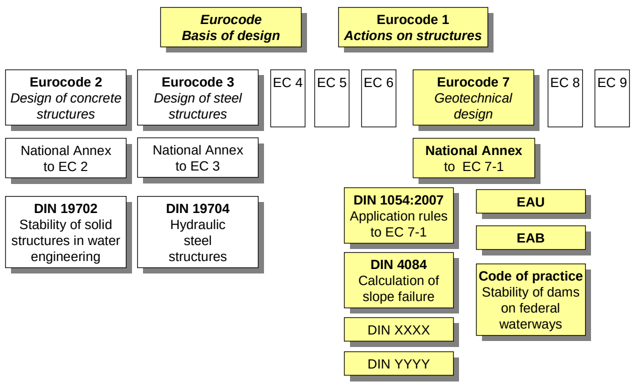


Figure 1: Future hierarchy of standards in Germany illustrated for waterway engineering

All other Eurocodes refer to these two Eurocodes: from EC 2: Design of concrete structures to Eurocode 9: Design of Aluminium structures. Most of the Eurocodes are more or less umbrella codes. So a design cannot be performed using Eurocodes alone as the values for the partial factors are recommended values, for example. Moreover, most of the ECs only give options for design procedures. So every country must decide on its own safety level and decide which DA must be used in the various verifications. That is why we need national annexes (NA). The special application of the Eurocode in each member state is laid down in the NAs. Thus the NAs make the Eurocodes operable in every Member state. In future, the Member States will still be permitted to have national standards as long they do not compete or conflict with Eurocodes or general provisions. So the national annexes will also act as an interface between the Eurocodes and national standards.

4.4 Procedures of ULS verifications of Eurocode 7

4.4.1 General

The ultimate limit states (ULS) to be checked are defined in the following manner by Eurocode 7 – Part 1 and are consistent with Eurocode: Basis of structural design (CEN 2002) (clause 2.4.7.1 in EN 1997-1) :

'(1)P Where relevant, it shall be verified that the following limit states are not exceeded:

– *loss of equilibrium of the structure or the ground, considered as a rigid body, in which the strengths of structural materials and the ground are insignificant in providing resistance (EQU);*

– *internal failure or excessive deformation of the structure or structural elements, including footings, piles, basement walls, etc., in which the strength of structural materials is significant in providing resistance (STR);*

– *failure or excessive deformation of the ground, in which the strength of soil or rock is significant in providing resistance (GEO);*

– *loss of equilibrium of the structure or the ground due to uplift by water pressure (buoyancy) or other vertical actions (UPL);*

– *hydraulic heave, internal erosion and piping in the ground caused by hydraulic gradients (HYD).*

NOTE: Limit state GEO is often critical to the sizing of structural elements involved in foundations or retaining structures and sometimes to the strength of structural elements.'

Thanks to the Eurocodes, a single format will be used for the mathematical analysis of the ultimate limit states throughout the construction sector in Europe in future. Accordingly, for any section in a structure, structure-soil interface or the soil, it will have to be verified that the design value of the effects of actions, E_d, never exceeds the design bearing capacity or the design resistances, R_d, i.e.:

$$E_d \leq R_d \qquad (1)$$

There has to be a clear-cut distinction between the effects of actions and resistances in order for the general limit state equation (1) to be applied. Such a distinction can be made without much difficulty in other fields of structural engineering. However, in geotechnical engineering, there are many cases in which it is not possible to make a clear-cut distinction between the effects of actions and the resistances. For instance, the action of the active earth pressure also depends on the shearing resistance or the shear strength in the failure surface of the active sliding wedge. In other cases, the resistance of the soil depends on the magnitude of the action. For instance, the sliding resistance is governed by the magnitude of the effect of the action due to the vertical component of the bearing pressure resultant.

Additional problems concerning the application of equation (1) are caused by the fact that there are two entirely different ways of introducing the partial safety factors in geotechnical engineering, as described below.

– On the one hand, the design values, E_d and R_d, of the geotechnical effects of actions and resistances can be determined by what is known as the method of factored shear parameters (MFA: 'material factor approach') . In this method, the 'material' partial factors are applied to the characteristic shear parameters, φ'_k and c'_k. Thus the design value of the effective coefficient of friction, $\tan \varphi_d$, is determined by dividing the characteristic coefficient of friction, $\tan \varphi'_k$, by the partial factor for friction, c_K. Similarly, the design cohesion, c'_d, is obtained by dividing the characteristic cohesion, c'_k , by the partial factor for cohesion, γ_c, i.e.:

$$\tan \varphi'_d = \tan \varphi'_k / \gamma_\varphi \qquad (2)$$

$$c'_d = c'_k / \gamma_c \qquad (3)$$

The design values of the geotechnical actions and resistances, E_d and R_d, to be used in the limit state equation (1) are then determined with the design values of the shear parameters, φ'_d and c'_d.

– On the other hand, there is the method of factored actions and resistances (RFA: 'resistance factor approach'). In this method, the characteristic values of the actions, effects of actions and resistance of the soil, F_k, E_k and R_k respectively, are determined using the characteristic values of the shear parameters, φ'_k and c'_k. The design values of the geotechnical effects of actions, E_d, (stresses, internal forces and moments) and the resistances are then obtained by applying the partial factors for the geotechnical effects of actions and resistances, γ_E and γ_R, to the characteristic values, i.e.:

$$E_d = E_k \cdot \gamma_E \qquad (4)$$

$$R_d = R_k / \gamma_R \qquad (5)$$

The different ways of introducing the partial factors into the calculation explained above are the principle reason why Eurocode 7 - Part 1 offers three different methods of verifying GEO ultimate limit states for persistent and transient situations. The choice of design approach can be determined nationally by each National Standards Body. Yet different design approaches can be used to verify different limit states. The numerical values of the partial factors to be applied in a given design procedure can also be determined nationally and must be specified in the National Annex to EC 7-1.

The three design approaches of Eurocode 7 - Part 1 differ in the way in which they distribute the partial factors between geotechnical actions and resistances (see Table 8). The concept of partial factors differentiates between the partial factors on actions or effects of actions and those on the resistances. As regards the actions and effects of actions, a distinction is made between actions coming from the structure and actions coming from the ground.

Table 8: Recommended values of partial factors for persistent and transient situations for the design of shallow foundations and slopes in accordance with Annex A of Eurocode 7 - Part 1

Design Approach		Actions or effects of actions: of the structure	Actions or effects of actions: of the ground	Resistance of the ground
DA 1	Comb. 1	γ_G = 1.35; $\gamma_{G,inf}$ = 1.00; γ_Q = 1.50		$\gamma_R = \gamma_{\varphi'} = \gamma_{c'} = \gamma_{cu}$ = 1.0
	Comb. 2	γ_G = 1.00; γ_Q = 1.30	$\gamma_{\varphi'} = \gamma_{c'}$ = 1.25; γ_{cu} = 1.40; γ_R = 1.0	
DA 2, DA 2*		γ_G = 1.35; $\gamma_{G,inf}$ = 1.00; γ_Q = 1.50		$\gamma_{R;e} = \gamma_{R;v}$ = 1.40; $\gamma_{R;h}$ = 1.10 $\gamma_{\varphi'} = \gamma_{c'} = \gamma_{cu}$ = 1.0
DA 3		γ_G = 1.35; $\gamma_{G,inf}$ = 1.00; γ_Q= 1.50	$\gamma_{\varphi'} = \gamma_{c'}$ = 1.25; γ_{cu} = 1.40; γ_R = 1.00	

γ_G: partial factor for unfavourable permanent actions,
$\gamma_{G;inf}$: partial factor for favourable permanent actions
γ_Q: partial factor for unfavourable variable actions (for favourable variable actions γ_Q = 0)
$\gamma_{R;e}$: partial factor for passive earth pressure
$\gamma_{R;v}$: partial factor for ground bearing resistance
$\gamma_{R;h}$: partial factor for resistance to sliding

With regard to the design values for accidental situations, Eurocode 7 only states that (clause 2.4.7.1 in EN 1997-1):

'(3) All values of partial factors for actions or the effects of actions in accidental situations should normally be taken equal to 1.0. All values of partial factors for resistances should then be selected according to the particular circumstances of the accidental situation.

NOTE The values of the partial factors may be set by the National annex.'

Although the verification of serviceability limit states (SLS) is a issue of equal importance in contemporary geotechnical design it gave rise to only a few difficult discussions, unlike the ultimate limit states, when Eurocode 7 was drawn up. That is why the issue of SLS will probably will not play an important part in future discussions on further harmonization.

4.4.2 Design Approach DA 1

In Design Approach DA 1, two combinations of partial factors have to be investigated. Combination 1 aims to provide safe design against unfavourable deviations of the actions from their characteristic values. Thus, in Combination 1, partial factors greater than 1.0 are applied to the permanent and variable actions from the structure and the ground. The recommended factors are: γ_G = 1.35 for unfavourable permanent actions, $\gamma_{G;inf}$ = 1.00 for favourable permanent actions and γ_Q = 1.50 for variable actions. The factors are the same as those used in other fields of structural engineering and they are consistent with those specified in EN 1990: Basis of structural design. By contrast, the calculations for the ground resistance are performed with characteristic values, i.e. the partial factors γ_φ, γ_c and γ_{cu}, which are all set at 1.00, are applied to the shear parameters; the partial factor for the ground resistance, γ_R, is also 1.00.

Combination 2 of Design Approach DA 1 aims to provide safe design against unfavourable deviations of the ground strength properties from their characteristic values and against uncertainties in the calculation model. It is assumed that the permanent actions correspond to their expected values and the variable actions deviate only slightly from their characteristic values. Thus, the partial factors $\gamma_{\varphi'}$, $\gamma_{c'}$ and γ_{cu} with numerical values of 1.25 or 1.40 are applied to the characteristic values of the ground strength parameters while the characteristic values of the permanent actions from the structure (with γ_G set at 1.00) are used in this verification. The partial factors are applied to the representative values of the actions and to the characteristic values of the ground strength parameters at the beginning of the calculation. Thus the entire calculation is performed with the design values of the actions and the design shear strength.

Of the two combinations, the one resulting in the larger dimensions of the foundation will be relevant for designs according to Design Approach DA 1. More details on the use of the three Design Approaches are given in FRANK ET AL. (2004), for instance.

4.4.3 Design Approaches DA 2 and DA 2*

In Design Approach DA 2, only one verification is ever required unless different combinations of partial factors for favourable and unfavourable actions need to be dealt with separately in special cases. In DA 2, the partial factors applied to the geotechnical actions and effects of actions are the same as those applied to the actions on or from the structure, i. e. $\gamma_G = 1.35$, $\gamma_{G;inf} = 1.00$ and $\gamma_Q = 1.50$. The partial factors given in Table 1 are recommended for the ground resistances.

There are two ways of performing verifications according to Design Approach DA 2. In the design approach referred to as "DA 2" by FRANK ET AL. (2004), the partial factors are applied to the characteristic actions right at the start of the calculation and the entire calculation is subsequently performed with design values. By contrast, in the design approach referred to as "DA 2*" by FRANK ET AL. (2004), the entire calculation is performed with characteristic values and the partial factors are not introduced until the end when the ultimate limit state condition is checked. As characteristic internal forces and moments are obtained in the calculation, the results can generally also be used as a basis for the verification of serviceability.

4.4.4 Design Approach DA 3

Similarly, only one verification is required for Design Approach DA 3. The partial factors applied to the actions on the structure or coming from the structure are the same as those used in Design Approach DA 2. However, for the actions and resistances of the ground, the partial factors are not applied to the actions and resistances but to the ground strength parameters, φ', c' or cu instead. The recommended values for $\gamma_{\varphi'}$, $\gamma_{c'}$ and γ_{cu} are 1.25 and 1.40. The partial factors are applied to the representative values of the actions at the beginning of the calculation and to the characteristic values of the ground strength parameters. Thus, in Design Approach DA 3, the entire calculation is performed with design values of the actions and the design shear strength.

4.5 State of implementation and dicisions on the design approaches of EC 7-1 by the European member States

4.5.1 General

Questionnaires were sent to the Member States in 2005 and 2006 to collect information about the stage that had been reached in the implementation of EC 7-1, the drafting of the National Annex and the selection of the partial factors and design approaches. The questionnaire circulated in 2006 was more detailed in so far as the selection of the design approaches and the numerical values of the partial factors was linked to practical examples. The examples were taken from geotechnical design examples prepared for the International Workshop on the Evaluation of EC 7-1 held in Trinity College, Dublin on 31st March and 1st April 2005 (ORR, 2006). The aim of the questionnaire was

– to stimulate the discussion on problems of implementing and applying EC 7-1 in the European Member States and

– to support and discuss with the Joint Research Centre (JRC) of the European Commission the next steps in their mandate to contribute to the implementation, harmonization, international promotion and further development of the Eurocodes.

The questionnaires were sent to the National Standards Bodies of the Member States of the European Union and to the affiliated Member States of CEN. Not all were returned by January 2007. Some of them were not filled in completely as some Member States had not concluded their decision-making process on which design approaches and partial factors to use in geotechnical verifications. Other questionnaires contained quite detailed explanations and reports on the discussions. The following sections can therefore only give an overview of the most important aspects of the implementation of EC 7-1 reached by January 2007.

4.5.2 GEO ultimate limit states

The decisions of the Member States with respect to the selected design approaches for the GEO ultimate limit states are presented in Table 9 (The names of the countries have been abbreviated using the vehicle country identification codes). The design approaches had to be stated for the design of

Table 9: Selection of Design Approach in the European Member States (as at January 2007)

Design example	No/incomplete answers from	Design approach of EC 7-1				
		All DAs	DA 1	DA 2	DA 2*	DA 3
Shallow foundation	N, CZ, M, S, EST, LV, CY, IS, H, BG	IRL	B, UK, P, LT, I, RO	F, SK, I	D, A, E, PL SLO, GR	CH, NL, DK
				SF, L		
Piles		IRL	B, UK, P, LT, I, RO	F, SK, CH, SF, D, A, E, NL, SLO, PL, DK, GR, L		NL
Retaining structures		IRL	B, UK, P, LT, I, RO	F, SK, CH, SF, D, A, E, SLO, PL, GR, L		NL, DK
Slopes		IRL	B, UK, P, LT, I	F,E		NL,F,SK,CH,SF,D,A, PL, DK, SLO, GR, L, RO
Total:	10	1	5-6	2 - 13		2 – 13

– a shallow foundation where the ground bearing capacity and sliding failure had to be verified;

– a pile foundation for bored and driven piles based on soil parameter values and pile load tests;

– a retaining structure of an anchored sheet pile quay wall - design of embedment depth - and

– a road embankment constructed over soft clay where the maximum height had to be determined based on an analysis of the slope stability.

One Member State has decided to admit all three design approaches. Five countries have decided to use Design Approach DA 1 in all GEO ultimate limit states. Between 11 and 13 Member States have made design approaches DA 2 and DA 2* mandatory for shallow foundations, piles and retaining structures whereas two or three have chosen Design Approach DA 3. However, almost all Member States that have selected Design Approach DA 2 or DA 2* for shallow foundations, piles and retaining structures have decided that Design Approach DA 3 will be mandatory for slope stability, except for Spain. In most cases, the use of DA 3 for slopes is in effective similar to that of Combination 2 in DA 1.

The partial factors for the three design approaches recommended in Annex A of EC 7-1 are presented in the first line of each design example in Tables 3, 4 and 5. The second line shows the Member States and their choice of partial factors if they differ from the recommended values.

There are no great deviations from the recommended values of the partial factors for the verification of pad foundations (see Table 10) when the design approaches DA 1 and DA 2 are adopted. However, the variance in partial factors is greater for Design Approach DA 3. The Netherlands reduces almost all factors except the factor on the cohesion intercept c´ in terms of effective stresses; Switzerland reduces the factor on the effective angle, ´, of shearing resistance but increases the factor on the cohesion intercept, c´. Switzerland even uses a factor of $_{G,fav}$ = 0.80 for favourable permanent actions.

Table 10: Selection of partial factors for GEO limit states for pad foundations

Design example	DA 1: recommended factors MS: Differing values	DA 2: recommended factors MS: Differing values	DA 3: recommended factors MS: Differing values
Example 2: Pad foundation, verification of ground bearing capacity	C.1: γ_G = 1.35; $\gamma_{G,fav}$ = 1.0; γ_Q=1.50 C.2: γ_G= 1.0; γ_Q= 1.30; γ_φ= 1.25; $\gamma_{c'}$ = 1.25, γ_{cu}= 1.40;	γ_G =1.35; $\gamma_{G,fav}$ =1.0; γ_Q=1,5, $\gamma_{R;v}$ = 1,4	γ_φ= γ_c=1.25; γ_{cu}=1.40;γ_Q= 1.3, structure: γ_G= 1.35; $\gamma_{G,fav}$= 1.0; γ_Q=1.5
	IRL:C.1: γ_{cu} = 1.25 B:C.2: γ_Q = 1.10 LT: $\gamma_{G,fav}$ = 0.90; I: C.1: γ_G = 1.5, $\gamma_{G,fav}$ = 1.3; C.2: $\gamma_{G,fav}$ = 1.0, γ_G = 1.3; γ_c= 1.4, $\gamma_{R,v}$ =1.8;	E: global Factor $\gamma_{R;v}$ = 3.0, F: $\gamma_{R;v}$ = ? I: γ_G =1.5,$\gamma_{G,fav}$ =1.3, $\gamma_{R,h}$=1.1 L, SK undecided	CH: γ_φ= 1.2; γ_c= 1.5; γ_{cu}= 1.5; structure: $\gamma_{G,fav}$= 0.8 NL: γ_φ=1.15, γ_c=1.6; γ_{cu}=1.35; structure: $\gamma_{G,fav}$= 0.90; DK: γ_φ= 1.2; γ_c= 1.2, γ_{cu}= 1.8; structure: γ_G = 1.2 / 1.0; $\gamma_{G,fav}$= 1.0 / 0.9
Example 2: Pad foundation,verification of sliding resistance	C.1: $\gamma_{G;unfav}$=1.35; $\gamma_{G,fav}$=1.0; γ_Q=1.50 C.2: γ_G= 1.0; γ_Q= 1.30; $\gamma_{\varphi'}$ = $\gamma_{c'}$ = 1.25, γ_{cu}= 1.40;	$\gamma_{G;unfav}$= 1.35; $\gamma_{G,fav}$=1.0; γ_Q= 1.50, $\gamma_{R;h}$ = 1.10	γ_φ= γ_c=1.25; γ_{cu}=1.40; γ_Q= 1.30, structure: γ_G= 1.35; $\gamma_{G,fav}$=1.0; γ_Q=1.5
	B:C.2: γ_Q = 1.10 I: C.1: γ_G = 1.5, $\gamma_{G,fav}$ = 1.3, C.2: γ_c= 1.4, $\gamma_{G,fav}$ = 1.0, $\gamma_{R;h}$ = 1.1 LT: $\gamma_{G,fav}$ = 0.90;	IRL: $\gamma_{R;h}$ = 1.40 E: global factor $\gamma_{R;h}$ = 1.5 F: $\gamma_{R;h}$ = ? L, SK undecided	CH:γ_φ=1.2; structure: $\gamma_{G,fav}$ = 0.8 NL: γ_φ=1.15, γ_c=1.6; γ_{cu}=1.35; structure: $\gamma_{G,fav}$ = 0.90; DK: γ_φ= 1.2; γ_c= 1.2, γ_{cu}= 1.8; structure: γ_G = 1.2 /1.0; $\gamma_{G,fav}$= 1.0 / 0.9

C.1: Combination 1 of DA 1, C.2: Combination 2 of DA 1,
γ_G : partial factor for unfavourable permanent actions,
$\gamma_{G;fav}$: partial factor for favourable permanent actions
γ_Q : partial factor for unfavourable variable actions (for favourable variable actions $_Q$ = 0)
$\gamma_{R;e}$: partial factor for passive earth pressure on the side of the shallow foundation
$\gamma_{R;v}$: partial factor for ground bearing resistance
$\gamma_{R;h}$: partial factor for resistance to sliding
γ_φ : partial factor for the angle of shearing resistance
γ_c : partial factor for the effective cohesion
γ_{cu} : partial factor for the undrained shear strength

Approaches DA 1 and DA 2 were chosen for pile design by all Member States except the Netherlands (see Table 11). No Member State adopted the recommended values for bored piles without alteration and five Member States have not yet decided on the values of the partial factors. The situation is more homogeneous for the design of driven piles derived from pile load tests as the tests give a more reliable basis for the design.

Table 11: Selection of partial factors for GEO limit states in pile foundations

Design example	DA 1: recommended factors	DA 2: recommended factors	DA 2: recommended factors
	MS: Differing value	MS: Differing value	MS: Differing value
Example 3: foundation with bored piles – design of the pile length from soil parameter values	C.1: γ_G =1.35; γ_Q=1.50; γ_b=1.25; γ_s= 1.0; γ_t= 1.15; C.2: γ_G=1.0; γ_Q=1.30; γ_b= 1.6; γ_s= 1.3; γ_t= 1.5	γ_G=1.35; $\gamma_{G;fav}$=1.0; γ_Q=1.5; γ_b= 1.1; γ_s= 1.1; γ_t= 1.1;	γ_G=1.35; $\gamma_{G;fav}$=1.0; γ_Q=1.5; γ_b= 1.1; γ_s= 1.1; γ_t= 1.1;
	UK: C.2: γ_t= 1.6 P, IRL: C.1 and C.2: γ_R =1.5 LT: C.1 and C.2: γ_R =1.4 I: C.1: γ_G = 1.5, $\gamma_{G,fav}$ = 1.3, γ_b= γ_s= 1.0; γ_t= 1.2; C.2: γ_G = 1.3, γ_b= γ_s=1.35, γ_t= 1.6 RO: C.1: γ_b = γ_s = γ_t = 1.0; C.2: γ_b = γ_s= β_t= 1.3; B: undecided	CH: γ_t= 1.4 E: global γ_R = 3.0 D: γ_b= 1.4; γ_s= 1.4; γ_t= 1.4; SLO, SF, GR, A: γ_R = 1.3 + ξ (Table A.10) DK: γ_G= 1.2 / 1.0; γ_b= 1.3; γ_s= 1.3; γ_t= 1.3; γ_R= 1.0; ξ = 1.5 PL, F, L, SK: undecided	NL: CPT-method: $\gamma_{G,fav}$=0.90; material factor on q_c: γ_b = γ_s= γ_t=1.2 and ξ (Table A.10)
Example 4: pile foundation – determination of the number of piles from pile load tests on driven piles	C.1: γ_G= 1.35; γ_Q= 1.50; γ_b= γ_s= γ_t= 1.0; C.2: γ_G= 1,0; γ_Q= 1.30; γ_b= 1.3; γ_s= 1.3; γ_t= 1.3	γ_G =1.35; γ_Q=1.50; $\gamma_{G;fav}$= 1.0 γ_b= 1.1; γ_s= 1.1; γ_t= 1.1;	γ_G =1.35; $\gamma_{G;fav}$= 1.0; γ_Q=1.5; γ_b= 1.1; γ_s= 1.1; γ_t= 1.1;
	IRL: C.2: γ_t=1.3; C.2: γ_t=1.50; LT: C.1: γ_t= 1.1, γ_R =1.3; C.2: γ_t = 1.5, γ_R =1.3 P: C.2: γ_R =1.0 I: C.1: γ_G= 1.5; $\gamma_{G,fav}$ = 1.3, γ_b= γ_s= 1.0, γ_t= 1.2 ; C.2: γ_G= 1,3; γ_b= 1.35; γ_s= 1.3, γ_t= 1.6 RO: C.1: γ_t= 1.6, C.2: γ_t= 1.3; B: undecided	CH: γ_t= 1.3; D: γ_t= 1.20 ; γ_R = 1.05 DK: γ_G = 1.2 / 1.0; γ_t= 1.3 ; γ_R = 1.0; ξ = 1.1 / 1.25 E, F, L, SK, PL: undecided	NL: γ_G = 1.20; γ_R = 1.2 and ξ (Table A.9)
List of symbols see also Table 3 γ_b: partial factor on the base resistance γ_s: partial factor on the shaft resistance γ_t: partial factor for the total resistance of the pile γ_R: model factor			

Most Member States will use the partial factors recommended in EC 7-1 for the verification of the embedment depth of anchored sheet pile quay walls (see Table 5), but there are some changes to the conservative and some to the less conservative side. However, it is interesting to note that the Netherlands has chosen noticeably lower partial factors for the soil parameters and for the actions coming from a structure. It should also be noted that Switzerland has a highly differentiated way of factoring earth and water pressures, Germany and Austria apply reduced partial factors in transient design situations while Spain again uses the global concept.

Most Member States have introduced Design Approach DA 3 for the verification of slope stability (see Table 12). However, none of the countries has adopted all of the partial factors recommended in Annex A of EC 7-1 although the differences are not very great. The Member States that selected De-sign Approach DA 1 adopted the recommended partial factors of Annex A, except for Belgium which reduced the partial factor for the variable action in Combination 2 to γ_Q = 1.10 and Lithuania which reduced the partial factor on favourable actions to $\gamma_{G;fav}$ = 0.90. Design Approach DA 2 was only selected by Spain which retained the global safety concept.

The evaluation of the results of the comparative design for the workshop in Dublin (see ORR, 2005) indicates that, for slope stability, Design Approach DA 1 Combination 2, which is very similar to Design Approach DA 3, will be relevant for design. So, in a next step towards harmonization, a reduction in the number of design approaches and partial factors could be possible for the verification of slope stability, taken in isolation. However, it will be necessary to ensure that situations including slopes, retaining structures and foundations acting in combination are accommodated, which is the benefit claimed for DA 1. A result which is also quite promising for future harmonization is the fact that all Member States use the partial factor on weight density, γ_γ, of 1.0 as recommended in Table A.4 of EN 1997-1.

Table 12: Selection of partial factors for GEO limit states of retaining walls and slopes

Design example	DA 1: recommended factors	DA 2: recommended factors	DA 3: recommended factors
	Member State: Differing value	Member State: Differing value	Member State: Differing value
Example 7: anchored sheet pile quay wall	C.1: γ_G=1.35; $\gamma_{G;fav}$= 1.0; γ_Q= 1.50 C.2: γ_φ= 1.25; γ_G= 1.0; γ_Q= 1.30	$\gamma_{G;unfav}$=1.35; $\gamma_{G;fav}$ =1.0; γ_Q= 1.5; $\gamma_{R;e}$ = 1.40	γ_φ= γ_c= 1.25; γ_{cu}=1.40; γ_Q= 1.30; structure: γ_G=1.35; $\gamma_{G,fav}$=1.0; γ_Q=1.5
	B: C.2.γ_Q = 1.10 I: C.2: γ_c=1.40 IRL: C.1: γ_G= $\gamma_{G;fav}$= 1.35 LT: undecided	D: $\gamma_{G;fav}$=1.35 CH: γ_G(Water)= 1.20; $\gamma_{G;fav}$= 0.80; E: global $\gamma_{R;e}$ = 1.8 F, SK, L, PL: undecided	NL: γ_φ = 1.15, γ_c =1.05, γ_{cu} =1.6; structure: $\gamma_{G,fav}$= 0.9; γ_Q=1.0 DK: γ_φ = 1.2; structure: γ_G=1.2/1.0; $\gamma_{G,fav}$= 1.0/0.9;
Example 10: road em-bankment – determination of the maxi-mum height using the slope stability as criterion	C.1: γ_G = 1.35; $\gamma_{G,fav}$= 1.0; γ_Q= 1.5; C.2: γ_G= 1.0; γ_Q= 1.3, γ_φ= γ_c= 1.25, γ_{cu}=1.40;	γ_G = 1.35; $\gamma_{G;fav}$= 1.0, γ_Q= 1.5; $\gamma_{R;e}$= 1.1 $\gamma_{\varphi'}$ = $\gamma_{c'}$ = γ_{cu}=1.0;	γ_φ= γ_c=1.25; γ_{cu}=1.40; γ_Q= 1.30; $\gamma_{R;e}$=1.0; structure: γ_G= 1.35; $\gamma_{G,fav}$=1.0; γ_Q=1.5, $\gamma_{R;e}$= 1.0
	B: C.2: γ_Q = 1.10; IRL: C.1: γ_G= $\gamma_{G;fav}$ =1.35 LT: C.1: $\gamma_{G,fav}$ = 0.90;	F: $\gamma_{R;e}$ = 1.5 for soft soils E: global $\gamma_{R;e}$ = 1.5 IRL: $\gamma_{R;e}$= 1.1;	D, A: γ_{cu}= 1.25; CH: γ_φ=1.2; γ_c= 1.5, γ_{cu}= 1.5; NL: γ_c= 1.45, γ_{cu}= 1.75; GR: γ_φ= γ_c=1.40; γ_{cu}=1.50; DK: γ_φ = 1.2; γ_c= 1.2, γ_{cu}= 1.8; Structure: SF, D, GR, CH: γ_G= $\gamma_{G,fav}$ =1.0 NL: $\gamma_{G,fav}$= 0.9 DK: γ_G =1.2 /1.0; $\gamma_{G,fav}$= 1.0/0.9 PL, F, L, SK: undecided
List of symbols see Table 10 and 11 $\gamma_{R;e}$: partial factor for earth resistance			

4.6 Further steps towards implementation and harmonization

4.6.1 Education and training

The general policy of the European Commission is to improve the competitiveness of the construction industry. Further harmonization is therefore necessary. Establishing the design approaches and the values of the partial factors for the verifications in each Member State and specifying them in a National Annex is only the first step in the implementation of a Eurocode. It is obvious that extensive training is required in the Member States if the EN Eurocodes are to be applied adequately. The training of staff is the responsibility of industry in cooperation with national authorities and National Standards Bodies and will be supported by the European Commission. Training programmes have been established in all the Member States and numerous courses and seminars have been held. Even in Croatia, a future EU Member State, a course on EC 7-1 was held in May 2007.

4.6.2 Maintenance

Maintenance of the Eurocodes is essential to preserve their credibility, integrity and relevance, as well as to ensure that they do not contain any errors. Especially after their implementation and initial application, the Eurocodes are likely to give rise to technical, editorial and possibly legal questions. Therefore, maintenance will involve:

– correction of errors

– technical amendments with regard to urgent matters of health and safety

– technical and editorial improvements

– resolution of matters of interpretation

– elimination of inconsistencies and misleading statements

– development of new items.

CEN/TC250 is responsible for the maintenance of the Eurocodes which will proceed according to CEN rules. A special Maintenance Group of Subcommittee 7 (SC 7) which is in charge of Eurocode 7 was established in October 2006 to deal with these items with respect to EC 7-1.

All feedback from the application of the Eurocodes in the Member States should be submitted to the National Standards Bodies (NSB) using templates and processed by the responsible and competent national standardization committee according to national rules (see Figure 2). The comments should be dealt with as far as possible by the NSBs in the Member States; only comments that have an effect on corrections or amendments and matters of interpretation should be forwarded to SC 7 or its Maintenance Group.

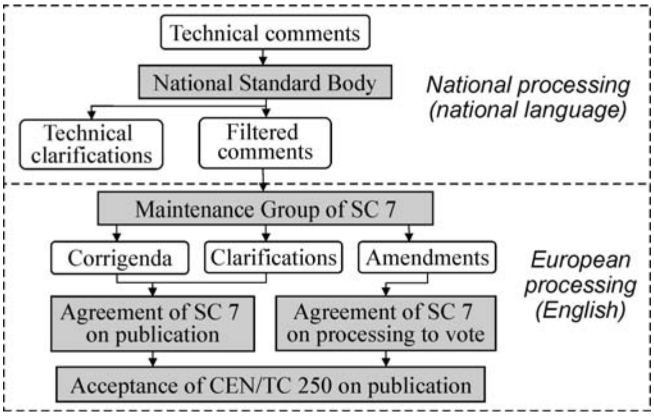


Figure 2: Flowchart for the maintenance of the Eurocodes

The maintenance activities should be divided into three parts:

– the short term (immediate or within a year)

– the medium term (the regular five-year review)

– the long term (greater than five years)

The short-term activities involve the technical amendments with regard to urgent matters of safety and the correction of technical and editorial errors (e.g. mistakes in symbols, typographical errors). Corrigenda will eventually be issued at the end of the short-term period.

Reviews of European Standards will be initiated by the relevant Technical Committee (TC) four years after ratification of the EN at the latest. The appropriate SC is responsible for the scientific and technical aspects of those parts of the EN Eurocode that fall within its responsibility and field of competence. The review of the technical and editorial improvements and the resolution of matters of interpretation will be prepared by the Maintenance Group which will collect, identify and analyse the comments. The Maintenance Group will also consider whether liaisons need to be established with other SCs and CEN/TCs for structural components, execution or testing. Eventually, drafts for corrigenda, clarifications of matters of interpretation and amendments will be prepared for the SC. These drafts must all be agreed upon by the SC by resolution. To ensure efficiency and consistency, CEN/TC 250 will coordinate the publication of corrigenda and amendments to the EN Eurocode Parts produced by the SCs.

The general issues for further harmonization are laid down in a recommendation of the Commission as follows:

Member States should use the recommended values provided by the Eurocodes. When nationally determined parameters have been identified in the Eurocodes, they should diverge from those recommended values only where geographical, geological or climatic conditions or specific levels of protection make that necessary.

Member States should, ..., compare the nationally determined parameters implemented by each Member State and assess their impact as regards the technical differences for works or parts of works. Member States should, at the request of the Commission, change their nationally determined parameters in order to reduce divergence from the recommended values provided by the Eurocodes. (EC (2003b))

Although the Member States retain sole responsibility for the levels of safety of works they are strongly encouraged to minimize the number of cases in which recommendations for a value or method are not adopted for their Nationally Determined Parameters (NDP). Therefore, the principal objectives of further harmonization are as follows:

– the reduction of NDPs in the EN Eurocodes resulting from different design cultures and pro-cedures in structural analysis

– the reduction of NDPs and their variety through the strict use of recommended values

– the gradual alignment of safety levels across Member States.

Moreover, it is important to harmonize not only the values of the NDPs (harmonization across national borders), but also the design procedures.

This work of the Maintenance Group will be supported by the development and maintenance of an EN Eurocodes informatics platform by the Joint Research Centre of the EC in Ispra, Italy. The platform includes the NDPs and National Annexes database as well as a database of background documents on the recommended values and on the reasons for deviations in the National Annexes. This will permit the statistical analysis of the NDPs and support both the expert analysis and the elaboration of technical justification documents.

4.6.3 Research for further harmonization

4.6.3.1 General

In the long term, matters relating to the development of new items will be examined, e.g. the harmonization of calculation methods or the evaluation of test results with respect to the selection of characteristic values of ground parameters in geotechnical design. New EN Eurocodes or Parts can only be developed following appropriate studies and research along with substantial practical experience. Research is encouraged by the following recommendation of the Commission:

Member States should undertake research to facilitate the integration into the Eurocodes of the latest developments in scientific and technological knowledge. Member States should pool the national funding available for such research so that it can be used at Community level to contribute to the existing technical and scientific resources for research within the Commission, in cooperation with the Joint Research Centre, thus ensuring an ongoing increased level of protection of buildings and other civil works, specifically as regards the resistance of structures to earthquakes and fire. (EC (2003b))

For geotechnical design this may include, e.g.

– comparative studies of the different design approaches and values of partial factors used in geotechnical verifications in the Member States to evaluate the potential for further harmonization and

– investigations of the interpretation und evaluation of field and laboratory tests in the Member States with respect to the establishment of characteristic values of ground parameters.

The general issues for further harmonization are laid down in the following European Commission recommendation (EC (2003b)):

Member States should use the recommended values provided by the Eurocodes. When nationally determined parameters have been identified in the Eurocodes, they should diverge from those recommended values only where *geographical, geological or climatic conditions or specific levels of protection make that necessary.*

Member States should, ..., compare the nationally determined parameters implemented by each Member State and assess their impact as regards the technical differences for works or parts of works. Member States should, at the request of the Commission, change their nationally determined parameters in order to reduce divergence from the recommended values provided by the Eurocodes.

Although the Member States retain sole responsibility for the levels of safety of works they are strongly encouraged to minimize the number of cases where recommendations for a value for their Nationally Determined Parameters (NDP) are not adopted. Moreover, it is important to harmonize not only the values of the NDPs (harmonization across national borders), but also the Design Approaches given as options in EC 7-1.

Therefore, the principal objectives of further harmonization of EC 7-1 and EC 7-2 are as follows:

– the harmonization of parameter evaluation based on field and laboratory tests

– the harmonization of the models used for the calculation of geotechnical actions and resistances

– the reduction of NDPs and their variety,

– the gradual alignment of safety levels across Member States and

– the reduction of Design Approaches from different design cultures.

4.6.3.2 Eurocode 7-1 General rules

Questionnaires linked to practical examples (also see section 5) were sent to the CEN Members to gather information about the selection of the partial factors and design approaches). The examples were taken from geotechnical design examples prepared for the International Workshop on the Evaluation of EC 7-1 held in Trinity College, Dublin 2005 (ORR, 2005). The evaluation of the questionnaires showed the following distinct results (SCHUPPENER, 2007):

– All three design approaches given as options in EC 7-1 for the verification of ground limit states are used by the Member States.

– Most Member States selected their own values of the partial factors of safety and will only partly use the values recommended in Annex A of EC 7-1.

– However, there are limit states where the results of the design are at first sight not so different in spite of the variability of design approaches and factors of safety used.

– For Member States where seismic conditions apply, most of the model factors need to be defined and quantified for a sound and economical geotechnical design.

Research is needed to investigate the potential for harmonization in geotechnical design. It should be conducted in the following steps for each typical geotechnical structure and/or limit state:

– collection of detailed information on the application of EC 7-1 (i.e. design approach, partial factors and calculation model) in the Member States for the verification of the geotechnical structure and/or limit state;

– comparative calculations and studies on the different applications of the EC 7-1 with respect to the resulting design;

– evaluation of the results with respect to the potential for harmonization;

– recommendations for the adaptation of EC 7-1 and/or Nationally Determined Parameters.

4.6.3.3 Eurocode 7-2 Ground investigation and testing

There are no Nationally Determined Parameters in EC 7-2. However, this part of Eurocode 7 contains a number of informative annexes in which procedures are described on how the test results

– can be evaluated with respect to the determination of values of geotechnical parameters and coefficients commonly used in design or

– can be used directly for geotechnical design.

Some of these Annexes - especially the ones related to field tests - give guidance on the use of the values in the sample calculation models in the Annexes of EC 7-1. Further research should be directed towards the harmonization of accepted and well-proven procedures given in the annexes as well as towards extending the existing data base. In spite of the large number of known procedures for the evaluation of the results of laboratory and field tests little is known about their acceptance and application in specific design examples in the Member States. Thus, the research above also needs to include the evaluation of the potential for harmonization of the procedures for the evaluation of field and laboratory tests in the Member States with a view to establishing derived values.

For each of the recommended procedures the research should be carried out in the following stages:

– gathering information on the application of the procedure in the Member State;

– comparative studies on the differences in the applications;

– evaluation of the results with respect to the potential for harmonization and

– recommendations for the adaptation and/or adoption as a standard procedure in EC 7-2.

5 Concluding remarks

The work on the elaboration of a common framework for geotechnical design throughout Europe, i.e. Eurocode 7, started nearly 25 years ago. Part 1 of EC 7 - General rules - has been completed and the European Member States are now starting to implement it in their national systems of standards. EC 7-1 is an umbrella code as analytical geotechnical models are given in informative annexes instead of the normative core text. Moreover, EC 7-1 contains a number of options which have to be decided upon by the national standards bodies, such as three design approaches for the verification of geotechnical ultimate limit states and the values of the partial factors. On the one hand, this is of course a shortcoming for a code but, on the other hand, it constitutes an openness which makes the adoption and the implementation of the code attractive, not only in Europe but also world-wide, as a gradual evolution of national traditions of design procedures is possible. However, further harmonization will be necessary in future to improve the competitiveness of industry and promote sustainable development. The evaluation of questionnaires on the selection of the design approaches for the verification of geotechnical ultimate limit states and the values of the partial factors in the Member States shows that there is great potential for the harmonization of geotechnical design in Europe which must be investigated by research to support and prepare the next steps in standardization.

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ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΤΕΧΝΙΚΩΝ ΕΠΙΣΤΗΜΟΝΩΝ

Κύριε Συνάδελφε,

δια της παρούσης θα ήθελα να πληροφορήσω την Εταιρεία ότι πρόσφατα ειδοποιήθηκα από το Ευρωπαϊκό Συμβούλιο Έρευνας (ERC) ότι η πρότασή μου "MEDIGRA", έτυχε ευμενών κρίσεων και έγινε αποδεκτή προς χρηματοδότηση.

Επισυνάπτω τη σχετική επιστολή και κατάλογο. Η πρόταση αυτή αφορά στη βασική έρευνα και ειδικότερα στον πειραματικό προσδιορισμό και θεωρητική προσομοίωση των μηχανισμών κατανάλωσης σε μικροκλίμακα του μηχανικού έργου σε θερμότητα σε κοκκώδη υλικά με πεδίο εφαρμογής την Γεωμηχανική και Γεωφυσική της γένεσης και εξέλιξης καταστροφικών κατολισθήσεων και σεισμών. Το πρόγραμμα είναι 5ετές και έχει ύψος χρηματοδότησης περίπου 2.5Μευρώ. Σημειωτέον ότι υπεβλήθησαν στη εν λόγω περιοχή (Physical Sciences & Engineering στο πρόγραμμα ERC Advanced Grants) συνολικά 997 προτάσεις από όλη την Ε.Ε. και χρηματοδοτούνται 105. Από την Ελλάδα κρίθηκαν επιτυχείς δύο προτάσεις και οι δύο από το ΕΜΠ: του Καθηγ. κ. Γκαζέτα και η δική μου.

ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΠΡΟΕΔΡΟΣ

Αριθμ.Πρωτ.: 7713 Αθήνα, 21.08.08

Προς: τον Καθηγ. Γ. Γκαζέτα

Θέμα: Συγχαρητήρια για διάκριση στο πρόγραμμα IDEAS/European Research Council

Αγαπητέ κ. Γκαζέτα,

Σας συγχαίρω εκ μέρους της Σχολής μας για την πολύ μεγάλη επιτυχία και διάκριση στο πρόγραμμα IDEAS του European Research Council με την πρόταση σας: «DARE Soil-Foundation-Structure Systems Beyond Conventional Seismic "Failure" Thresholds: Application to New or Existing Structures and Monuments». Είναι γνωστό ότι το πρόγραμμα αυτό είναι εξαιρετικά ανταγωνιστικό. Φέτος, στην κατηγορία των προτάσεων των Advanced Grants, από 1000 προτάσεις χρηματοδοτήθηκαν 100, από τις οποίες δύο μόνο προέρχονται από την Ελλάδα και ειδικότερα από το ΕΜΠ (η δεύτερη είναι του συναδέλφου Καθηγητή της ΣΕΜΦΕ κ. Ι. Βαρδουλάκη, τον οποίο επίσης συγχαίρουμε θερμά). Στους χαλεπούς καιρούς που ζούμε στο Πανεπιστήμιο, με την μεγάλη ανάλωση χρόνου και ενέργειας για την εφαρμογή των 'αυτονόητων', τέτοιου είδους διακρίσεις σε διεθνούς κύρους ανταγωνιστικά προγράμματα είναι σημαντικές και πρέπει να προβάλλονται.

Και πάλι συγχαρητήρια!

Η Πρόεδρος

Μ.Α.Μιμίκου

Κοιν.:

- ✓ Μέλη ΔΕΠ ΕΜΠ

Σημαντικό για την Εταιρεία μας είναι το γεγονός ότι και η τρίτη χρηματοδοτηθείσα πρόταση στα πλαίσια του εν λόγω προγράμματος που αφορά στο engineering είναι του Καθηγ. G. Pijaudier Cabot και αφορά επίσης στη γεωμηχανική.

Φιλικά
Ιωάννης Βαρδουλάκης
Καθηγητής

EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL

Directorate S - Implementation of the "Ideas" programme
Administration and finance

Brussels, 25/07/2008
S.4(2008)D/559050

Prof. Ioannis Vardoulakis
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Iroon Politechniou 5
EL-15773 Athens

Sent by electronic mail only

Programme "Ideas" - Call identifier: ERC-2008-AdG
Proposal No 228051 - MEDIGRA

Dear Prof. Vardoulakis,

I am pleased to inform you that the ERC Dedicated Implementation Structure (ERC-DIS) is now in a position to initiate the preparation of the granting process for proposals under the AdG call, including your proposal entitled: "Mechanics of Energy Dissipation in Dense Granular materials".

The results of the proposal evaluations have already been transmitted to you, yet you will find attached to this letter a copy of the Evaluation Report (ER) for your convenience. The Evaluation Report reflects the comments of the independent experts on the proposal and their advice to the ERC-DIS, which the ERC-DIS intends to follow.

The ERC Grant Agreement specific conditions applying to your project, to be considered by the ERC-DIS when preparing the grant agreement, are attached to this letter.

Following the evaluation, and on the basis of the ERC Grant Agreement specific conditions, it is estimated that the maximum Community financial contribution to your project could be up to 2.450.000,00 Euro for a period of up to 60 months. Please note that, where considered appropriate (please refer to the comments of the Panel Members in the Evaluation Report), you are expected to take into consideration changes to the technical content and the financial aspects of the Description of Work, which will form Annex I to the ERC Grant Agreement.

During a later stage of the granting process, we will request additional information via the Grant Agreement Preparation Forms (GPFs). These are standard forms used to collect the information needed by the ERC-DIS, in order to prepare the grant agreement and to gather programme-wide statistical information. This is done via an online web application (NEF), and these forms can be printed as GPFs. Your Host Institution will receive the details of the web-site address for updating information in the GPFs in due course, as well as log-in details and guidelines on how to use the NEF application.

Commission européenne, B-1049 Bruxelles / Europese Commissie, B-1049 Brussel - Belgium. Telephone: (32-2) 299 11 11.

It is important to note that before preparing the GPFs you, as Principal Investigator, should prepare the related Description of Work which must be based on the proposal submitted and updated, if necessary.

The other documents listed under point 1 of the appendix titled "List of Required Documents" of this letter should be sent by the administration of your Host Institution via email to the Commission at the address indicated in point 3 of the ERC GA specific conditions as soon as possible but not later than 5 weeks from reception of the present invitation letter.

Failure to respect this deadline without justification may be considered by the Commission as an indication that you do not wish to enter into the preparation for a grant agreement and therefore withdraw your proposal. In such a case, the Commission will initiate 8 weeks after the procedures to reject your proposal.

Please note that the granting process must be completed as soon as possible, and by December 2008 at the latest.

This letter should by no circumstances be regarded as a formal commitment by the Commission to provide financial support, as this depends on the satisfactory conclusion of the preparation of the grant agreement and the internal completion of the formal selection process.

Should you need further details concerning drafting the Description of Work of your proposal, or concerning financial and administrative issues, you are invited to contact the administrative officer indicated under point 3 of the ERC Grant Agreement specific conditions.

Other important and useful documents needed for the granting process can be found at the web addresses listed in the appendix titled "Useful documents".

Please acknowledge receipt of the present letter by return e-mail and inform us if the contact person named in the proposal has changed in the meantime. It is important that the name and address of the contact person are updated because he/she will receive from us the log-in and access information on how to enter the web application (NEF) and produce the GPF Forms.

Yours sincerely,

(signed)

Martin BOHLE
Head of Unit

cc. Prof. Polyzos Yannis

Appendices: ERC Grant Agreement specific conditions
List of required documents and detailed instructions
Useful Documents

Encl.: Evaluation Report
Statement about the interest/non interest bearing nature of the bank account
Templates of budget tables
Checklist of required documents
Flowchart

2

ΑΝΑΦΟΡΕΣ ΤΟΥ ΤΥΠΟΥ ΣΕ ΤΕΧΝΙΚΑ ΘΕΜΑΤΑ

We recycle cans and bottles, why not buildings?

Since the first curbside recycling program was initiated in 1987, Seattleites have become accustomed to recycling paper, glass, metals and yard waste. Many see it as their civic duty and a way to help the environment.

Still, the city of Seattle sends by truck and train more than 50 percent — 440,000 tons per year — of its municipal waste to landfills, much of it to Bend, Ore. A large percentage of municipal landfill waste is from construction and demolition debris, estimated to be between 20 and 30 percent nationally.

Construction and demolition waste is produced from new construction and renovation of buildings, and by the demolition of existing buildings. Such waste is an enormous environmental problem because of the sheer volume of discarded construction-related refuge dumped into landfills.

We recycle cans, bottles and even plastic bags, so why not reuse older buildings? There are many good reasons to do so, and opportunities and benefits abound to reduce such waste.

First, it's very costly and energy consumptive: Municipal waste that must be loaded, hauled, transferred from trucks to trains, processed and dumped into landfills costs between $50 and $75 per ton.

Second, it pollutes: Fuel used in the handling and disposal contributes significantly to environmental impacts and carbon emissions. Landfills are filling up, and the sites themselves pose environmental hazards from loss of natural-resource lands, leaching of toxic chemicals and release of methane gas.

Third, it's wasteful: Most construction debris — such as land clearing, wood, metal, glass, asphalt and concrete rubble — is fully reusable at lower cost than the production of new materials. Upstream, reducing construction and demolition waste reduces the need for the extraction and processing of raw materials, product manufacture and eventual disposal.

And finally, the preservation and adaptive reuse of older buildings — especially historic landmarks — as compared with new construction is considered to be one of the most sustainable "green building" practices achievable.

Climate-protection strategies must address the issue. In the United States, building construction and operations account for 48 percent of greenhouse-gas emissions. The U.S. Environmental Protection Agency sees enormous benefits from preventing construction and demolition waste, and has made it a top policy priority over land-filling, incineration and even recycling.

In Seattle, nearly 700 buildings were torn down last year to make way for new buildings. This is an enormous lost source of renewable, embodied energy. A recent study by the Brookings Institution projects that by the year 2030, we will have demolished and replaced 82 billion square feet of our existing building stock, or nearly one-third of our 300 billion square feet of space in the U.S. today.

How many bottles and metal cans would we have to save and recycle to match an equivalent amount of construction and demolition waste and embodied energy — the amount of energy originally embedded in the materials and expended through extraction, processing and construction?

There is no reason why durable buildings of all types and ages cannot be adaptively reused, retrofitted, or at least deconstructed and recycled, rather than be demolished and hauled off to landfills.

While preservation laws help protect our valued historic landmarks, incentives and possibly new regulations are needed to address waste of building stock. For example, Portland, Ore., mandates that all building projects valued at over $50,000 separate on site and recycle all nontoxic construction materials. New York City provides tax incentives, electric rebates and employs rezone strategies to encourage reuse and conversion of commercial buildings to residential.

King County's GreenTools recycling program emphasizes education and outreach to contractors and suburban cities on the environmental and economic benefits of reuse and recycling. Another approach would be to impose a federal carbon tax on the demolition of existing buildings, calculated on the embodied energy wasted in disposing of the structure.

The bottom line: Landfills should no longer be an option for used but otherwise clean and durable building materials. Policymakers, preservationists and architects need to push green building practices into the 21st century by promoting the environmental, economic and community benefits of building reuse and recycling. State and local governments should establish working guidelines, programs and incentives to promote the reuse, retrofit and reinvestment of older buildings.

The energy invested in the existing built environment must be seen as a tangible resource of economic, environmental and cultural value, not to be wasted. In this way, preservation and reuse can be our "greenest" tools of sustainability.

Peter Steinbrueck, left, is an architect and former member of the Seattle City Council. Kathryn Rogers Merlino is an architectural historian and an assistant professor of architecture at the University of Washington.

(The Seattle Times, Peter Steinbrueck and Kathryn Rogers Merlino, Tuesday, September 16, 2008)

TEMPTING SEISMIC DISASTER

Bay Area schools need quake-proofing

Bill Savidge, engineering officer for the West Contra Costa Unified School District, recently appraised a structurally unsound, circa-1957 three-story school in the Richmond hills that he said is 1,000 yards from the dangerous Hayward fault.

Adams Middle School, with 900 students, is on a state inventory of nearly 8,000 older school buildings that engineers say are prone to collapse during a major quake. It lacks even a complete shear wall, a basic seismic safety structure that absorbs some of the force of a quake.

"This is our next priority," Savidge said.

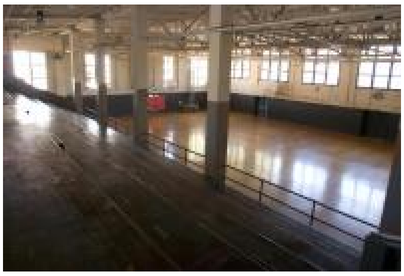
But he's frustrated that it doesn't qualify for a still-untapped $199.5 million state fund for school retrofits. "It's quite upsetting for us," he said.

When voters in 2006 approved Proposition 1D, a $10.4 billion school construction bond, $199.5 million was set aside to establish the state's first fund dedicated to paying for seismic retrofits at public schools.

First in line were districts with structures on the state inventory of seismically vulnerable buildings.

But two years later, not a dime has been spent to move thousands of students and their teachers into modern classrooms designed to survive even severe shaking, or shore up existing school structures with steel anchors and braces.

"That's one of the biggest stories out there," Savidge added.



Other Bay Area school administrators with older Other Bay Area school administrators with older seismically vulnerable buildings were dismayed as well at the challenge in qualifying for the money. The funds will be awarded based on a U.S. Geological Survey system assessing hazard risk from a quake.

"We're still trying to figure out how we have a school identified by the state (as a collapse hazard) and sitting within a half mile from the Hayward fault, and still not qualify," said Jerry Macy, deputy superintendent of the Castro Valley Unified School District.

Sen. Ellen Corbett, D-San Leandro, fell silent for a moment when learning that none of the $199.5 million from Proposition 1D that she'd maneuvered to set aside for school retrofits was in use.

"I'm just shocked that money hasn't moved into the hands of school districts to do retrofit work," Corbett said.

Later that day, an aide to Corbett — who heads the Senate Select Committee on Earthquakes and Disaster Preparedness — said the state senator will hold a committee hearing in November to investigate why the funds haven't been disbursed.

The Office of Public School Construction will award money from the $199.5 million retrofit fund. Rob Cook, executive officer of the state agency, said guidelines for applying for the funds were finished April 30, which focused on directing the money to the buildings at greatest risk.

Cook said, "$199.5 million is not much when you're getting into construction costs."

"We wanted to make sure we were taking care of the worst first," he said.

But when designated state funds remain unused, it can make it nearly impossible to ask voters for a bigger sum next time, said Tom Duffy, a lobbyist for the Coalition for Adequate School Housing.

And there's no debate that more is needed.

The concern centers on the 2002 inventory of close to 8,000 school buildings — about 1,000 of them in the Bay Area — that were built between 1933 and 1978. These were deemed at risk of collapse during a major earthquake and urgently in need of evaluation. If they fail the review, districts need to either retrofit or demolish the buildings. In 1978, the state bolstered the building code for public schools with many seismic safety protections, so structures built since then are exempt from the list. Because of the 1933 Field Act, California schools are also built to higher seismic safety standards than other buildings.

The older school buildings of concern are generally made of concrete with inadequate steel reinforcements or with weak roof-to-wall connections, or both. The buildings are at risk for wall or roof collapse during a major earthquake, or columns that tumble over, as earthquakes have proved.

"The buildings on this list are vulnerable to sustaining significant damage during an earthquake," wrote State Architect David Thorman, in an e-mail. Thorman heads the Division of the State Architect, which oversees school construction.

The state fund will only put a nick in an estimated $9 billion price tag for retrofitting or replacing the older school structures that are deemed deficient.

But the $199.5 million, when used, will spell safety for thousands more students during the inevitable earthquakes that rock California, with its more than 1,000 known faults.

And loosening up the state funds will give a boost of confidence to school districts that commit to a thorough seismic review of their buildings. Many district chiefs describe the dilemma of discovering a serious, potentially life-threatening deficiency in buildings they can't afford to fix.

"There is some uneasiness," said Savidge, of knowing a few of his campuses serving many hundreds of students, as well as staff, are vulnerable. Bond money approved by local voters, however, paid for new, seismically sturdy campuses elsewhere in his district, such as a magnificent 20,000-square-foot campus under construction at El Cerrito High School. There just wasn't enough for all the schools.

"It's hard for districts to look at the problem," agreed Lew Jones, director of facilities and maintenance with the Berkeley Unified School District. "You've bought liability without having a solution." Berkeley voters approved bond measures that paid for complete retrofits or rebuilding of almost all the buildings on district campuses — a $300 million project — although the district embarked on the effort without the security of bond money.

"We issued debt in order to move forward very quickly," Jones said.

When faced with the news that some of his school buildings were on the list, however, the superintendent of the Moraga School District in Contra Costa County decided to forgo evaluating the buildings, including several "concrete tilt-up" structures that are among the most seismically hazardous.

"We're caught between a rock and a hard place," said Rick Schafer, the superintendent. "Something built to code is now out of compliance, and we've got no funding to do anything about this."

But that's not a valid reason to avoid a seismic review, the Earthquake Engineering Research Institute in Oakland stated in a news release issued after the May 12 earthquake in China, which killed 10,000 students inside collapsed classrooms. Some California schools, the institute stressed, aren't immune from building collapses during major quakes.

"Ignorance is not bliss," the statement said.

And only 10 percent of the state's 1,052 school districts have requested the state inventory, according to a spokesman with the state architect's office.

Part of the reason, however, is reflected in the fact that several districts surveyed for this article were unaware of the list. Liberty Union High School District in Brentwood, for example, learned of the list through a 2003 Contra Costa Times article. Three districts on the Peninsula, which is sliced through by the San Andreas fault, only learned of it through this newspaper's recent inquiries.

The state, for reasons no government official can or will explain, prohibited the inclusion of school names when the report was issued. Instead, districts must ask the state for the list, stated a 2003 letter sent by the Division of the State Architect to every district in the state, a step that may explain part of the poor participation by districts.

Last week, the agency began sending letters again to every district, reminding them of the list, Thorman added.

But several Bay Area district administrators also described a "head-in-the-sand" mentality that contributes to the low number of districts requesting the list.

"The challenge is if you ask the question, what do you do with the information?" said Therese Gain, director of facilities management for the Fremont Unified School District. "Our answer was to go out to the public for a health and safety bond."

Her district's campuses boast numerous retrofits. But she, too, said the state qualifications for the $199.5 million in funding were "so restrictive we don't qualify."

"That was a good bill that was passed," said Leland Noll, an administrative director with the Alameda City Unified School District, speaking of the legislation creating the seismic safety inventory of public schools.

"As soon as something is identified, you're liable to take care of it," Noll said. And it helps districts get "first in line" for funding, he added.

"That's a great position to be in," Noll said. "So hiding your head in the sand isn't the way to get these problems resolved."

(Suzanne Bohan, Contra Costa Times, 21 Σεπτεμβρίου 2008)

Professor works to create earthquake-proof structure

A civil engineering professor at Colorado State University, John W. van de Lindt, has joined four other universities in a project to help create an earthquake sound structure for building and houses.

The project's goal is to create a structure that a six- or seven-story building can sit on and remain unscathed after even the worst earthquake.

The structure, which acts as the foundation of the building, is built using pendulum sliders and allows the entire house to move back and forth without shaking and crumbling, to put it in layman's terms.

"It reduces the acceleration of the Earth by 300 percent," van de Lindt said. "You could probably put a glass of water in there, and it wouldn't spill."

Van de Lindt conducted a shake-table test on Friday to assess the system using a two-story home built to half-scale. He simulated three historic earthquakes.

"The whole building rocks with the same motion no matter how hard we shake it," he said.

This is one of four tests van de Lindt and others are conducting around the world as part of a four-year study.

The project kicked-off with a $1.37 million grant from the National Science Foundation to develop a new design approach for wood-frame buildings in earthquake-prone areas.

Colorado State University completed one test in 2006, along with another at the State University of New York-Buffalo. The final test will occur next summer in Japan with a seven-story, 17,000-square-foot building.

"This study will give people in the high seismic zones another option," said Hongyan "Sueellen" Liu, a civil engineering doctoral student who helped design the project.

Liu said she became interested in the project because she came from a country where it was not uncommon to see earthquakes tear buildings apart.

"This study can help reduce damage and save people's lives," she said.

(Hallie Woods, Fort Collins (Colo.) Coloradoan, 22 September 2008)

Retrofit plan to ride out quake at Cal stadium

Seismic engineers apparently have solved one of the world's great retrofit puzzles: how to keep UC Berkeley's Memorial Stadium from crumbling into a pile of concrete rubble during a major earthquake.

It took decades of research, experimentation and head-scratching, but a team of San Francisco engineers says it has found a way to save the beloved landmark in Strawberry Canyon, which straddles the state's most dangerous earthquake fault.

"I'll sleep well at night, even if I have season tickets in Section KK," said David Friedman, lead engineer on the long-awaited Memorial Stadium retrofit project. "We've come up with a unique solution to a very unique problem."

The plan, which is expected to get under way in the next year or two, calls for portions of the stadium to be sliced into blocks that will rest on plastic sheets. When the earth ruptures, the soil will move under the sheets but, engineers hope, will leave the blocks intact. The price tag for the retrofit is estimated at between $150 million and $175 million.

"If there's a quake during a football game, people sitting on those blocks might be seated a little differently after the quake, but they'll be safe," Friedman said. "We can't prevent the building from moving or cracking, but we can save lives."

Right through the end zones

Memorial Stadium was built in 1923 atop the Hayward Fault, which the U.S. Geological Survey said has a 70 percent chance of hatching a 6.7-magnitude or greater quake by 2030. The earth could move up to 6 feet horizontally and 2 feet vertically, presenting a challenge to engineers charged with saving the stadium and the football fans who might be inside.

While plenty of buildings around the world sit atop earthquake faults, Memorial Stadium is unique because of the sheer quantity of people it holds: 75,662. It's also unique because seismologists know exactly where the fault lies - under Section LL, through both end zones and out Section XX.

Adding to the challenge is the stadium's architectural and historical merit, which prevents engineers from ordering major overhauls of the building's exterior. Designed by John Galen Howard, the bowl is on the National Register of Historic Places and is widely considered the most beautiful college football venue in the country.

But it's also the most perilous. The eastern half is built into the hillside and does not need to be retrofitted. But the western half, with its Beaux Arts flourishes and spectacular views of the hills and bay, rests precariously on landfill over a creekbed. Its concrete walls are cracked and strained, as the Pacific Plate - which is under Sections M through XX - inches south and the North American Plate - under Sections MM through X - creeps north.

The problem has vexed engineers for decades. At various times, the campus has considered building a giant steel net under the stadium or filling the stands with sand.

But the model the university finally chose is notable for its simplicity, said independent structural engineer Craig Comartin, who sits on the campus' Seismic Review Committee.

'Earthquake junkies'

"It's a complex problem, but it's a simple and very effective solution," he said. "Although it's no accident. The campus has taken a leadership role in seismic retrofit technology. They're all earthquake junkies, so to speak."

At Memorial Stadium, the sections directly on top of the fault will be cut into three large free-floating blocks. The blocks will be separated from the surrounding structure by 5 feet of open space, which will give the blocks room to wobble and twist - but not topple - in the event of an earthquake.

Hinged steel flaps would prevent people from falling through the 5-foot gaps around the blocks.

The blocks would sit on plastic sheets unanchored to the soil, so when the earth moves the blocks should stay put, more or less.

"The earth would slide past along that slippery surface," Comartin said.

Below the plastic sheet, a series of stone columns will stabilize the soil, hopefully keeping shaking to a minimum.

"The blocks might twist and wiggle, but they should retain their structural integrity," said Loring Wyllie, a structural engineer at Degenkolb Engineers in San Francisco who reviewed Friedman's plan. "It'll be like a ship at sea. It might move a little, but the stadium's a few inches off now anyway."

The western half of the stadium will undergo a standard retrofit, with bracing, sheer walls and an extra layer of concrete coating the interior. The concrete will have breaks at either end over the fault, so if the stadium cracks, it will crack in a designated and relatively clean way.

Cracked, not collapsed

"Under severe ground shaking, the building will crack, but we do not believe it will collapse or pancake," Friedman said. "We want the exterior to fracture, but we'll pin it so it doesn't fall."

Friedman said he came up with the block idea by studying the existing cracks in the stadium, most notably in Section KK. The cracks were a clue to the structure's particular weaknesses, and also the nature of the fault's movement.

"We said, 'OK, we're going to do this retrofit,' " he said. "But is the stadium already trying to tell us something?"

The funds for the retrofit must be privately raised. The state Alquist-Priolo Act prohibits retrofit projects from costing more than half the value of the building, which could be a roadblock at Memorial Stadium.

The university values the stadium at $600 million, based on its replacement cost, but the valuation could end up in court if challenged by the plaintiffs in a recent battle over the adjacent athletic training center being built.

"We remain completely confident we're compliant with Alquist-Priolo," said campus spokesman Dan Mogulof.

"We're excited to finally move forward with this retrofit project. Our primary goal has always been safety."

E-mail Carolyn Jones at carolynjones@sfchronicle.com.

(Carolyn Jones, San Francisco Chronicle Thursday, September 25, 2008)

ΑΝΑΣΚΟΠΗΣΗ ΓΕΓΟΝΟΤΩΝ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ

EuroGeo4
4th European Geosynthetics Conference
Edinburgh, UK, 7 – 10 September 2008
www.eurogeo4.org

1. ΓΕΝΙΚΑ

Υπό την αιγίδα του Διεθνούς Ένωσης Γεωσυνθετικών Υλικών (IGS), του Αγγλικού Συνδέσμου Γεωσυνθετικών Υλικών (UK Chapter) και της BGA (British Geotechnical Association) πραγματοποιήθηκε με εξαιρετική επιτυχία το 4ο Ευρωπαϊκό Συνέδριο Γεωσυνθετικών Υλικών στο Εδιμβούργο της Σκωτίας από 7 έως 10 Σεπτεμβρίου 2008.

Στο συνέδριο συμμετείχαν περισσότεροι από 600 Σύνεδροι από 36 χώρες, με σύγχρονη παρουσία συνέδρων και εκτός Ευρώπης, από Ηνωμένες Πολιτείες Αμερικής, Καναδά, Βραζιλία, Νότια Αφρική, Σιγκαπούρη, Ινδία, Κίνα, Ιαπωνία κ.α.

Οι δραστηριότητες του συνεδρίου περιλάμβαναν :

- 3 βασικές ομιλίες (Keynote Lectures) και την διάλεξη MERCER.
- 24 συνεδρίες σε θέματα :
  - Σταθεροποίηση - Βελτίωση εδαφών.
  - Εφαρμογές οδοποιίας και σιδηροδρομικής.
  - Τα γεωσυνθετικά προϊόντα "εν δράσει".
  - Μακροχρόνια μηχανική συμπεριφορά και αντοχή.
  - Υδραυλικές εφαρμογές και λιμενικά έργα - παράκτια προστασία.
  - Ανάλυση και σχεδιασμό συστημάτων με γεωσυνθετικά υλικά.
  - Οπλισμένα επιχώματα και τοίχοι αντιστήριξης.
  - Περιβαλλοντική προστασία - Σχεδιασμός χώρων αποβλήτων.
  - Νέες εφαρμογές.
- Έκθεση γεωσυνθετικών υλικών και εφαρμογών στη γεωτεχνική μηχανική (39 εκθέτες)
- 3 workshops σε θέματα οπλισμένων επιχωμάτων και τοίχων, γεωμεμβράνες και περιβαλλοντικός σχεδιασμός χώρων αποβλήτων, υδραυλικές εφαρμογές (πριν από την έναρξη του κυρίως συνεδρίου, 6 - 7/9/2008).

2. ΒΑΣΙΚΕΣ ΟΜΙΛΙΕΣ - ΔΙΑΛΕΞΗ MERCER

- "Electro-kinetic geosynthetics - from research to applications". COLIN JFP JONES, UK.
- "Long term performance and lifetime prediction of geosynthetics". GRACE HSUAN, USA.
- "Geoenvironmental applications of geosynthetics". NATHALIE TOUZE - FOLTZ, FRANCE.
- "Soil - geosynthetics interaction : modeling and analysis". ENNIO M. PALMEIRA, BRAZIL.

3. ΕΛΛΗΝΙΚΗ ΣΥΜΜΕΤΟΧΗ

Η Ελληνική Συμμετοχή στο συνέδριο ήταν εντυπωσιακή. Συμμετείχαν 16 σύνεδροι ενώ στην έκθεση συμμετείχε και η εταιρεία "Πλαστικά Θράκης Α.Ε. - Thrace Plastics S.A."

NAME	UNIVERSITY - COMPANY
ATMATZIDIS DIMITRIOS K.	UNIVERSITY OF PATRA
BARITAKIS NIKITAS	GEOPLAST LTD
CARNOMOURAKIS GEORGIOS I.	GEOPLAST LTD
CHRYSIKOS DIMITRIOS A.	UNIVERSITY OF PATRAS
DAMIANOS DIMITRIS	THRACE PLASTICS Co S.A.
FIKIRIS IOANNIS	EDAFOS S.A.
KAPOGIANNI ELENI	NATIONAL TECHNICAL UNIVERSITY OF ATHENS
KOLLIOS ANASTASIOS	EDAFOMICHANIKI S.A.
LOGDANIDIS GEORGE	THRACE PLASTICS Co S.A.
MANTZAVINOS GEORGE	THRACE PLASTICS Co S.A.
MARKOU I.N.	DEMOCRITUS UNIVERSITY OF THRACE, DEPT. OF CIVIL ENGINEERING
MAVROGENIS EVAGELOS	O.T.M. SA
PAPAGIANNIS GEORGE	THRACE PLASTICS Co S.A.
SARIGIANNIS DIMITRIOS	EGNATIA ODOS SA
VOURAKIS ANDREW	THRACE PLASTICS Co S.A.
ZANIA VARVARA	TECHNICAL UNIVERSITY OF GRETE

Σε διάφορες συνεδρίες παρουσιάσθηκαν οι ακόλουθες 6 εργασίες :

- ΑΤΜΑΤΖΙΔΗΣ Δ. - ΧΡΥΣΙΚΟΣ Δ.: Protection efficiency of non-woven polypropylene geotextiles.
- ΖΑΝΙΑ Β. - ΤΣΟΜΠΑΝΑΚΗΣ Ι. - ΨΑΡΡΟΠΟΥΛΟΣ Π.: The role of geosynthetics on seismic behaviour of landfills.
- ΚΑΠΟΓΙΑΝΝΗ Ε. - ΣΑΚΕΛΛΑΡΙΟΥ Μ.: Comparison of an analytical solution for multi -step reinforced soil slopes with conventional numerical methods.
- ΚΟΛΛΙΟΣ Α. - ΣΤΑΘΟΠΟΥΛΟΥ Ε.: Design and Construction of highway clay embankments reinforced with woven geotextiles over soft foundation soil.
- ΜΑΡΚΟΥ Ι.: Effect of sand characteristics on Sand/Geotextile interface friction.
- ΦΙΚΙΡΗΣ Ι.: Design and Construction of high reinforced motorway embankments in Greece: Experiences and Lessons Learned.

4. ΕΠΟΜΕΝΟ ΣΥΝΕΔΡΙΟ

Κατά την συνεδρίαση της Ευρωπαϊκής Επιτροπής Δράσης (EAC), το Σάββατο 6/9/2008 έγινε αποδεκτή η σχετική υποψηφιότητα του Ισπανικού Τμήματος Γεωσυνθετικών και το επόμενο (5ο) Ευρωπαϊκό Συνέδριο θα πραγματοποιηθεί τον Σεπτέμβριο 2012 στην Βαλένθια.

Αναφορά : Α. ΚΟΛΛΙΟΣ Αντιπρόεδρος HGS (12/9/2008)

19th European Young Geotechnical Engineers Conference 4 - 5 September 2008, Gyor, Hungary

Στο εφετεινό 19° Πανευρωπαϊκό Συνέδριο Νέων Γεωτεχνικών Μηχανικών η ΕΕΕΕΓΜ εκπροσωπήθηκε από τα μέλη της Γεώργιο Αναγνωστόπουλο και Ανθή Παπαδοπούλου. Στο συνέδριο συμμετέσχε ακόμα ένα μέλος της ΕΕΕΕΓΜ, ο Χρήστος Χατζηγώγος, εκπροσωπώντας την Γαλλική Ένωση Εδαφομηχανικής και Θεμελιώσεων.

Στη συνέχεια παρατίθεται η έκθεση παρουσίασης των εργασιών του συνεδρίου από τον Γ. Αναγνωστόπουλο, καθώς και το πρόγραμμα του συνεδρίου.

ΕΚΘΕΣΗ

Επί των εργασιών του 19° Πανευρωπαϊκού Συνεδρίου Νέων Γεωτεχνικών Μηχανικών

Κατά το διάστημα 3 - 6 Σεπτεμβρίου 2008, πραγματοποιήθηκε το 19° Πανευρωπαϊκό Συνέδριο Νέων Γεωτεχνικών Μηχανικών στο Πανεπιστήμιο Széchenyi István στην πόλη Györ της Ουγγαρίας. Στο Συνέδριο αυτό συμμετείχα ως εκπρόσωπος της ΕΕΕΕΓΜ, κατόπιν έγκρισης της αιτήσεώς μου από την Εκτελεστική Επιτροπή. Συμμετείχαν επίσης νέοι Γεωτεχνικοί Μηχανικοί από 23 χώρες της Ευρώπης.

Οι εργασίες του Συνεδρίου περιελάμβαναν τρεις ειδικές ομιλίες προσκεκλημένων ομιλητών, του καθ. P. Séco e Pinto από την Πορτογαλία και Προέδρου της ISSMGE, του καθ. R. Frank από τη Γαλλία και Αντιπροέδρου της ISSMGE για την Ευρώπη και του καθ. R. Ray από τις Η.Π.Α (University of South Carolina), καθώς και δεκαπεντάλεπτες παρουσιάσεις των εργασιών των Συνέδρων. Μετά από κάθε παρουσίαση ακολουθούσε πεντάλεπτη συζήτηση. Ο υπογράφων παρουσίασε την εργασία με τίτλο: ''Estimation of the mechanical properties of soils in tunnelling with the use of the observational method".

Το Σάββατο 6 Σεπτεμβρίου, μετά τη λήξη των εργασιών του Συνεδρίου ακολούθησε Τεχνική Επίσκεψη σε τρεις υπό κατασκευή σταθμούς για την επέκταση του Μετρό της Βουδαπέστης. Τόσο η διοργάνωση του Συνεδρίου, όσο και η φιλοξενία των διοργανωτών υπήρξε εξαιρετική.

Με την ευκαιρία της παρούσης Έκθεσης θα ήθελα να ευχαριστήσω την Εκτελεστική Επιτροπή της ΕΕΕΕΓΜ, τόσο για την επιλογή μου, όσο και για την πλήρη κάλυψη της συμμετοχής μου στο Συνέδριο, καθώς και των εξόδων μετάβασης και επιστροφής από την Ουγγαρία. Θα ήθελα επίσης να ευχαριστήσω τα μέλη της ΕΕΕΕΓΜ, κ.κ. Γ. Ντούλη και Η. Μιχάλη για την παροχή στοιχείων σχετικών με την εργασία μου και για τις συμβουλές - υποδείξεις τους για την ολοκλήρωσή της.

Με τιμή,

Γεώργιος Αναγνωστόπουλος
Μέλος της ΕΕΕΕΓΜ

EYGEC 2008 3-6 September, 2008, Györ, Hungary

Conference program

Date	Time	Event	Person
03.09.	18.00 - 19.00	**Conference Registration**	M. Meszaros
	19.00 - 22.00	**Welcome speech and reception**	T. Szekeres
04.09.	09:00 - 09:15	**Opening ceremony**	R. Frank, G. Telekes
	09.15 -17.00	**Session 1: Research and Development in Geotechnics**	
	09:15 - 10:30	**Session 1 / a**	G. Telekes, chair
	09:15 - 09:45	Keynote lecture American R+D activities in soil dynamics	R. Ray
	09:45 -10:30	Presentations (3)	
		Determination of elastic deformation modulus using the Cone Loading Test	H.Ali
		Comments on analysis of borehole dilatometer measurements	M. Zalesky
		Water Distribution and Behaviour in Tunnel Backfill in Deep Repository	S. Anttila
	10:30 -10:45	Coffee break	
	10:45 - 12:00	**Session 1 / b**	Gy. Greschik. Chair
		Presentations (5)	
		Soil water characteristic curve of some sand mixtures	T. Firgi
		Grading entropy criterion for crushing of sands	T. Q. Phong
		Geotechnical characteristics of crushability of granular soils	K Vinck
		A laboratory investigation into the factors affecting liquefaction resistance	A. Papadopoulou

	of silky sands	
	Speculations on the process of piping in laterally heterogeneous sands	V.M. van Beek
12:00 - 13:00	Lunch	
13:00 - 15:15	**Session 1 / c**	I. Lazanyi, chair
13:00 - 13:30	Keynote lecture Geotechnical design of piles according to Eurocode 7	R. Frank
13:30 - 15:15	Presentations (7)	
	Behaviour of reinforced sands: experiments and modelling	A. Diambra
	Centrifuge Modelling of the Dynamic Response of Cantilever Retaining Walls	R. Conti
	An Experimental Investigation of Arching in Piled Embankments	E. Britton
	Time and stress path dependant performance of excavations in soft soils	P. Becker
	The effect of the stress path on the interaction between yielding supports and squeezing ground	L. Cantieni
	Failure Mechanisms of Hydraulic Heave at Excavations	R. Wudtke
	Use of Electrical Resistivity Methods in Characterisation of Irish Soils	S. O'Connor
15:15-15:30	Coffee break	
15:30 -17:00	**Session 1 / d**	P. Scharle, chair
15:30 - 17:00	Presentations (6)	
	Some Geotechnical Aspects to use Marginal soils with Ladle Furnace	J. M. M.Cooper
	Slag in Embankment Constructions	
	A general macroelement for shallow foundations and applications for performance-based design	Ch. T. Chatzigogos
	The Bearing Capacity of Bored Belled Piles in Subsiding Soils under the Dead Weight	D. Karpenko
	Inverse Analysis in Road Geotechnics: ETH Delta	C. Rabaiotti
	Installation of piles with hammer grab and chisel under ground water conditions	M. Szabȯ
	Mechanical properties of a soft limestone: a laboratory study	M. Ramos da Silva
17:00 - 17:30	Refreshment	
17:30 - 19:30	Sight seeing boat trip on the rivers of Györ	M. Meszaros
19:30 - 21:30	Dinner with wine-tasting	M. Meszaros

ΝΕΑ ΑΠΟ ΤΙΣ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

ISRM Newsletter No. 3, September 2008

Crazy Horse memorial

Under the heading of ‘Interesting Rock Engineering Project Objectives’ is the Crazy Horse Memorial, located in the Black Hills of South Dakota, USA. It is the world’s largest mountain carving in progress. When completed, it will be 641 feet long and 563 feet high. Sculptor Korczak Ziolkowski began this undertaking in 1948 at the invitation of Lakota Chief Henry Standing Bear, who wanted a monument to honor the warrior and hero, Crazy Horse. Work on the mountain carving continues year-round, with hundreds of tons of rock being removed weekly. Shaping of the colossal horse’s head is now the main focus of the work and extends 300 feet below the top of the sculpture – see photos.

For more information visit the website at www.crazyhorsememorial.org.

John Hudson, with help from Ace Crawford of the Crazy Horse Memorial Project.

Three new ISRM Commissions were approved

The ISRM commissions study scientific and technical matters of topical interest to the Society. Since the publication of the last newsletter, in June, three new ISRM Commissions were approved for the period 2007-2011. The new commisions and their Presidents are:

- Commission on Rock Spalling - Prof. Mark Diederichs
- Commission on Rock Engineering Design Methodology - Prof. Xia-Ting Feng
- Commission on Preservation of Ancient Sites - Prof. Li Zuixiong

This brings the ISRM to eight working commissions, with the other five Commissions being:

- Commission on Testing Methods - Prof. Resat Ulusay
- Commission on Radioactive Waste Disposal - Prof. Ju Wang
- Commission on Rock Dynamics - Prof. Zhou Yingxin
- Commission on Education - Prof. Cai Meifeng
- Commission on Application of Geophysics to Rock Engineering - Prof. Toshifumi Matsuoka

For proposing the creation of a Commission, the proposed Commission President shall fill up an application form and send it to the ISRM President.

If you are a member of the ISRM and wish to participate in the work of any of the Commissions please contact the Commission President.

To get further information on the ISRM Commissions go to the ISRM website www.isrm.net.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

ΕΛΛΗΝΙΚΟΣ ΣΥΝΔΕΣΜΟΣ ΓΕΩΣΥΝΘΕΤΙΚΩΝ ΥΛΙΚΩΝ (HGS)

Η Γενική Συνέλευση των μελών του Ελληνικού Συνδέσμου Γεωσυνθετικών Υλικών, κατά την οποία θα πραγματοποιηθούν και εκλογές ανάδειξης νέου Διοικητικού Συμβουλίου, προγραμματίζεται για το Νοέμβριο ή Δεκέμβριο 2008 σε αίθουσα του Ε.Μ.Π. (Πολυτεχνειούπολη Ζωγράφου). Στη Γενική Συνέλευση θα μπορούν να πάρουν μέρος όλα τα μέλη του Συνδέσμου που έχουν τακτοποιήσει τις ταμειακές τους υποχρεώσεις. Σύντομα θα ειδοποιηθούν όλα τα μέλη σχετικά με τη διαδικασία υποβολής υποψηφιοτήτων και με τις λεπτομέρειες διεξαγωγής της συνέλευσης.

Υπενθυμίζεται επίσης στα μέλη ότι, επιπλέον των εργασιών που θα υποβληθούν ατομικά, ο Σύνδεσμος μπορεί να υποβάλει έως 10 περιλήψεις εργασιών που να αφορούν Πρακτικές Εφαρμογές (Case Histories of Geosynthetics Engineering Practice) για το 9ο Παγκόσμιο Συνέδριο Γεωσυνθετικών Υλικών (http://www.9icg-brazil2010.info). Οι περιλήψεις αυτές δεν θα πρέπει να ξεπερνούν τις 500 λέξεις. Προθεσμία υποβολής στο Σύνδεσμο (hgs@upatras.gr) ορίζεται η 24.10.2008. Καταληκτική ημερομηνία υποβολής περιλήψεων στο Συνέδριο είναι η 30.10.2008.

ICSE-4 Fourth International Conference on Scour and Erosion, Tokyo, 5 - 7 November 2008, icse-4.kz.tsukuba.ac.jp

3ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας, 5 – 7 Νοεμβρίου 2008, Αθήνα, www.civil.ntua.gr/3-PCEEES

Atlantis 2008 - The Atlantis Hypothesis Q Searching for a Lost Land, Athens, 10 - 11 November 2008, atlantis2008.conferences.gr/4299.html

International Conference on Deep Excavations (ICDE), 2008 10 - 12 November 2008, Singapore, www.icde2008singapore.org

International Conference on Management of Landslide Hazard in the Asia-Pacific Region, 11 - 15 November 2008, japan.landslide-soc.org/index-e.html

1ο Πανελλήνιο Συνέδριο Μεγάλων Φραγμάτων, 13 – 15 Νοεμβρίου 2008, Λάρισα, portal.tee.gr/portal/page/portal/teelar/EKDILWSEIS/damConference

The First World Landslide Forum - Implementing the 2006 Tokyo Action Plan on the International Programme on Landslides (IPL) - Strengthening Research and Learning on Earth System Risk Analysis and Sustainable Disaster Management within UN-ISDR as Regards "Landslides", 18 - 21 November 2008, United Nations University, Tokyo, Japan - www.iclhq.org

5th Asian Rock Mechanics Symposium "New Horizons in Rock Mechanics - Development and Applications", 24 - 26 November 2008, Tehran, Iran, www.arms2008.org

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

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

GEOAGE Advances in Geotechnical Engineering – IGC 2008, 17 – 19 December 2008, Bangalore, India, civil.iisc.ernet.in/~igc 2008

International Conference on Rock Joints and Jointed Rock Masses, 4 – 11 January 2009, Tucson, Arizona, USA, www.jointedrock2009.org

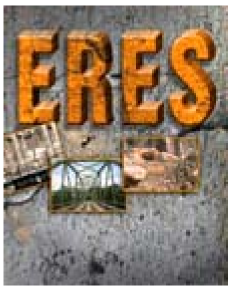
RGMA-09 International Symposium on Rock Mechanics and Geoenvironment in Mining and Allied Industries, 12 - 14 February 2009, Varanasi, Uttar Pradesh, India, www.itbhu.ac.in/min/conferences

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

International Foundation Congress & Equipment EXPO '09, 15 – 19 March 2009, Orlando, Florida, USA, www.ifcee09.org

22nd Annual Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP 2009) March 29 - April 2, 2009, Fort Worth, TX www.eegs.org/sageep/index.html

7th International Conference on GROUND IMPROVEMENT TECHNIQUES, 20 - 22 April 2009, Macau, China, www.cipremier.com/ciframeset.htm?index2.htm



Seventh International Conference on Earthquake Resistant Engineering Structures
11 - 13 May 2009, Cyprus
www2.wessex.ac.uk/09-conferences/eres-2009.html

ERES 2009 is the seventh international conference in the series on Earthquake Resistant Engineering Structures organised by the Wessex Institute of Technology. The Meeting provides a unique forum for the discussion of basic and applied research in the various fields of earthquake engineering relevant to the design of structures.

This Conference aims to discuss the state of the art in structures subjected to earthquakes, including the geophysical aspects, the behaviour of historical buildings, seismic isolation, retrofitting, base isolation and energy absorption systems, as well as a wide range of applications and case studies.

The problem of protecting the built environment in earthquake-prone regions of the world involves not only the optimal design and construction of new facilities, but also the upgrading and rehabilitation of existing structures and infrastructures. The latter is a laborious and expensive task, which can be accomplished only gradually. However the inestimable loss of life and the colossal costs following a major earthquake in a metropolitan area, provide sufficient reason to make it an important challenge for the scientific and technical community.

The conference series began in Thessaloniki, Greece in 1997, followed by Catania, Italy in 1999; Malaga, Spain in 2001; Ancona, Italy (2003); Skiathos, Greece (2005); and Bologna, Italy (2007).

Topics of the conference:

- Site effects and geotechnical aspects
- Earthquake resistant design
- Seismic behaviour and vulnerability
- Structural dynamics
- Monitoring and sensoring
- Bridges
- Masonry construction
- Retrofitting
- Passive protection devices
- Seismic isolation
- Self-centring systems
- Lifelines
- Design codes and response spectre
- Material mechanics / characterisation
- Numerical simulation
- Experimental studies
- Earthquake performance based design
- Earthquake countermeasures for existing structures
- Earthquake disaster prevention
- Case studies
- Material characterisation

Conference Secretariat

Irene Moreno
ERES 2009
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA
Tel: 44 (0) 238 0293223
Fax: 44 (0) 238 0292853
imoreno@wessex.ac.uk

SINOROCK2009 International Symposium on Rock Mechanics “Rock Characterization, Modelling and Engineering Design Methods”, 19 - 22 May 2009, Hong Kong, www.hku.hk/sinorock

SINOROCK2009 Extra-terrestrial rock mechanics.

"Safe Tunnelling for the City and Environment" ITA-AITES World Tunnel Congress 2009 and the 35th ITA-AITES General Assembly, Budapest Congress and Word Trade Center, Budapest, Hungary, 23 - 28 May 2009 - www.wtc2009.org

Géotechnique SYMPOSIUM IN PRINT 2009, May 2009, www. geotechnique-ice.com

3rd International Conference on New Development in Rock Mechanics and Engineering & Sanya Forum for the Plan of City and City Construction (NDRM'2009), 24 - 26 May 2009, Sanya, Hainan Island, China, www.ndrm2008.cn

International Symposium on Prediction and Simulation Methods for Geohazard Mitigation IS-Kyoto, 25 – 27 May 2009, Kyoto, Japan, nakisuna2.kuciv.kyoto-u.ac.jp/tc34/is-kyoto

IS-Tokyo 2009 “International Conference on Performance-Based Design in Earthquake Geotechnical Engineering - from case history to practice”, 15 – 17 June 2009, Tokyo, Japan, www.comp.tmu.ac.jp/IS-Tokyo

WCCE – ECCE – TCCE Joint Conference “EARTHQUAKE & TSUNAMI”, 22 – 24 June 2009, Istanbul, Turkey - www.imo.org.tr/eqt2009

TCLEE 2009 – Lifeline Earthquake Engineering in a Multi-hazard Environment, June 28 – July 1, 2009, Oakland, California, USA, content.asce.org/conferences/tclee2009

The 3rd International Geotechnical Symposium (IGS2009) on Geotechnical Engineering for Disaster Prevention and Reduction, 22 - 25 July 2009, Harbin, China, igs2009.hit.edu.cn

GeoHunan International Conference: Challenges and Recent Advances in Pavement Technologies and Transportation Geotechnics, 3 – 6 August 2009, dchen@dot.state.tx.us

GeoAfrica 2009 “Geosynthetics For Africa”, 2 – 4 September 2009, Cape Town, South Africa, www.gigsa.org

17th International Conference on Soil Mechanics and Geotechnical Engineering “Future of Academia & Practice of Geotechnical Engineering”, 5 – 9 October 2009, Alexandria, Egypt - www.2009icsmge-egypt.org

AMIREG 2009 - 3rd International Conference Advances in Resources & Hazardous Waste Management Towards Sustainable Development, 7 – 9 September 2009, heliotopos.conferences.gr/amireg2009

9 – 11 September 2009
Bochum, Germany
www.eurotun.rub.de/index.html

EURO:TUN 2009 will be held at Ruhr University Bochum, Germany, on September 9-11, 2009. The conference aims to provide a forum for scientists, developers and engineers to review and discuss novel research findings and to assess the suitability and robustness of advanced computational methods and models for the design and construction of tunnels. Bochum is centrally located within the Ruhr Area and is accessible by public transport from the international airports Düsseldorf, Dortmund and Cologne-Bonn.

EURO:TUN 2009 is a follow-up conference after the first successful conference EURO:TUN 2007 held in Vienna, August 27-29th 2007. EURO:TUN 2009 is one of the Thematic Conferences of the European Community in Computational Methods in Applied Science (ECCOMAS).

Conference Objectives

Computational Methods have experienced increasing application in the design, construction and maintenance of underground infrastructure. Tunnelling is characterized by continuously changing environmental conditions, a relatively high degree of uncertainty of the underlying parameters and complex interactions between the tunnelling process and its environment. In addition, new tunnelling technologies and changing requirements for the construction of tunnels (e.g. larger diameters, tunnelling in difficult ground conditions, safety concerns, life time prognoses) are placing new challenges for adequate computational methods to be used for prognoses and decisions in all phases of the design, construction, service and maintenance of tunnels. To meet these challenges new solutions in the field of computational methods in tunnelling are required. Methods of computational mechanics are concerned, for example with the simulation of the excavation process, the realistic description of the soil/rock mass and the materials used for support, using advanced constitutive models. More recently, hybrid concepts aiming at an integration of advanced methods of computational intelligence and computational mechanics are being developed and applied to the optimisation of the design and the construction of underground structures.

Conference Topics

The conference will be concerned with innovative computational concepts and strategies for optimised design and construction of tunnels.

Topics to be addressed are:

- spatial and temporal discretization strategies for realistic and efficient numerical analyses of tunnel excavations at various scales,
- advanced inviscid as well as time-dependent, multi-phase and multi-scale constitutive models for support materials, soils and rocks,
- methods for the prediction of tunnel face stability,
- new developments in boundary and hybrid methods,
- procedures for parameter identification,
- soft computing, visualisation, data mining, and expert systems in tunnelling,
- sensitivity analysis, back analysis,
- stochastic methods and methods based on fuzzy logic,
- computational methods for life cycle analysis and maintenance,
- risk analysis and
- other related topics.

More information from:

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Germany

Phone: +(49) 234 32 - 29069
Fax: +(49) 234 32 - 14149
E-Mail: eurotun@sd.rub.de

EUROCK'2009 Rock Engineering in Difficult Ground Conditions - Soft Rocks and Karst, 29 - 31 October 2009, Dubrovnik-Cavtat, Croatia, www.eurock2009.hr

Submarine Mass Movements and Their Consequences
4th International Symposium
Austin, Texas
November 8 – 11, 2009
www.beg.utexas.edu/indassoc/dm2/Conference2009

The 4th International Symposium on Submarine Mass Movements and Their Consequences will be hosted by the Bureau of Economic Geology, Jackson School of Geosciences in Austin, Texas on November 8-11, 2009.

This symposium is part of an initiative of the International Geoscience Programme (project 511), a joint endeavor of UNESCO and the International Union of Geological Sciences.

The main objective of this event is to bring a world perspective of submarine mass movements and their consequences by assembling excellent contributions from active international researchers, academic institutions and the oil and gas industry thus providing full coverage of the many scientific and engineering aspects of this type of marine and coastal geo-hazard.

The themes of the conference are:

1. Application of new technologies and techniques to the study of submarine mass movements.
2. Role of mass transport processes in margin development.
3. Mass movement evolution: From initiation to distal turbidites.
4. New approaches to slope stability analysis.
5. In situ measurements of pore pressures, deformations, and sediment properties on submarine slopes.
6. Mass transport deposits in volcanic island settings.
7. Mass transport events and their tsunamigenic risk.
8. Impact of mass transport events on benthic ecosystems.
9. Impact of mass transport events on sea floor structures/risk and mitigation.

10. Mass transport deposits and their role in offshore hydrocarbon field development.

11. Hazard assessment of submarine mass movements.

12. Current challenges in the study of submarine mass movements and future directions.

Technical Committee TC-16 of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) in collaboration with California State Polytechnic University are pleased to announce the 2nd International Symposium on Cone Penetration Testing, CPT'10. This event builds on the success of CPT'95 that was held in Linkoping, Sweden in 1995.

The 2nd International Symposium on Cone Penetration Testing will be held in Huntington Beach, California, USA on May 9-11, 2010.

Please use the links on the left for more information on the conference, important dates and deadlines and travel information. This web site will be updated when more information becomes available.

Theme

The theme of the Symposium is the solution of geotechnical and geo-environmental problems using the Cone Penetration Test (CPT). Particular emphasis will be placed on the exchange of practical experience and the application of research results through key note lectures and panel-lead discussion sessions. The technical and social program will provide an opportunity for meeting new contacts and an exchange of ideas and experience

Congress Secretariat
World Tunnel Congress (ITA-AITES 2010)
National Research Council Canada
1200 Montreal Road, Building M-19
Ottawa, ON
Canada K1A 0R6

IX International Conference on Geosynthetics, Guarujá, Brazil, 23 – 27 May 2010 - www.igsbrasil.org.br/icg2010

ISRM Regional Symposium on Rock Mechanics, Lausane, Switzerland, 23-25 June 2010

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

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

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

ΝΕΑ ΑΠΟ ΤΟΝ ΚΟΣΜΟ

Auckland's Te Wero Bridge designs unveiled

Hyder Consulting, Denton Corker Marshall and Kenneth Grubb Associates winning design for Auckland's NZ$ 51 million Te Wero Bridge.

Auckland City Council, New Zealand has selected a design by Hyder Consulting, Denton Corker Marshall and Kenneth Grubb Associates as the winner of an international design competition for the Te Wero Bridge.

The winning design, a twin leaf bascule bridge, with a mast structure that houses counter weights and a control room, was described by the chair of the judging panel, Professor John Hunt from Auckland University's school of Architecture, as a "striking submission [that] stood out from others in respect of its high level of design innovation and the unique way the twin leaves open."

The judging panel was particularly impressed by the design's high level of innovation, the dramatic effect of the bridge opening and closing, the landmark impact of the mast structure and its potential for special event illumination, the profile of the three main elements subtly reflecting contemporary yacht hull and sail forms and the combination of the two pedestrian routes in a single promenade.

The bridge will be surrounded by tall structures, so the winning solution needed to have strong visual impact, be large in scale, bold in form and clearly identifiable from its surroundings, said a Hyder spokesman. Taking inspiration from images of closely tacking America's cup yachts, the form and motion of the bridge were developed to create a "stunning efficient design that transforms a routine opening bascule into elegant choreography".

"The NZ$ 50 million (US$ 35 million) bridge will have a clear opening span of more than 40 m to retain boat access to the Viaduct Harbour. Constructed with a lightweight aluminium deck, the design of the counterweight results in very low energy use. The material selection also gives excellent durability and provides a sustainable low maintenance solution," explained Phil Tindall, Hyder's technical director in the international design team.

Auckland City Council sees the Te Wero bridge, which will carry cyclists, pedestrians, passenger transport and possibly light rail, as vital to its plans for the future success of the wider waterfront and Central Business District regeneration.

(WORLD CONSTRUCTION, 2 September 2008, Editor: Richard High)

New contracting alliance for Abu Dhabi's Tameer Towers development

The 300 m Commercial Tower on Al Reem Island in Abu Dhabi is the first structure of its kind to use concrete to form its diagrid perimeter shell.

The Al Habtoor Leighton Group has entered into an AED 6.4 billion (US$ 1.74 billion) alliance contract to construct Abu Dhabi-based Tameer Holdings' Tameer Towers.

The Group's share is AED 2.1 billion (US$ 572 million). The work will be undertaken through the Abu Dhabi division of Al Habtoor Engineering in a joint venture (JV) with Murray & Roberts and Al Rajhi.

The JV will deliver the project under an alliance structure with Tameer, one of the first such alliances in the region.

In a statement David Savage, managing director of the Al Habtoor Leighton Group, said, "It's a credit to our client, Tameer Holdings, to move to a more sophisticated form of project delivery in a true alliance.

"This form of contracting, whilst not previously undertaken in the United Arab Emirates, has been successful elsewhere around the world, particularly in the UK and Australia.

"It is best suited to large-scale, complex and challenging projects, and Tameer Towers fits into this category," he added.

Tameer Towers is located on Al Reem Island (see International Construction, December 2007), and the site covers over 920000 m2 and comprises four residential towers ranging from 42 to 66 floors, a five-star business hotel, a 74-level "premier" office tower, a canal and "significant" public areas, and a marina.

Work on the project will start this month, and will be completed in two stages: the residential stage will be completed in June 2011 and the commercial stage will be completed in December 2011.

The Al Habtoor Leighton Group was established in September 2007 following the merger of Al Habtoor Engineering with the Arabian Gulf operations of Leighton International. The new entity immediately became the UAE's largest construction group, with revenue of over AED 6 billion (US$ 1.63 billion) in 2007.

The Group comprises four key operating divisions: Al Habtoor Engineering Dubai; Al Habtoor Engineering Abu Dhabi; Al Habtoor Engineering Qatar; and Gulf Leighton. Leighton International owns a 45% stake in the Group.

Leighton International is part of the Leighton Group, Australia's largest project development and contracting group with annual revenues exceeding US$ 10 billion.

(WORLD CONSTRUCTION, 2 September 2008, Editor: Richard High)

a range of high-end hotels we are planning in other waterfront and city locations."

Construction is due to start towards the end of this year, with the project expected to take about two years to complete.

(WORLD CONSTRUCTION WEEK, 24 September 2008, Editor: Chris Sleight)

New island for Dubai

Dubai, UAE-based real estate developer Limitless has unveiled plans for yet another artificial island 14 km off the emirates' coast. Construction of the 10.5 ha World Island Resort is expected to cost US$ 350 million.

Located on the north-east edge of The World development, the resort will comprises 53 villas, 23 of which will be offered for sale by invitation. Described as an 'Ultra luxury resort", each of the villas will have its own beachfront, jetty, spa room, swimming pool, rooftop garden and outdoor kitchen.

The resort will also include a luxury hotel, with a 2000 m2 spar and a general focus on health and relaxation. A reception suite will be built on Dubai's mainland, with private boats to bring residents to the island.

The entrance to Limitless' planned World Island Resort in Dubai.

Saeed Ahmed Saeed, CEO of Limitless said, "Word Island Resort will set a new global benchmark in the design and operation of luxury resorts. It is the flagship for Limitless' waterfront hospitality developments and the launch pad for

To bridge or not to bridge? Danish-German bridge link agreed

Danish-German bridge link agreed Germany and Denmark have reached agreement to build a bridge across the Fehmarn Belt to connect Germany with Copenhagen. Earlier this month, the Danish parliament (Folketinget) issued the final law bill making the project possible.

The 19km bridge between Puttgarden on the Baltic Sea island of Fehmarn and Rodby, on the Danish island of Lolland, is estimated to cost €5 billion. Construction is expected to begin in 2010 with a completion date of 2018.

The construction of a fixed link has been discussed for a decade and a half. The proposal was agreed on in the coalition pact of 2005 at both regional and federal level. The financing of the project, as yet undetermined, had until now been an obstacle to a positive decision in spite of several meetings between the parties.

Because the Germans were comparatively less interested, Denmark stated it was willing to bear the whole cost. The cost will be recouped through tolls. Germany will only pay for linking the bridge to its existing road and rail system.

According to the Danish Minister of Transport, Carina Christensen, the new bridge will be a combined bridge for road traffic and railway, and it will cut travel time between Copenhagen and Hamburg for both categories by an hour (down to 3.5 hours).

Her counterpart, German Transport Minister Wolfgang Tiefensee said: "This is a good day for the strengthening of communication routes across Europe. This is northern Europe's biggest construction project."

As one of the European Union's 30 most important traffic projects, it forms part of the Trans-European Transport Network (TEN-T). The preferred solution is a cable-stayed bridge. Once constructed, it will represent the final missing link connecting Scandinavia to mainland Europe.

Proponents of the project emphasise that, as a fixed link, the crossing will provide an uninterrupted, fast and safe transport corridor for both road and rail between the cities of Copenhagen and Hamburg.

……………………………

For decades Danish and German engineers have dreamed of building a bridge linking Denmark and Germany. Now it is to become a reality, or is it? Although Ministers have now signed a treaty authorising construction the estimated € 5.5 billion, 19km bridge between the Danish port of Rodby and the German island of Fehmarn (the Fehmarn Link), protests against the plan are becoming more vociferous, and those opposed, including environmentalists, are threatening court action.

They say the link will ruin tourism in the region, damage birds (with some hitting the possible 280m tall towers), and slow water flowing through the Fehmarn Belt into the Baltic Sea. They claim the project is a "multi-billion Euro mistake."

Proponents of the project (one of the last bridgeable gaps in the landmass occupied by the European Union) say a fixed link will provide an uninterrupted, fast and safe transport corridor for both road and rail between the cities of Copenhagen and Hamburg (cutting the current journey by an hour), and reduce greenhouse gases compared with ferries.

The war of words, and possible legal actions, will go on. But in the end it may be finance that will decide the outcome. As one of the European Union's 30 most important traffic projects, this means it has to compete with other projects for possible EU funding.

(WORLD HIGHWAYS, Patrick Smith, Eurofile editor, 24 and 30 September 2008)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

Preliminary report on the principal seismological and engineering aspects of the Mw = 6.5 Achaia-Ilia (Greece) earthquake on 8 June 2008

Report of the Geotechnical Earthquake Engineering Reconnaissance (GEER) Team

Following the earthquake of June 8, 2008 near Patras, Greece, researchers from the Institute of Engineering Seismology and Earthquake Engineering in Thessaloniki, the University of Patras, and UCLA performed reconnaissance of seismological, geotechnical, and structural aspects of the earthquake effects. The results are summarized in a report recently published on the GEER web site at http://research.eerc.berkeley.edu/projects/GEER/Post_EQ_Reports.html

(GEER, June 2008)

SCOTTISH ROAD NETWORK LANDSLIDES STUDY: IMPLEMENTATION

Editors

M. G. Winter (Transport Research Laboratory), F. Macgregor (Consultant to Transport Scotland) and L. Shackman (Transport Scotland)

In August 2004 Scotland experienced rainfall substantially in excess of the norm. The rainfall was both intense and long lasting and as a result a large number of landslides, in the form of debris flows, were experienced in the hills of Scotland. A small number of these intersected the trunk (strategic) road network, notably the A83 between Glen Kinglas and to the north of Cairndow (9 August), the A9 to the north of Dunkeld (11 August), and the A85 at Glen Ogle (18 August).

The most dramatic events occurred at Glen Ogle, where 57 people had to be airlifted to safety when they became trapped between two major debris flows (see cover picture). It was, perhaps, fortuitous that there were no major injuries to those involved. However, the real impacts of the August events were economic and social, in particular the severance of access to and from relatively remote communities.

The need to acknowledge such natural processes and act accordingly was recognised by

Transport Scotland and an initial landslides study was commissioned alongside a second study on climate change. The landslides study comprises two parts. The initial study collated and presented the background information and developed the plan for the second part. The second part of the landslides study presents the proposed means of debris flow management on the trunk road network and is documented in this report.

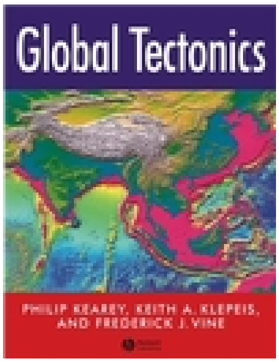
The overall purpose of the landslides study is to ensure that Transport Scotland has systematically assessed and ranked the hazards posed by debris flows and has in place a management and mitigation strategy for the Scottish trunk road network. The purpose of the ranking system is to allow the future effects of debris flow events to be appropriately managed and mitigated as budgets permit, thus ensuring that the exposure of road users to the consequences of future debris flows is minimised.

It is important to recognise that it is not possible to prevent landslide events from occurring and some may occur in such close proximity as to affect the operation of the trunk road network.

The work undertaken and set out in this report is therefore targeted at developing the evidence base for allocating resources to reduce the exposure of road users to landslide hazards and/or to reduce the physical hazard. Notwithstanding this, the latter actions involve higher cost solutions and are likely to be applied only in rare cases.

Η έκθεση είναι διαθέσιμη (σε μορφή αρχείου PDF) από την ιστοσελίδα http://www.transportscotland.gov.uk/news/lanslides-study-implementation-report τη ευγένεια φροντίδα του συναδέλφου Dr Mike Winter, Regional Director (Scotland), Transport Research Laboratory (TRY)

(Transport Scotland, October 2008)



Global Tectonics, 3rd Edition

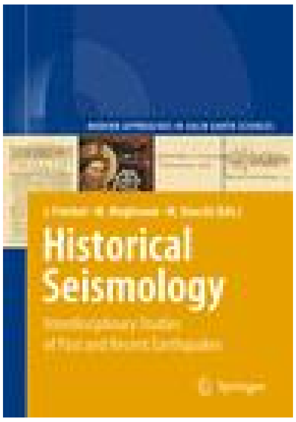
Philip Kearey, Keith A. Klepeis, Frederick J. Vine

The third edition of this widely acclaimed textbook provides a comprehensive introduction to all aspects of global tectonics, and includes major revisions to reflect the most significant recent advances in the field.

- A fully revised third edition of this highly acclaimed text written by eminent authors including one of the pioneers of plate tectonic theory
- Major revisions to this new edition reflect the most significant recent advances in the field, including new and expanded chapters on Precambrian tectonics and the supercontinent cycle and the implications of plate tectonics for environmental change

- Combines a historical approach with process science to provide a careful balance between geological and geophysical material in both continental and oceanic regimes

(Wiley-Blackwell, December 2008)



Historical Seismology

Interdisciplinary Studies of Past and Recent Earthquakes

Series: Modern Approaches in Solid Earth Sciences , Vol. 2

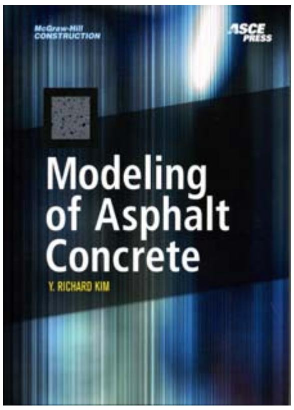
Fréchet, J., Meghraoui, M. & Stucchi, M. (Eds.)

Modern seismology has faced new challenges in the study of earthquakes and their physical characteristics. This volume is dedicated to the use of new approaches and presents a state of the art in historical seismology. Selected historical and recent earthquakes are chosen to document and constrain related seismic parameters using updated methodologies in the macroseismic analysis, field observations of damage distribution and tectonic effects, and modelling of seismic waveforms. A critical re-evaluation of historical accounts and early seismograms provides us with the basis for a realistic seismic hazard assessment.

This book is dedicated to the memory of Jean Vogt (1929 - 2005).

Audience: This book is of value to seismologists, earthquake geologists, engineering seismologists, earth scientists and historians of catastrophes.

(Springer, 2008)

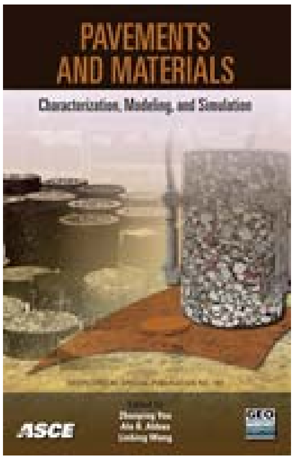


Modeling of Asphalt Concrete

Y. Richard Kim

Written by distinguished experts from countries around the world, Modeling of Asphalt Concrete presents in-depth coverage of the current materials, methods, and models used for asphalt pavements. Included is state-of-the-art information on fundamental material properties and mechanisms affecting the performance of asphalt concrete, new rheological testing and analysis techniques, constitutive models, and performance prediction methodologies for asphalt concrete and asphalt pavements. Emphasis is placed on the modeling of asphalt mixes for specific geographic/climatic requirements. In light of America's crumbling infrastructure and our heavy usage of asphalt as a paving material, this timely reference is essential for the development of more-durable and cost-effective asphalt materials for both new construction and rehabilitation.

(McGraw Hill & ASCE Press, 2008)



Pavements and Materials: Characterization, Modeling, and Simulation

Proceedings of the Symposium on Pavement Mechanics and Materials at the 18th ASCE Engineering Mechanics Division Conference held June 3–6, 2008 in Blacksburg, Virginia

(Geotechnical Special Publication No. 182)
Zhanping Y., Ala R. A. & Linbing W. (Editors)

This Geotechnical Special Publication contains 16 papers concerning a variety of timely issues in pavement mechanics. Topics include the characterization, modeling, and simulation of asphalt mixtures, asphalt pavements, and concrete mixtures. Eight of these papers were submitted for publication only, while the other eight were presented at the Symposium on Pavement Mechanics and Materials at the 18th ASCE Engineering Mechanics Division Conference held June 3–6, 2008 in Blacksburg, Virginia. Topics discussed include; modeling and simulations of asphalt concrete; interactions between aggregates; mastics, and voids, use of finite-element-method (FEM) and discrete-element-method (DEM); continuum approaches including nonlinear viscoelastic analysis and temperature dependency; pavement stress and strain analysis; laboratory characterization of modified asphalt concrete; pavement fatigue analysis; tire-pavement interaction, and coefficient of thermal expansion on concrete for rigid pavement design. Pavements and Materials: Characterization, Modeling, and Simulation will be valuable to geotechnical engineers, pavement engineers, and all those involved in the field of pavement mechanics.

(American Society of Civil Engineers, 2008)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.geoengineer.org

Κυκλοφόρησε το Τεύχος #45 του Newsletter του Geoengineer.org (Σεπτέμβριος 2008) 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).

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