

Φυσικός λίθος στον Βώλακα της Τήνου
Α. Νικολόπουλος



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Δηλώστε συμμετοχή στις TCs της
ISSMGE (σελ.38) και στο WG9 της
ITA (σελ.40)

Αρ. 29 – ΑΠΡΙΛΙΟΣ 2010



Τα Νέα

της Ε Ε Ε Ε Γ Μ

29

Στο τεύχος αυτό γίνεται εκτενής αναφορά στους πρόσφατους ισχυρότατους σεισμούς που συγκλόνισαν το τελευταίο δίμηνο ολόκληρη την γη: στην ανατολική Τουρκία (Μ 6.1, σελ. 5), στην θαλάσσια περιοχή βορειοανατολικά της Ιαπωνίας (Μ 6.5, σελ. 5), στην Baja California, Μεξικό (Μ 7.2, σελ. 6), στην βόρεια Sumatra, Ινδονησία (Μ 7.7, σελ. 9), στις Νήσους Σολομώντος (Μ 6.8, σελ. 10), στην Ισπανία (Μ 6.2, σελ. 10) στην νότια Κίνα (Μ 6.9, σελ. 11) και νοτιοανατολικά της Ταϊβάν (Μ 6.5, σελ. 12). Οι σεισμοί αυτοί εκδηλώθηκαν σε συνέχεια των άλλων ισχυρότατων σεισμών του προηγούμενου διμήνου: στην Αϊτή και στην Χιλή (βλέπε Τεύχη 27 και 28 αντίστοιχα), στις Νήσους Σολομώντος (Μ 7.1) και στην θαλάσσια περιοχή της βόρειας Καλιφόρνια (Μ 6.5). Υπάρχει κατ' αρχάς κάποια σχέση μεταξύ των σεισμών της Αϊτής και της Χιλής; Στο άρθρο του R. G. Satter αναφέρεται η αρνητική τοποθέτηση των σεισμολόγων στο ενδεχόμενο αυτό. Συσχετίζονται οι σεισμοί της Χιλής και της Baja California; Εν τέλει, είναι ασυνήθιστη η πρόσφατη έντονη σεισμική δραστηριότητα σ' ολόκληρη την γη; Οι M. Blanpied και C. Nassif Ransom της U.S. Geological Survey με το άρθρο τους στην σελ. 4 απαντούν και αυτοί αρνητικά. Ανεξαρτήτως, όμως, του ασυνήθιστου ή όχι της σεισμικής δραστηριότητας, καταλήγουν σε αυτό που προτείνουν όλοι οι μηχανικοί ανά τον κόσμο:

«Scientists cannot predict the timing of specific earthquakes. However, families and communities can improve their safety and reduce their losses by taking actions to make their homes, places of work, schools and businesses as earthquake-safe as possible».

Στο ίδιο συμπέρασμα καταλήγει και το άρθρο του Γενικού Γραμματέα των Ηνωμένων Εθνών **Ban Ki-moon : Μην περιμένετε την καταστροφή** (σελ. 4), που αναφέρεται στην ανάγκη λήψης κατάλληλων μέτρων για τη μείωση του κινδύνου καταστροφών προκειμένου να μειώσουμε δραστικά τις συνέπειές τους.

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ΜΗΧΑΝΙΚΗΣ

ΔΙΑΛΕΞΗ

την Δευτέρα, 3 Μαΐου 2010, ώρα 19:00

στην

Αίθουσα Εκδηλώσεων της
Σχολής Πολιτικών Μηχανικών ΕΜΠ
στην Πολυτεχνειούπολη Ζωγράφου

«Σύγχρονες Εξελίξεις

**στον Σχεδιασμό και την Κατασκευή
Στραγγιστηρίων – Χαλικοπασσάλων
για τον Έλεγχο Ρευστοποίησης»**

από τον

Δρ. Γεώργιο Μπουκοβάλα

Πολιτικό Μηχανικό

Καθηγητή Τομέα Γεωτεχνικής
Σχολής Πολιτικών Μηχανικών ΕΜΠ



ΔΙΑΛΕΞΗ

την Τρίτη, 18 Μαΐου 2010, ώρα 19:00

στο

Αμφιθέατρο Πολυμέσων της
Κεντρικής Βιβλιοθήκης ΕΜΠ
στην Πολυτεχνειούπολη Ζωγράφου

«Επιτόπου μετρήσεις για την εκτίμηση της ευστάθειας σηράγγων και πρανών»

από τον

S. S. Sakurai

Καθηγητή του Πανεπιστημίου του Kobe και
Προέδρου του CERIF

(οργάνωση του Εργαστηρίου
Τεχνολογίας Διάνοιξης Σηράγγων του ΕΜΠ,
<http://www.tunnelling.metal.ntua.gr>)



ΕΛΛΗΝΙΚΗ
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& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

ΔΙΑΛΕΞΗ

την Πέμπτη, 27 Μαΐου 2010, ώρα 19:00

στην

Αίθουσα Εκδηλώσεων της
Σχολής Πολιτικών Μηχανικών ΕΜΠ
στην Πολυτεχνειούπολη Ζωγράφου

από τον

Dr. Jean-Pierre Magnan

Καθηγητή Ecole Nationale des Ponts et
Chaussées

Dr. Michael Blanpied and Clarice Nassif Ransom U.S. Geological Survey

China's tragic magnitude 6.9 earthquake on April 13 and the recent devastating earthquakes in Haiti, Chile, Mexico, and elsewhere have many wondering if this earthquake activity is unusual.

Scientists say 2010 is not showing signs of unusually high earthquake activity. Since 1900, an average of 16 magnitude 7 or greater earthquakes — the size that seismologists define as major — have occurred worldwide each year. Some years have had as few as 6, as in 1986 and 1989, while 1943 had 32, with considerable variability from year to year.

With six major earthquakes striking in the first four months of this year, 2010 is well within the normal range. Furthermore, from April 15, 2009, to April 14, 2010, there have been 18 major earthquakes, a number also well within the expected variation.

"While the number of earthquakes is within the normal range, this does not diminish the fact that there has been extreme devastation and loss of life in heavily populated areas," said USGS Associate Coordinator for Earthquake Hazards Dr. Michael Blanpied.

What will happen next? Aftershocks will continue in the regions around each of this year's major earthquakes sites. It is unlikely that any of these aftershocks will be larger than the earthquakes experienced so far, but structures damaged in the previous events could be further damaged and should be treated with caution. Beyond the ongoing aftershock sequences, earthquakes in recent months have not raised the likelihood of future major earthquakes; that likelihood has not decreased, either. Large earthquakes will continue to occur just as they have in the past.

Though the recent earthquakes are not unusual, they are a stark reminder that earthquakes can produce disasters when they strike populated areas — especially areas where the buildings have not been designed to withstand strong shaking. What can you do to prepare? Scientists cannot predict the timing of specific earthquakes. However, families and communities can improve their safety and reduce their losses by taking actions to make their homes, places of work, schools and businesses as earthquake-safe as possible. The USGS provides information on how you can prepare at the [Earthquake Hazards Program Web site](#).

(U.S.G.S., 15 Απριλίου 2010)



Ban Ki-moon : Μην περιμένετε την καταστροφή

Καμμία χώρα δεν μπορεί να αγνοήσει όσα μας δίδαξαν οι σεισμοί στη Χιλή και την Αϊτή. Τους σεισμούς δεν μπορούμε να τους σταματήσουμε. Μπορούμε όμως να μειώσουμε δραματικά τις συνέπειές τους αν λάβουμε τα κατάλληλα μέτρα για τη μείωση του κινδύνου καταστροφών.

Πριν από μια εβδομάδα επισκέφθηκα τις σεισμόπληκτες περιοχές της Χιλής. Εκεί είδα το πώς σώθηκαν αμέτρητες ζωές, επειδή οι ηγέτες της Χιλής έχουν διδαχθεί από το παρελθόν.

Χάρη στην εφαρμογή ενός αυστηρού αντισεισμικού κανονισμού δεν είχαμε πολύ μεγαλύτερες απώλειες. Παρά το μέγεθος του σεισμού των 8.8 βαθμών της κλίμακας Ρίχτερ, του πέμπτου μεγαλύτερου που έχει καταγραφεί παγκοσμίως, στη Χιλή θρηνήσαμε μόνο μερικές εκατοντάδες νεκρούς. Στην

Αϊτή, ένας λιγότερο ισχυρός σεισμός προκάλεσε εκατοντάδες χιλιάδες θύματα. Η Αϊτή δεν εφαρμόζει ή δεν έχει αντισεισμικό κανονισμό, ενώ το επίπεδο ετοιμότητας είναι πολύ χαμηλό.

Είναι απαραίτητο να διαδοθεί η κουλτούρα της μείωσης του κινδύνου καταστροφών. Έχουμε ήδη κάνει μια αρχή στον τομέα αυτό. Το 2005, 168 κυβερνήσεις ενέκριναν το Πλαίσιο Δράσης του Χιόγκο, ένα δεκαετές σχέδιο με στόχο την προστασία από τις φυσικές καταστροφές. Το Πλαίσιο Δράσης του Χιόγκο προσφέρει στις εθνικές αρχές ένα λεπτομερές σχέδιο για την αξιολόγηση και τη μείωση των κινδύνων, μέσω του προγραμματισμού, της κατάρτισης καθώς και της εκπαίδευσης του κοινού. Για παράδειγμα, διασφαλίζοντας ότι

τα σχολεία, τα νοσοκομεία και οι άλλες βασικές δημόσιες υποδομές πληρούν ορισμένες προδιαγραφές ασφαλείας.

Έχουμε σημειώσει πρόοδο. Το 1970, περισσότεροι από 500,000 άνθρωποι έχασαν τη ζωή τους εξ αιτίας του κυκλώνα «Bola» στο Bangladesh. Μετά την καταστροφή κατασκευάστηκαν 2,500 καταφύγια και εκπαιδεύτηκαν περισσότεροι από 32,000 εθελοντές, προκειμένου να προσφέρουν βοήθεια σε κατάσταση ανάγκης.

Όταν το 2007 χτύπησε ο κυκλώνας «Sidr», ο αριθμός των νεκρών ήταν λιγότερος από 4,000. Ο κυκλώνας «Nargis», ένα παρόμοιο μέγεθος φαινόμενο, προκάλεσε τον θάνατο 140,000 ατόμων στην απροετοίμαστη Μιανμάρ τον Μάιο 2008. Κούβα ξεπέρασε τέσσερις τυφώνες το 2008. Υπέστη υλικές ζημιές ύψους 9 δισ. δολαρίων, αλλά οι απώλειες σε ανθρώπινες ζωές ήταν ελάχιστες.

Τα στοιχεία είναι αδιάσειστα. Δυστυχώς, όμως, ξεχνάμε πολύ γρήγορα όσα μαθαίνουμε από τις καταστροφές. Πολλές κυβερνήσεις δεν εφαρμόζουν τα πρακτικά μέτρα που προτείνει το Πλαίσιο Δράσης του Χιόγκο, ενώ ορισμένες χώρες υποστηρίζουν ότι δεν έχουν τα μέσα να εφαρμόσουν το μοντέλο πρόληψης. Εγώ πιστεύω ότι καμμία χώρα δεν έχει την πολυτέλεια να το αγνοήσει.

Για τις περιοχές που κινδυνεύουν από πλημμύρες και σεισμούς, η λύση είναι η υιοθέτηση και εφαρμογή οικοδομικών κανονισμών. Για τις περιοχές που κινδυνεύουν από πλημμύρες, η λύση είναι η μετακίνηση των αυθαίρετων οικισμών, η αφαίρεση των φυσικών παράκτιων εμποδίων, η βελτίωση των υποδομών για τους φτωχούς των αστικών περιοχών και η εγκατάσταση αποτελεσματικών συστημάτων έγκαιρης προειδοποίησης.

Τα μέτρα αυτά θα σώσουν πολλές χιλιάδες ανθρώπους. Τα κράτη-δωρητές πρέπει να χρηματοδοτήσουν τη μείωση της επικινδυνότητας καταστροφών και την αύξηση των μέτρων ετοιμότητας. Προσαρμογή στην κλιματική αλλαγή σημαίνει επένδυση στη μείωση των καταστροφών, στην ετοιμότητα και τη διοίκηση.

Οι σεισμοί της Χιλής και της Αϊτής μας έδειξαν άλλη μια φορά γιατί η δράση πριν από τις καταστροφές κάνει όλη τη διαφορά. Για να αποτρέψουμε τις καταστροφές από φυσικούς κινδύνους, πρέπει όλοι να ενεργήσουμε ενωρίτερα και εξυπνότερα.

Μπαν Κι-Μουν, Γενικός Γραμματέας των Ηνωμένων Εθνών.

(Η ΚΑΘΗΜΕΡΙΝΗ, Παρασκευή 2 Απριλίου 2010 - United Nations Department of Public Information (UN/DPI) 18 Μαρτίου 2010)

ΙΣΧΥΡΩΝ ΣΕΙΣΜΩΝ ΣΥΝΕΧΕΙΑ

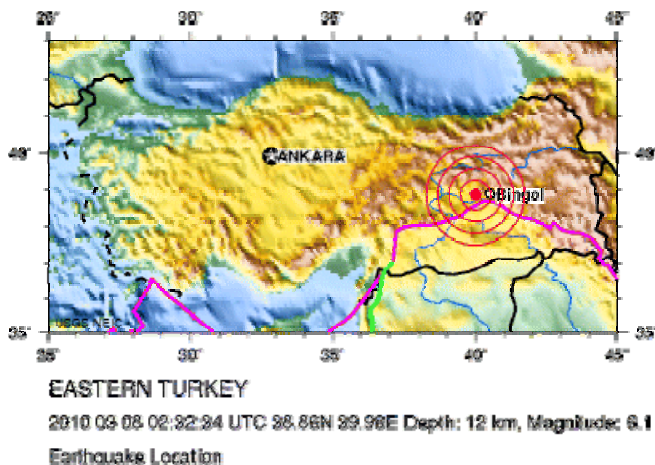
Ο σεισμός στην Ανατολική Τουρκία της 8^{ης} Μαρτίου 2010

At least 51 people killed, 100 injured and 5,000 displaced, 287 buildings destroyed and 700 heavily damaged in the Basyurt-Demirci-Kovancilar-Okcular area. Felt (VI) at Diyarbakir and Elazig; (IV) at Gaziantep and Siirt; (III) at Erzurum and (II) at Trabzon. Felt widely in eastern Turkey. Felt (III) at Mosul, Iraq. Also felt at Arbil and Sinjar. Felt (II) at Aleppo, Syria. Also felt at Al Qamishli, Manbij, Nubl and Ra's al 'Ayn.

Tectonic Summary (από USGS)

Turkey is a tectonically active country that experiences frequent destructive earthquakes. At a large scale, the tectonics of the region near the recent earthquake are controlled by the collision of the Arabian Plate and the Eurasian Plate. At a more detailed level, the tectonics become quite complicated. A large piece of continental crust almost the size of Turkey, called the Anatolian block, is being squeezed to the west. The block is bounded to the north by the North Anatolian Fault and to the southeast by the East Anatolian fault. The March 8, 2010, earthquake occurred near the East Anatolian fault at its eastern end. The pattern of seismic-wave radiation from the source is consistent with left-lateral strike-slip displacement on a northeast-striking strike-slip fault, such as would be expected if the East Anatolian fault were the causative fault. The same radiation pattern, however, might also be associated with right-lateral strike-slip displacement on a northwest-striking strike-slip fault, which could occur in the same tectonic environment. Confident identification of the causative fault will await more detailed studies.

This earthquake is a reminder of the many deadly earthquakes that Turkey has suffered in the recent past. The devastating Kocaeli (Izmit) earthquake of 1999 (M = 7.6) broke a section of the North Anatolian Fault 900 km to the west of the recent quake and killed 17,000 people, injured 50,000, and left 500,000 homeless. The recent earthquake (March 8, 2010) occurred about 90 km south of the M = 6.6 earthquake of March 13, 1992, which killed hundreds of people and left thousands homeless in Erzincan. Another even larger earthquake struck Erzincan in 1939. This magnitude 8.0 earthquake killed an estimated 33,000 people.



Earthquake Details (από USGS)

Magnitude 6.1

Date-Time

• Monday, March 08, 2010 at 02:32:34 UTC

• Monday, March 08, 2010 at 04:32:34 AM at epicenter

Location

38.873°N, 39.981°E

Depth

12 km (7.5 miles) set by location program

Region

EASTERN TURKEY

45 km (25 miles) W of **Bingol, Turkey**

70 km (45 miles) ENE of **Elazig, Turkey**

Distances

105 km (65 miles) SSE of **Erzincan, Turkey**

625 km (390 miles) E of **ANKARA, Turkey**

Source

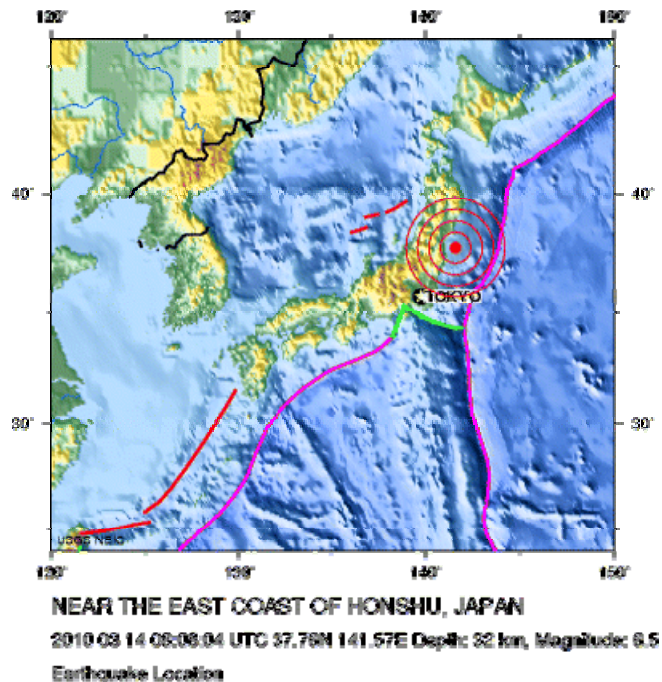
USGS NEIC (WDCS-D)



Ο σεισμός ανατολικά των ακτών της Ιαπωνίας της 14^{ης} Μαρτίου 2010

Earthquake Summary

Felt (IV) at Kitakami and Sendai; (III) at Ayase, Misawa, Tokyo, Yokohama and Yokosuka and (II) at Hamura. Widely felt throughout Honshu.



Earthquake Details (από USGS)

Magnitude 6.5

Date-Time

• Sunday, March 14, 2010 at 08:08:05 UTC

• Sunday, March 14, 2010 at 05:08:05 PM at epicenter

Location

37.780°N, 141.562°E

Depth

39 km (24.2 miles)

Region

NEAR THE EAST COAST OF HONSHU, JAPAN

80 km (50 miles) SE of **Sendai, Honshu, Japan**

Distances

100 km (60 miles) NE of **Iwaki, Honshu, Japan**

100 km (60 miles) E of **Fukushima, Honshu, Japan**

285 km (175 miles) NE of **TOKYO, Japan**

[Source](#) USGS NEIC (WDCS-D)



Ο σεισμός στην Baja California, Mexico της 4^{ης} Απριλίου 2010

LOS ANGELES — A powerful earthquake southeast of Tijuana shook Southern California on Sunday afternoon, damaging buildings in northern Mexico and border cities in California and Arizona and rattling a seismically sophisticated population as far north as Los Angeles and Las Vegas.



Chandeliers swayed, homes shook and the earth seemed to slide under the feet of people emerging from Easter church services for well over a minute.

The 7.2-magnitude quake struck just after 3:30 p.m. local time, and was centered 16 miles southwest of Guadalupe Victoria in Baja California, Mexico, and about 110 miles southeast of Tijuana, said the United States Geological Survey.

The quake killed two people in northern Mexico. Alfredo Escobedo, the Baja California state civil protection director, told the Associated Press that one man was killed in a house collapse outside Mexicali. He said the other man was killed when he panicked as the ground shook, ran into the street and was struck by a car. At least another 100 people were injured, most from falling objects, he said.

Mexicali, a large industrial city near the quake's epicenter was reported to have suffered widespread blackouts, along with fires, gas leaks and phone line damage. Photographs posted on Twitter and some news sites showed buildings with crumbled facades and food on supermarket shelves sent crashing to the floor. Mr. Escobedo said a multistory parking structure collapsed at the Mexicali city hall but no one was injured.

Across the border from Mexicali in Calexico, Calif., police sealed off the downtown area, which is lined with buildings built in the 1930s and 40s. Broken glass and plaster littered some sidewalks and goods in several stores had been scattered across the floor.

A police officer said the City Council had declared a state of emergency. Some traffic lights were out, and in at least one hotel television sets were flung to the floor and lamps toppled over but the electricity was on and damage did not seem widespread.

Carlton Hargrave, 64, was standing in the entryway of Family Style Buffet when the quake hit. His restaurant, he said in a telephone interview, was "almost completely destroyed."

"We've got tables overturned, plates broken on the floor, the ceiling's caved in," Mr. Hargrave said with a shaky voice over the sound of his feet crunching rubble and glass. "It was big. I mean, it was major."

Reports from the remote area in Mexico where the quake hit were slow in coming. But an earthquake of that size would probably cause major property damage near the epicenter, experts said.

"In a 7.2, you are going to experience a lot of shaking," said Morgan Page, a geophysicist with the Geological Survey. "So it would be surprising if there wasn't a lot of damage. Mexico does have many vulnerable structures."

Postings on Twitter told of people in shock in Mexico as well as in southern California.

"People were outside crying because the beams looked like they were going to collapse and a wall cracked (along with various things falling) and the power went out in some parts," read one report from Calexico.

In the United States, the shaking was particularly acute in San Diego, where it set off alarms and sent the San Diego fire department responding to several calls. The San Diego Union-Tribune reported.

"We have some reports of scattered property damage," Sgt. Ramona Hastings of the San Diego Police Department said in a telephone interview.

At a Sheraton hotel in downtown San Diego, the floor cracked opened and prevented the front doors from shutting. Officials ordered all guests and staff from the building, pending an inspection from structural engineers. Fire officials reported a water main break in front of a hospital and another water line break at a department store.

"There's scattered stuff all over the place," said Maurice Luque, a spokesman for the San Diego fire department. "There's nothing colossal."

Even for California residents who are veterans of previous and more punishing earthquakes, the temblor was impressive.

"House was shaking. Pic fell off bookcase. Lasted about 30 seconds. Worst I've felt here since Northridge," Timothy Nash said in a Twitter message from San Diego.

The Northridge earthquake of Jan. 17, 1994 — a 6.7-magnitude temblor that was centered in the Los Angeles neighborhood of Reseda — lasted for about 20 seconds but proved to be one of the most devastating natural disasters to hit the United States. There were 72 deaths attributed to the quake, and it caused an estimated \$20 billion in damage.

Initial reports indicated that Sunday's earthquake, while bigger in magnitude, caused nowhere near the damage.

While this earthquake exceeded the numerical magnitude of the 7.0 earthquake in Haiti earlier this year, the damage there was far greater because the epicenter was near the heavily populated capital city, Port-au-Prince.

The Baja earthquake was the largest in a series that have taken place in the region that presages it, beginning with a 4.2 quake on March 31. It was followed by strong aftershocks.

In Los Angeles, homes slid from side to side for well over a minute, a nauseating and seemingly endless wave that could be felt from the beach to the Hollywood Hills. Power failures caused by the temblor were reported in Yuma, Ariz.

Emilio Magaña, 39, a priest at St. Patrick's Roman Catholic Church in Calipatria, Calif., had just finished a morning of Easter services at different locations around rural Imperial County and was napping in his church in the middle of lettuce and carrot fields when the quake struck.

"I awoke to my bed shaking and heard some pictures from the walls falling down," he said. "My nerves were a little rattled because it was a long earthquake. It lasted almost 2 minutes. It was one very long one, then short temblors. I've never felt anything like it."

Reporting was contributed by Randal C. Archibold from Calexico, Calif., and Rebecca Cathcart from Los Angeles, Brian Stelter from New York, Rob Davis from San Diego, and Elisabeth Malkin from Mexico City.

(The New York Times, Jennifer Steinhauer, April 5, 2010)

Earthquake Details (and USGS)

Magnitude 7.2

- **Sunday, April 04, 2010 at 22:40:41 UTC**

Date-Time

- Sunday, April 04, 2010 at 03:40:41 PM at epicenter

Location

32.128°N, 115.303°W

Depth

10 km (6.2 miles) set by location program

Region

BAJA CALIFORNIA, MEXICO

- 26 km (16 miles) SW (225°) from **Guadalupe Victoria, Baja California, Mexico**

- 60 km (38 miles) SSE (165°) from

Mexicali, Baja California, Mexico

- 62 km (38 miles) SW (233°) from **San Luis Río Colorado, Sonora, Mexico**

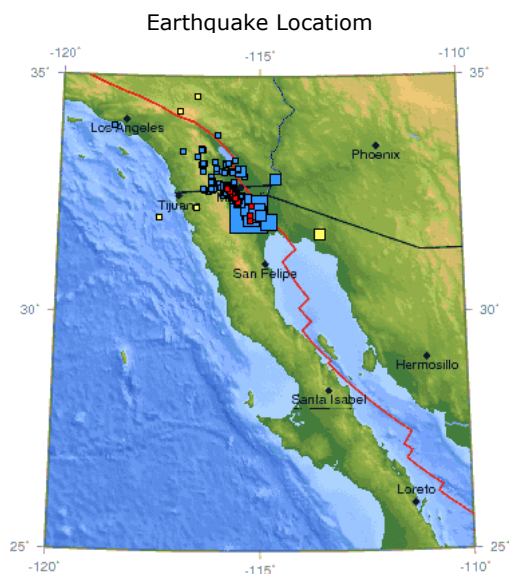
- 167 km (104 miles) ESE (105°) from **Tijuana, Baja California, Mexico**

Distances

- [California Integrated Seismic Net:](#)

- [USGS Caltech CGS UCB UCSD UNR](#)

Source

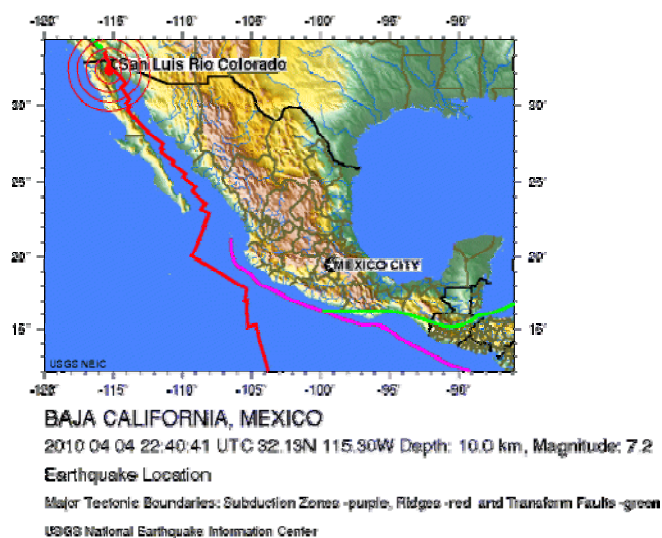


Tectonic Summary

The magnitude 7.2 northern Baja California earthquake of Sunday April 4th 2010, occurred approximately 40 miles south of the Mexico-USA border at shallow depth along the

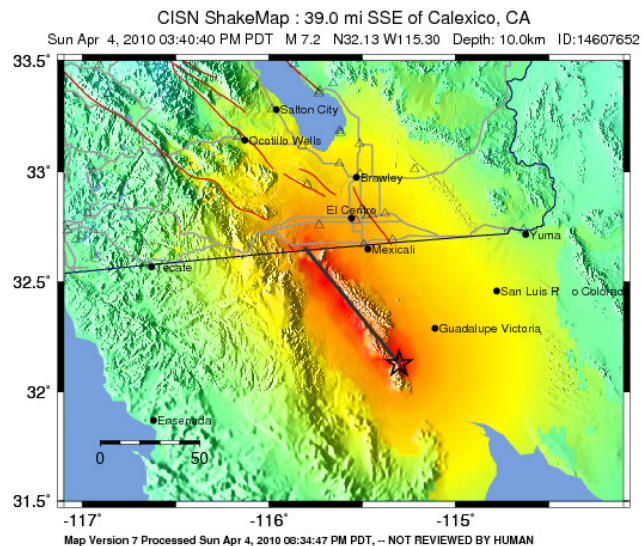
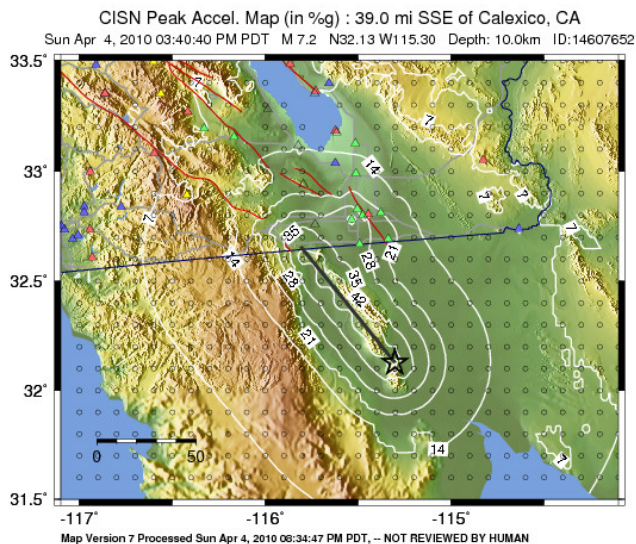
principal plate boundary between the North American and Pacific plates. This is an area with a high level of historical seismicity, and also it has recently been seismically active, though this is the largest event to strike in this area since 1892. Today's earthquake appears to have been larger than the M 6.9 earthquake in 1940 or any of the early 20th century events (e.g., 1915 and 1934) in this region of northern Baja California.

At the latitude of the earthquake, the Pacific plate moves northwest with respect to the North America plate at about 45 mm/y. The principal plate boundary in northern Baja California consists of a series of northwest-trending strike-slip (transform) faults that are separated by pull-apart basins. The faults are distinct from, but parallel to, strands of the San Andreas fault system. The April 4 main-shock occurred along a strike-slip segment of the plate boundary that coincides with the southeastern part of the Laguna Salada fault. Although the location and focal-mechanism of the earthquake are consistent with the shock having occurred on this fault, we do not yet have surface rupture or other confirmation. Aftershocks appear to extend in both directions along this fault system from the epicenter of today's event. The aftershock zone extends from the northern tip of the Gulf of California to the Mexico-USA border.

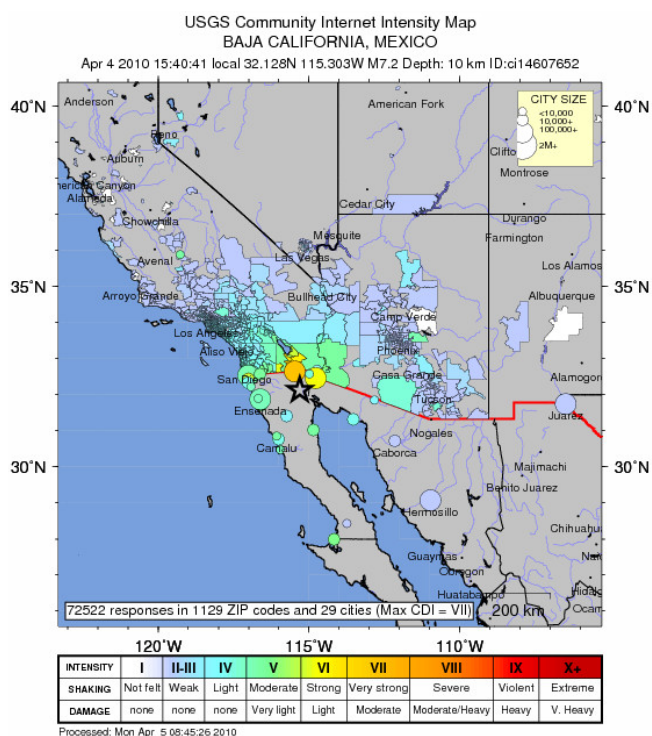


Earthquakes having magnitudes as high as 7 have been historically recorded from the section of the Pacific/North American plate boundary on which the 4 April 2010 earthquake occurred. The 1892 earthquake occurred along the Laguna Salada fault system, but significantly farther northwest than today's event epicenter. The 1940 Imperial Valley earthquake approached magnitude 7, though it occurred farther to the north and on the Imperial fault. Both the 1892 and 1940 earthquakes were associated with extensive surface faulting. An event of M 7.0 or 7.1 occurred in this region in 1915, and then an M 7.0 to 7.2 in 1934 broke the Cerro Prieto fault with up to several meters of surface slip.

In the vicinity of the 4 April 2010 earthquake, there are several active faults and it has not yet been determined specifically which fault the earthquake occurred on. Within the transition from the ridge-transform boundary in the Gulf of California to the continental transform boundary in the Salton Trough, faulting is complex. Most of the major active faults are northwest-southeast oriented right-lateral strike-slip faults that are common in mechanism to the San Andreas fault and parallel Elsinore and San Jacinto faults, that run north of the Mexico-USA border.



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL. (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+



Instrumental Intensity Map



Mexicali



Mexicali – Tijuana Highway



Much of the nearly completed four-story parking garage at the Mexicali Civic Center lies in ruins after the magnitude 7.2 earthquake. (The Los Angeles Times)



Mexicali, via elbetOe



Mexicali



Mexicali

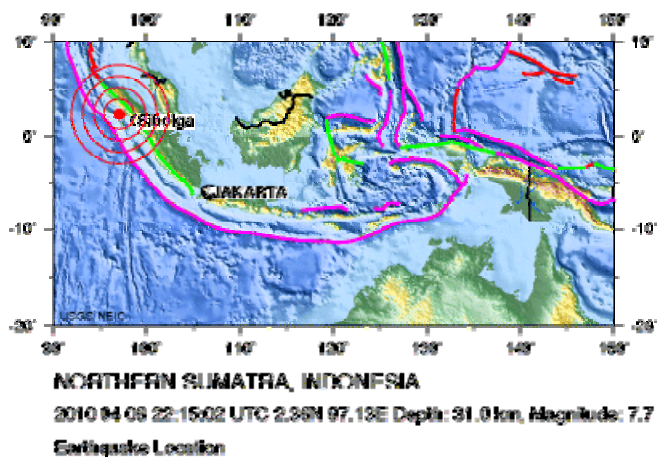
Ο σεισμός στην Βόρειο Sumatra, Ινδονησία της 6^{ης} Απριλίου 2010

Tectonic Summary (από USGS)

The Banyak Islands, Sumatra earthquake of April 6, 2010 occurred as a result of thrust faulting on or near the subduction interface plate boundary between the Australia-India and Sunda plates. At the location of this earthquake, the Australia and India Plates move north-northeast with respect to the Sunda plate at a velocity of approximately 60-65 mm/yr. On the basis of the currently available fault mechanism information and earthquake depth, it is likely that this earthquake occurred along the plate interface.

The subduction zone surrounding the immediate region of this event last slipped during the Mw 8.6 earthquake of March 2005, and today's event appears to have occurred within the rupture zone of that earthquake. Today's earthquake is the latest in a sequence of large ruptures along the Sunda megathrust, including two M 7.4 earthquakes beneath Simeulue 125 km to the north in 2002 and 2008; a M 9.1 earthquake that ruptured to within 125 km north of this earthquake in 2004; a M 8.5 375 km to the south in 2007; and a M 7.5 260 km to the south near Padang in 2009.

Earthquake Location



Earthquake Details (από USGS)

Magnitude 7.7

- Tuesday, April 06, 2010 at 22:15:02 UTC

Date-Time

- Wednesday, April 07, 2010 at 05:15:02 AM at epicenter

Location

2.360°N, 97.132°E

Depth

31 km (19.3 miles) set by location program

Region

NORTHERN SUMATRA, INDONESIA

200 km (125 miles) WNW of **Sibolga**,

Sumatra, Indonesia

215 km (135 miles) SW of **Medan, Sumatra,**

Indonesia

Distances

515 km (320 miles) W of **KUALA LUMPUR,**

Malaysia

1425 km (880 miles) NW of **JAKARTA, Java,**

Indonesia

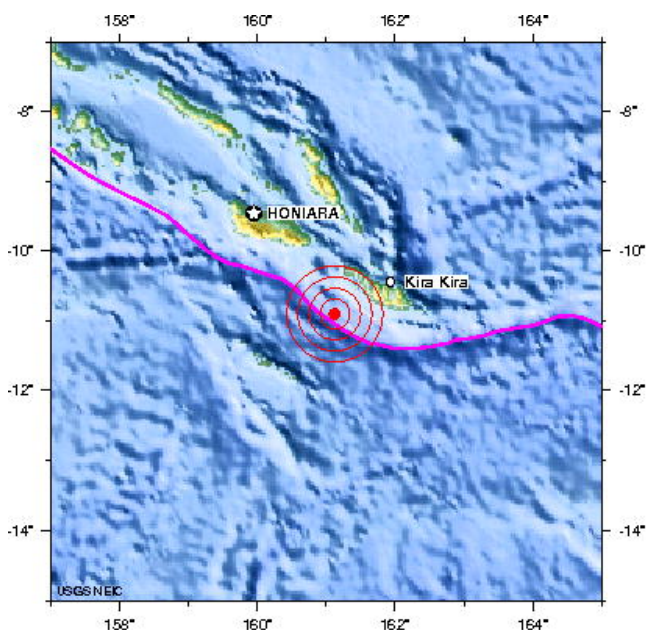
Source

USGS NEIC (WDCS-D)



Ο σεισμός στις Νήσους Σολομώντος της 11^{ης} Απριλίου 2010

Earthquake Location (από USGS)



SOLOMON ISLANDS

2010 04 11 09:40:30 UTC 10.91S 161.13E Depth: 60.2 km, Magnitude: 6.8
Earthquake Location

(Major Tectonic Boundaries: Subduction Zones - purple, Ridges - red and Transform Faults - green)

Earthquake Details (από USGS)

Magnitude 6.8

- Sunday, April 11, 2010 at 09:40:30 UTC

Date-Time • Sunday, April 11, 2010 at 08:40:30 PM at epicenter

Location 10.913°S, 161.130°E

Depth 60.2 km (37.4 miles)

Region SOLOMON ISLANDS

100 km (65 miles) WSW of Kira Kira, San Cristobal, Solomon Isl.

205 km (130 miles) SE of HONIARA, Guadalcanal, Solomon Islands

Distances 245 km (150 miles) S of Auki, Malaita, Solomon Islands
2025 km (1260 miles) NNE of BRISBANE, Queensland, Australia

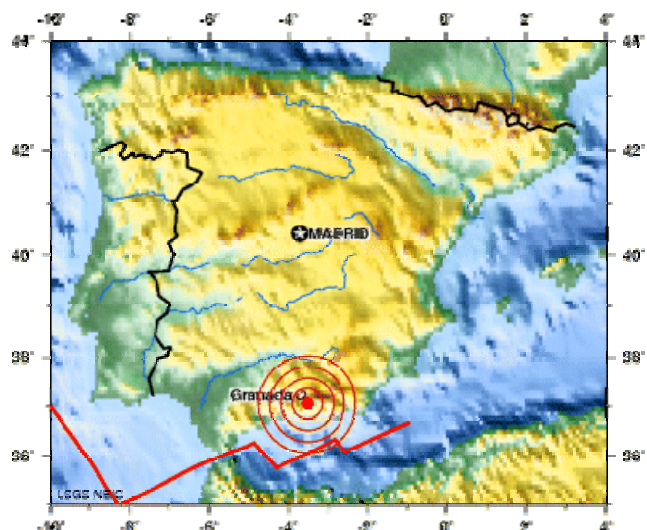
Source USGS NEIC (WDCS-D)



city) and limited instrumental recordings of the earthquake, is beneath the town of Dúrcal, 20 km south of Granada. Since the 1954 earthquake, a handful of small magnitude earthquakes (3 and smaller) have occurred in approximately the same location (Bufo et al., 1991). Southwest of the April 11, 2010 M6.3 earthquake in the area of the Alboran Sea, convergences of the African and Eurasian plates does produce a well-defined zone of small magnitude ($M < 4$) to depth of 200 km. Other than the localized zone of seismicity near 600 km depth, there are no known earthquakes between 200 km and 600 km depth.

Bufo, E., Udias, A., and Madariaga, R., 1991, Intermediate and deep earthquakes in Spain: Pure and Applied Geophysics, v. 136, p. 375–393.

Earthquake Location (από USGS)



SPAIN

2010 04 11 22:08:11 UTC 37.05N 3.51W Depth: 619.7 km, Magnitude: 6.3
Earthquake Location

Earthquake Details (από USGS)

Magnitude 6.3

- Sunday, April 11, 2010 at 22:08:11 UTC

Date-Time • Monday, April 12, 2010 at 12:08:11 AM at epicenter

Location 37.048°N, 3.513°W

Depth 619.7 km (385.1 miles)

Region SPAIN

25 km (15 miles) SE of Granada, Spain

90 km (55 miles) ENE of Malaga, Spain

Distances 100 km (60 miles) WNW of Almeria, Spain
375 km (235 miles) S of MADRID, Spain

Source USGS NEIC (WDCS-D)



Ο σεισμός στην Ισπανία της 11^{ης} Απριλίου 2010

Tectonic Summary

The seismotectonics of the April 11, 2010 M6.3 Spanish earthquake are enigmatic, but the occurrence of deep earthquakes beneath this region of Spain are well-documented. The location of the April 11, 2010 M6.3 and its unusual depth of 616 km suggests that it is related to the well-studied M7.1 deep Spanish earthquake of March 24, 1954. The epicenter of the 1954 earthquake, based on the distribution of ground shaking at the surface (macroseismi-

Ο σεισμός στην Νότιο Qinghai, Κίνα της 13^{ης} Απριλίου 2010

BEIJING — The death toll from the powerful earthquake that struck western China Wednesday rose to at least 617 (σ.σ. περί τους 2,064 στις 21 Απριλίου 2010) people on

Thursday, with 10,000 more injured as many remained buried under debris, Chinese state media reported.



Wu Hong/Xinhua, via Associated Press

The rubble near a destroyed building after an earthquake at Jiegu Town in Yushu county, a Tibetan autonomous prefecture in western Qinghai Province of northwest China on Wednesday.

China's earthquake agency said the quake centered on Yushu County, a remote and mountainous area sparsely populated by farmers and herdsman, most of them ethnic Tibetans. The region, pocked with copper, tin and coal mines, is also rich in natural gas.

The quake, which struck at 7:49 a.m. in Qinghai Province, bordering Tibet, had a magnitude of 7.1, according to China's earthquake agency. At least 18 aftershocks measuring more than 6.0 followed throughout the day, government officials said, according to Xinhua.

As with the devastating earthquake two years ago that killed 87,000 in neighboring Sichuan Province, many buildings collapsed, including schools. But with Qinghai's far smaller and less dense population, the toll is likely to remain far lower.

A seismologist, Gu Guohua, said in an interview with the national broadcaster CCTV that 90 percent of the homes in the county seat, Jiegu, had collapsed. The houses, he said, were of "quite poor quality," with many constructed of wood, mud and brick.

The dead included at least 56 students and 5 teachers who were crushed in the rubble of collapsing schools or dormitories, the English-language government newspaper China Daily reported. Of that number, 22 students — 20 of them girls — died in the collapse of a vocational school, the newspaper quoted the deputy chief of the Yushu education bureau, Xiao Yuping, as saying.

Among those still missing were 20 children buried in the wreckage of a primary school, and as many as 50 people were trapped beneath a collapsed office building that houses the Departments of Commerce and Industry, according to news reports.

"We're in the process of trying to rescue the students," Kang Zifu, a local fire department official, told CCTV on Wednesday afternoon. "We're hurrying to help them."

He said at least 32 survivors had been pulled from the debris.

The prefecture that includes Yushu is on the Tibetan plateau, with a population that is more than 96 percent Tibetan and overwhelmingly poor. Many villages sit well above 16,000 feet, with freezing temperatures not uncommon in mid-April. By Wednesday evening, temperatures in the county seat had already dropped to 27 degrees, and snow and sleet were forecast in the coming days.

China National Radio, citing an official with the local Red Cross Society of China, said that 70 percent of the school buildings had collapsed in neighboring Yushu Tibetan Autonomous Prefecture, an area the size of South Korea that has a population of 350,000. But at least some of the schools had not begun classes yet.

Xinhua, the official Chinese news agency, quoted a teacher surnamed Chang who said 5 of the 1,000 students at Yushu Primary School had died.

"Buildings in our school were all toppled," Mr. Chang said. "Morning sessions had not begun when the quake happened. Some pupils ran out of the dorm alive, and those who had not escaped in time were buried."

Karsum Nyima, an employee of a local television station in Yushu, told CCTV that the quake had sent people running into the streets not long after daybreak.

"All of a sudden, the houses collapsed," he said. "It was a terrible earthquake. In the park, a Buddhist pagoda fell down. Everyone is in the street in front of their houses. They are trying to find family members."

In the same broadcast, Wu Yong, an officer in the Chinese Army, said that the road to the airport was impassable and that soldiers were digging people out from collapsed homes by hand.

"The most important thing now is that this place is far from everything, with few accessible rescue troops available," Mr. Wu said. "I feel like the number of dead and injured will keep going up."

Officials said that rescue efforts were stymied by a lack of heavy equipment. Medical supplies and tents, they added, were in short supply. Phone calls to local government offices went unanswered Wednesday afternoon.

State news media reported that 700 paramilitary officers were already working in the quake zone and that more than 4,000 others would be sent to assist in search and rescue efforts. The Civil Affairs Ministry said it would also send 5,000 tents and 100,000 coats and blankets.

Workers also were rushing to release water from a reservoir after cracks were discovered in a dam, according to the China Earthquake Administration.

Genqiu Renqin, a teacher who lives in Sichuan Province, about 60 miles from Yushu, said he felt the earth shake and immediately drove to see if relatives who lived near the epicenter were safe.

"Almost all of their homes were badly damaged, but luckily no one was seriously injured," he said, speaking by phone from a town about 25 miles from the county seat. "All the people in the area are camping out for now."

(Andrew Jacobs, The New York Times, April 14, 2010 - Michael Wines contributed reporting. Xiyun Yang, Li Bibo and Zhang Jing contributed research).

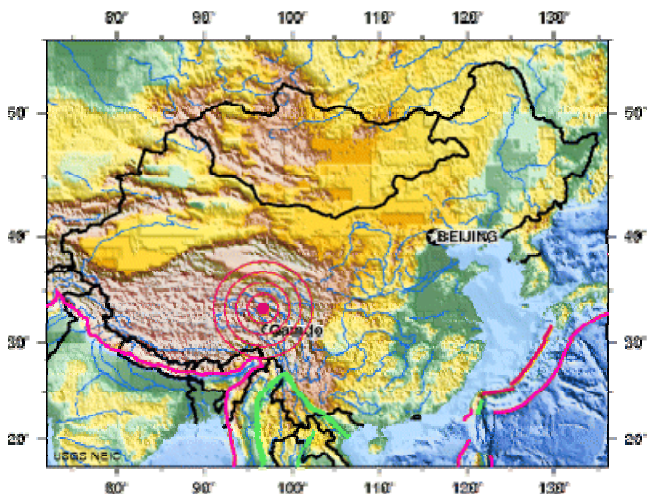
Clarissa Ward, in Beijing, fills us in: "It was 749am when the quake hit this remote community of farmers and yak herders...followed by three strong aftershocks - the largest a 6.3. In the town of Jiegu, near the epicenter, more than 85 percent of the buildings have collapsed...most made simply of wood and mud, not designed to withstand a strong quake." (abs NEWS, April 14, 2010)

Earthquake Summary (από USGS)

Tectonic Summary

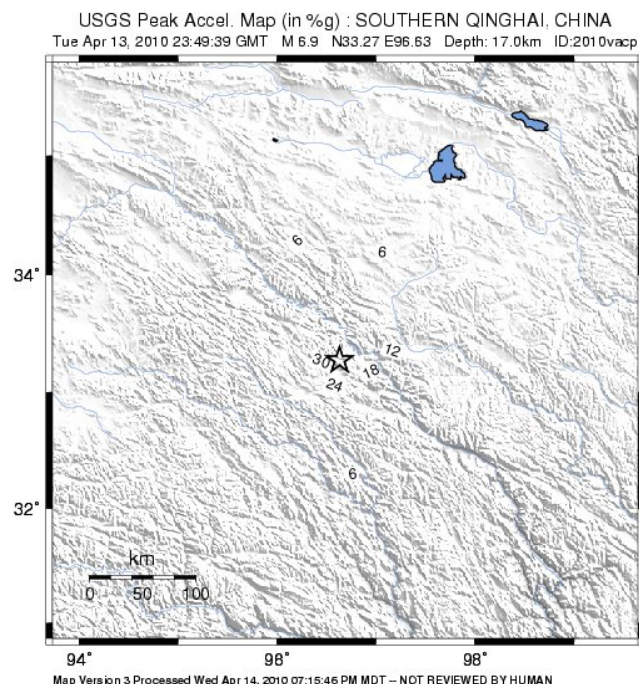
The southern Qinghai Province, China earthquake of April 13, 2010 occurred as a result of strike-slip faulting in the tectonically complex region of the eastern Tibetan Plateau. This earthquake occurred several hundred kilometers north of the convergent India: Eurasia plate boundary, where the Indian Plate is moving northwards with respect to Eurasia at a rate of approximately 46 mm/yr. This convergence drives the uplift of the Himalaya Mountains, at a rate of approximately 10 mm/yr, and the Tibetan Plateau, which is an extremely broad region of thickened and uplifted crust sitting above 4.5-5 km.

Earthquake Location



SOUTHERN QINGHAI, CHINA

2010 04 13 23:49:39 UTC 33.27N 96.62E Depth: 17.0 km, Magnitude: 6.9
Earthquake Location



In the region of the April 13 earthquake the Tibetan Plateau is extending and translating east-southeastward within a larger zone of generally north-south convergence. Based on the location, depth, and moment tensor of the event, the Qinghai Province earthquake likely reflects the interplay amongst these major tectonic forces, dominated in this loca-

tion by southeastward translation. The eastward motion of Tibet with respect to Eurasia further north is accommodated in part by the large intra-continental Altyn Tagh and Kunlun strike-slip fault systems. Several large historic events in the Qinghai Province have occurred on the Kunlun fault, which runs west-east approximately 300 km to the north of the April 13 event. The April 13 earthquake is one of the largest known historic earthquakes within several hundred kilometers of its location. In 1738, a nearby earthquake of approximately magnitude 6.5 caused over 300 fatalities.

The magnitude 7.9 Wenchuan (Sichuan) earthquake of May 12, 2008 occurred on the margin of the Tibetan Plateau, in contrast with the April 13, 2010 earthquake, which occurred in the plateau's interior. The 2008 earthquake killed over 70,000 people and displaced over 15 million.

Earthquake Details

Magnitude 6.9

- **Tuesday, April 13, 2010 at 23:49:37 UTC**

Date-Time

- Wednesday, April 14, 2010 at 07:49:37 AM at epicenter

Location 33.271°N, 96.629°E

Depth 10 km (6.2 miles) set by location program

Region SOUTHERN QINGHAI, CHINA

240 km (150 miles) NNW of **Qamdo, Xizang (Tibet)**

375 km (235 miles) SSE of **Golmud, Qinghai, China**

Distances

520 km (325 miles) SSE of **Da Qaidam, Qinghai, China**
1905 km (1190 miles) WSW of **BEIJING, Beijing, China**

Source USGS NEIC (WDCS-D)



Ο σεισμό νοτιοανατολικά της Ταϊβάν της 26ης Απριλίου 2010

Earthquake Details (από USGS)

Magnitude 6.5

- **Monday, April 26, 2010 at 02:59:51 UTC**

Date-Time

- Monday, April 26, 2010 at 10:59:51 AM at epicenter

Location 22.241°N, 123.709°E

Depth 22 km (13.7 miles) set by location program

Region SOUTHEAST OF TAIWAN

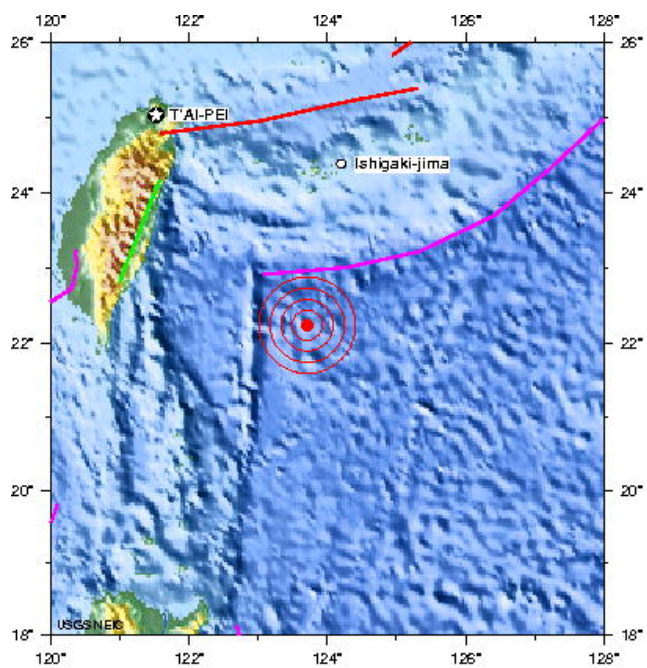
245 km (150 miles) SSW of **Ishigaki-jima, Ryukyu Islands, Japan**

270 km (165 miles) ESE of **T'ai-tung, Taiwan**

270 km (165 miles) NE of **Basco, Batan Islands, Philippines**

2160 km (1340 miles) SW of **TOKYO, Japan**

Source USGS NEIC (WDCS-D)



SOUTHEAST OF TAIWAN

2010 04 26 02:59:51 UTC 22.24N 123.71E Depth: 22.0 km, Magnitude: 6.5

Earthquake Location

ΛΟΓΟΣ - ΑΝΤΙΛΟΓΟΣ

Στο Τεύχος Αρ. 23 του Αυγούστου 2009 δημοσιεύσαμε την εισήγηση του συναδέλφου Θ. Βουδικλάρη, Πολιτικού Μηχανικού, Προέδρου ΙΟΚ, στο 3^ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής, Αθήνα 7 Νοεμβρίου 2008 με τίτλο «**Νομικά θέματα αντισεισμικών κατασκευών - Δικαιώματα μελέτης και κατασκευής ως συνάρτηση της εκπαίδευσης**». Επί του άρθρου αυτού απάντησε ο συνάδελφος Αχιλλέας Καλτσέτης, Τοπογράφος Μηχανικός, CEng, FICE ως ακολούθως:

Απάντηση στην ανακοίνωση του Κου Βουδικλάρη που δημοσιεύθηκε στην Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής στις 23 Αυγούστου 2009

Ο κύριος Θ. Βουδικλάρης, Πρόεδρος του Ινστιτούτου Οικονομίας Κατασκευών (ΙΟΚ), παρουσίασε την ανακοίνωση του στο 3^ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής της 7/11/2008, αντιδρώντας για την καταδίκη της Ελλάδος και την ακόλουθη επιβολή προστίμου από το Ευρωπαϊκό Δικαστήριο λόγω της μη συμμόρφωσης με την οδηγία για την ελεύθερη διακίνηση επιστημόνων στις χώρες της ΕΕ. Ο κος Βουδικλάρης φαίνεται να είναι κάθετα αντίθετος με την απόφαση αυτή και, επιδεικνύει κάτι σαν περιφρόνηση προς τους Ευρωπαίους συναδέλφους του, ειδικά τους σπουδασάντες στο Ηνωμένο Βασίλειο (ΗΒ), χωρίς να κάνει καμιά προσπάθεια να το κρύψει.

Η ανακοίνωση περιέχει σωρεία μειωτικών, προσβλητικών και περιφρονητικών εκφράσεων για τους στην Βρετανία σπουδασάντες πολιτικούς μηχανικούς και τους αντιμετωπίζει με μία αδικαιολόγητη επιθετικότητα. Όμως ο κος Βουδικλάρης φαίνεται να διακατέχεται από την ίδια περιφρόνηση και για το εν γένει σύστημα τριτοβάθμιας εκπαίδευσης του ΗΒ. Δεν φαίνεται να γνωρίζει ότι οι Βρετανικών σπουδών πολιτικοί μηχανικοί εργάζονται με λαμπρές επιδόσεις και διατρέπουν σε ολόκληρο τον κόσμο, με πληθώρα επιτευγμάτων. Επίσης, θα έπρεπε να δέχεται ως ορθόν το ότι όλοι οι πολιτικοί μηχανικοί ειδικεύονται και πχ. ένας ειδικός σε αντισεισμικές μελέτες οπλισμένου σκυροδέματος δεν γνωρίζει πως να μελετήσει την σταθερότητα των πρανών ή το πάχος και την σύσταση της ασφάλτου μίας οδού σαν αυτήν των Τεμπών. Τέλος, ας μη ξεχνά ότι τα κτίρια δεν είναι παρά ένα μικρό δείγμα στην πληθώρα των έργων που καλύπτει το επάγγελμα του πολιτικού μηχανικού.

Το πρόβλημα των ενιαίων επαγγελματικών δικαιωμάτων στην ΕΕ των 27 χωρών ή στις πλέον των 30 χωρών που έχουν συνυπογράψει τη σύμβαση της Μπολόνια είναι πολύπλοκο και δύσκολο στο να λυθεί. Μετά από χρόνια συζητήσεων φαίνεται να κυριαρχεί η σκέψη ότι η καλύτερη λύση είναι να αποκτώνται επαγγελματικά δικαιώματα από την χώρα που γίνονται οι σπουδές, που να ισχύουν σε όλη την Ευρώπη, έτσι ώστε να εκλείψει η ανάγκη έκδοσης πιστοποιητικού ισοτιμίας τίτλων σπουδών που μόνον αδικίες ή άλλες δυσάρεστες καταστάσεις μπορεί να προκαλέσει στους νεαρούς πολιτικούς μηχανικούς. Δηλαδή ο πτυχιούχος από το ΗΒ να αποκτά εκεί επαγγελματικά δικαιώματα τα οποία στη συνέχεια θα του δίνουν το δικαίωμα να ασκεί το επάγγελμα σε όλες τις άλλες χώρες, συμπεριλαμβανομένης της χώρας καταγωγής του, εφόσον δεν τυγχάνει Βρετανός αλλά είναι πολίτης άλλης χώρας της Ευρωπαϊκής Ένωσης.

Να σημειωθεί ότι οι πιο πολλές στρεβλώσεις έχουν δημιουργηθεί ακριβώς επειδή «παντρεύουμε» τμήματα διαδικασιών απόκτησης επαγγελματικών προσόντων από δύο διαφορετικές χώρες που έχουν εντελώς άλλη αντίληψη για τον τρόπο προετοιμασίας των νέων μηχανικών που οδηγεί στην απόκτηση των επαγγελματικών δικαιωμάτων. Το Ελληνικό σύ-

στημα που βασίζεται σε πολύχρονες σπουδές και σχεδόν αυτόματη χορήγησή τους και το βρετανικό, που βασίζεται σε τετραετείς σπουδές (παλαιότερα τριετείς), και στη συνέχεια τουλάχιστον τρία χρόνια εργασιακή εμπειρία υπό την επίβλεψη έμπειρου μηχανικού και τέλος περαιτέρω επαγγελματικές και όχι ακαδημαϊκές εξετάσεις, που κάθε άλλο παρά ρουτίνες θεωρούνται από τους νεαρούς Βρετανούς πολιτικούς μηχανικούς. Στο μεταξύ όμως, και οι ακαδημαϊκοί τίτλοι ελέγχονται και εγκρίνονται ή όχι από διαφορετική ελεγκτική υπηρεσία.

Θα πρέπει να σημειωθούν τα κάτωθι για να αποφευχθεί σύγχυση στον αναγνώστη της ανακοίνωσης του κ. Βουδικλάρη, σύγχυση που πιθανόν έχει περιπέσει και ο ίδιος και που τον έχει οδηγήσει σε λάθος συμπεράσματα.

1. Τίτλος σπουδών και επαγγελματικά δικαιώματα είναι εντελώς διαφορετικά για τους μηχανικούς στο ΗΒ. Για να επικεντρωθούμε στους πολιτικούς μηχανικούς που αφορά πιο πολύ τον κ. Βουδικλάρη και εμάς, η ακαδημαϊκή γνώση και η επαγγελματική εμπειρία σε εργοτάξιο και μελετητικό γραφείο κάθε υποψήφιου, αξιολογούνται ξεχωριστά, τυχόν ανεπάρκειές τους εντοπίζονται και μέτρα αναπλήρωσής τους προτείνονται και τότε μόνα ο υποψήφιος έχει δυνατότητα να δώσει επαγγελματικές εξετάσεις και συνέντευξη και να αποκτήσει επαγγελματικά δικαιώματα, λαμβάνοντας τον τίτλο Chartered Engineer (CEng). Αλλά και μετά την απόκτηση του τίτλου, ο μηχανικός υποχρεούται να επιμορφώνεται για ορισμένες ώρες τον χρόνο (ΟΡΟ).
2. Ας σημειωθεί ό,τι στο ΗΒ, δίδονται στους σπουδαστές δύο μόνον ευκαιρίες να περάσουν το κάθε μάθημα. Μετά από δύο αποτυχίες, ο σπουδαστής αποβάλλεται οριστικά. Έτσι, μόνον οι καλύτεροι γίνονται διπλωματούχοι. Επίσης, στο έτος σπουδών που οδηγεί στο master και το οποίο τώρα πλέον είναι υποχρεωτικό για τους CEng, συμπεριλαμβάνεται μία υψηλών προδιαγραφών Διπλωματική Εργασία που δεν έχει τίποτε να ζηλέψει από μία πραγματική μελέτη σαν αυτές που δίνει σε διαγωνισμό το Δημόσιο και για την οποία οι μέλλοντες πολιτικοί μηχανικοί υπερηφανεύονται για πολλά χρόνια. Το κυκλοφοριακό της Αθήνας, που επικαλέστε κύριε Βουδικλάρη αστειευόμενος, είναι πολυπλοκότερο έργο από μία οποιαδήποτε αντισεισμική εξαόρροφη πολυκατοικία.
3. Η διαδικασία αυτή έχει από χρόνια καθιερωθεί και εκ του αποτελέσματος κρίνεται πολύ καλή. Κάθε στάδιο της διαδικασίας ελέγχεται και οποιαδήποτε αδυναμία διορθώνεται. Ακόμα και οι σπουδές κάθε πανεπιστημίου που το επιθυμεί ελέγχονται και αξιολογούνται. Πιστοποίηση αυτής της διαδικασίας αποτελεί το γεγονός ότι Βρετανοί μηχανικοί έχουν μελετήσει, επιβλέψει ή / και κατασκευάσει πλήθος μεγάλων έργων ανά την υφήλιο. Ένας εκ των μηχανικών αυτών ήταν ο επικεφαλής της ανεξάρτητης επιβλέπουσας αρχής στη γέφυρα Ρίου Αντίρριου που έλεγχε την πρόοδο και το κόστος των εργασιών εκ μέρους των πιστωτριών τραπεζών. Πιθανόν κατά τον κ. Βουδικλάρη και ίσως και πολλούς άλλους συναδέλφους, ο εξέχων αυτός μηχανικός δεν θα έπρεπε να ασκεί τα καθήκοντα μηχανικού στην Ελλάδα μη έχοντας πενταετείς πανεπιστημιακές σπουδές.

Η ανάγκη αναγνώρισης των πτυχίων των παραρτημάτων βρετανικών πανεπιστημίων στην Ελλάδα προκύπτει από την εμμονή των Ελληνικών φορέων να αναγνωρίσουν ακαδημαϊκούς τίτλους και στη συνέχεια να αποδώσουν επαγγελματικά δικαιώματα. Η καλύτερη λύση θα ήταν να απαιτήσουν από τους αποφοίτους των παραρτημάτων (εργαστηρίων ελευθέρων σπουδών ή όπως αλλιώς είναι η δόκιμη ονομασία τους) να αποκτήσουν πρώτα επαγγελματικά δικαιώματα στο ΗΒ, χώρα του μητρικού ιδρύματος. Αυτό θα έφερνε όλους τους εκεί φορείς αντιμέτωπους με τη πρώτη δυσκολία, δηλαδή να πιστοποιηθεί ως επαρκής ακαδημαϊκός τίτλος αυτός που χορηγούν αυτές οι σχολές. Από τα μέχρι σήμερα γνωστά, κανένα από αυτά τα ιδρύματα δεν διαφημίζει την πι-

στοποίηση των σπουδών του από το Ινστιτούτο Πολιτικών Μηχανικών του ΗΒ, παρά μόνο τη δυνατότητα που έχουν οι απόφοιτοί τους να εγγραφούν σε αυτά, αλλά μόνον ως Διπλωματούχοι μηχανικοί (Graduate engineers). Η διαφορά όμως είναι τεράστια.

Ο ίδιος ο κος Βουδικλάρης αναγνωρίζει ότι το σύστημα απόδοσης επαγγελματικών δικαιωμάτων στην Ελλάδα είναι μη ελέγξιμο. Αυτό όμως σημαίνει αναξιόπιστο, που βασίζεται στον «πατριωτισμό» των εξεταστών και στην εμπιστοσύνη στο ελληνικό Πολυτεχνείο (και πολυτεχνικές σπουδές). Η εμπιστοσύνη στο Ελληνικό Πολυτεχνείο όμως περιέχει κινδύνους από τις καταλήψεις και τις ταραχές που προκαλούν οι καταλήψεις, που μεταφράζονται σε χαμένες ώρες διδασκαλίας. Είναι επίσης αδιανόητο να δίδονται πλήρη επαγγελματικά δικαιώματα σε νέους επιστήμονες, πριν αυτοί εργασθούν για μερικά χρόνια ώστε να αποκτήσουν την απαραίτητη πείρα κάτω από έναν πεπειραμένο μηχανικό. Στο ΗΒ, οι διπλωματούχοι (graduates) απέχουν από τους επαγγελματίες (chartered engineers ή CEng) τουλάχιστον μία τριετία μεθοδευμένης και υπό συνεχή επίβλεψη εμπειρίας σε γραφείο και εργοτάξιο. Αλλά και οι CEng, για να διατηρήσουν τον τίτλο τους, πρέπει να παρουσιάζουν κάθε έτος έναν ορισμένο αριθμό ωρών επιμόρφωσης.

Τέλος θα πρέπει ο κ. Βουδικλάρης και καθένας στο ΤΕΕ που μοιράζεται τις ίδιες απόψεις, να γνωρίζει ότι οι βρετανικοί επιστημονικοί τεχνικοί φορείς, όπως και το Ινστιτούτο Πολιτικών Μηχανικών (Institution of Civil Engineers) ενδιαφέρονται τουλάχιστον όσο και το ΤΕΕ ώστε τα μέλη τους να έχουν την απαραίτητη επαγγελματική επάρκεια. Η διαφορά με την Ελλάδα είναι ουσιαστική, το ενδιαφέρον είναι έμπρακτο και βασίζεται στη συνεχή αξιολόγηση της διαδικασίας απόκτησης επαγγελματικών δικαιωμάτων, συμπεριλαμβανομένων και των ακαδημαϊκών σπουδών και δεν αφήνεται το ενδιαφέρον στον πατριωτισμό των εξεταστών του ΤΕΕ ή στις Πολυτεχνικές Σχολές και το Πολυτεχνείο. Ένα μικρό ακόμα σχόλιο σε αυτά που αναφέρει ο κ. Βουδικλάρης περί της ποιότητας των ελλήνων σπουδαστών που φοιτούν στο εξωτερικό. Ο συλλογισμός του περί διωχθέντων νέων από όλες τις ανώτατες σχολές της Ελλάδας, είναι στις βασικές αρχές του λανθασμένου μια και στο ελληνικό πανεπιστήμιο κατά τεκμήριο μπαίνουν αυτοί που γράφουν άριστα σε εισαγωγικές εξετάσεις περιορισμένης ύλης και που δεν είναι απαραίτητα οι καλύτεροι μελλοντικοί επιστήμονες ή αυριανοί επαγγελματίες. Είναι απλά αυτοί που είχαν την τύχη να γράψουν καλύτερα στην δεδομένη στιγμή των εισαγωγικών εξετάσεων.

Μετά τιμή,

Αχιλλέας Calzetti CEng FICE TOP. ΜΗΧ.

Απάντηση Θ. Βουδικλάρη

Κατ' αρχήν επιθυμώ να δηλώσω ότι όσα είπα στο συνέδριο Αντισεισμικής Μηχανικής και δημοσιεύτηκαν στο περιοδικό της ΕΕΕΕΓΜ δεν έχουν σχέση με το ΙΟΚ, του οποίου πράγματι είμαι Πρόεδρος. Έχω πολλά χρόνια συμμετοχή στα κοινά των μηχανικών και αυτός είναι ο λόγος που μου έγινε η τιμή, να μου διατεθεί το βήμα στο συνέδριο και κάποια σελίδα στο περιοδικό.

Μοιάζει παραδοξολογία, αλλά είναι αλήθεια, ο συνάδελφος κ. Καλτσέτης δεν διαφωνεί μαζί μου και, στα περισσότερα από όσα έγραψε, ούτε εγώ διαφωνώ μαζί του. Ο κ. Καλτσέτης διαφωνεί με πράγματα που δεν είπα ποτέ, ούτε τώρα τα λέω, ούτε τα πιστεύω. Διαφωνεί με μια αντίληψη που νομίζει ότι έχω, αλλά δεν έχω.

Ο κ. Καλτσέτης νομίζει ότι απορρίπτω τόσο το Βρετανικό εκπαιδευτικό σύστημα όσο και τον τρόπο χορηγήσεως της Επαγγελματικής Αδείας στους μηχανικούς που προετοιμάζει, και ακόμη ότι αμφισβητώ («κάτι σαν περιφρόνηση», γράφει) την αξία όλων συλλήβδην των μηχανικών του Ηνωμένου Βασιλείου. Δεν συμβαίνει κάτι τέτοιο. Το Βρετανικό σύστημα είναι πολύ διαφορετικό από το δικό μας, χωρίς να το θεωρώ χειρότερο ή καλύτερο από το δικό μας. Δεν προτίθεμαι να κρίνω εκπαιδευτικά συστήματα, ούτε να τα κατατάξω κατ' αξίαν.

Ισχυρίστηκα και ισχυρίζομαι και τώρα, και είναι πραγματικό γεγονός, ότι ένα απίστευτα μεγάλο ποσοστό από τους αποφοίτους των σχολών του ΗΒ, που προσέρχονται στο ΤΕΕ για να εξασφαλίσουν την Άδεια ασκήσεως επαγγέλματος, έχει μια απίστευτα μεγάλη άγνοια των στοιχειωδών γνώσεων του Πολιτικού Μηχανικού, βρίσκεται σε απίστευτα χαμηλό επίπεδο. Εκτός από την προσωπική αντίληψη, από μερικούς γνωστούς μου που μου έχουν ζητήσει βοήθεια, γνωρίζω και τις απόψεις των εξεταστών του ΤΕΕ, οι οποίοι έχουν γνώση της συνολικής καταστάσεως και οι οποίοι έχουν επισημάνει το πρόβλημα στη Διοίκηση, χωρίς δυστυχώς να γίνει προσπάθεια διορθώσεως. Στο κάτω - κάτω η εξέταση γίνεται στη διπλωματική εργασία του απόφοιτου, με ενδεχόμενες **στοιχειώδεις** επί πλέον ερωτήσεις - η άγνοια δηλαδή είναι ακόμα περισσότερο αδικαιολόγητη. Και, παρεμπιπτόντως, όταν μιλάω για διπλωματική εργασία για το κυκλοφοριακό πρόβλημα της Αθήνας, εννοώ (δημοσιογραφική) περιγραφή της καταστάσεως όχι προτάσεις ή προσπάθεια επιλύσεως.

Θα ευχόμουν και εγώ, οι απόφοιτοι των Ελληνικών Πολυτεχνείων να κάνουν δύο ή τρία χρόνια «άσκηση» πριν αποκτήσουν την Άδεια, πιστεύω μάλιστα και στη χρησιμότητα της σπουδαστικής άσκησης. Αλλά δεν είμαι εγώ (ούτε ο κ. Καλτσέτης) που καθορίζω τις προϋποθέσεις χορηγήσεώς της, ούτε πιστεύω ότι σε μια χώρα στην οποία η συντριπτική πλειοψηφία των μηχανικών ασχολείται με κτίρια, μπορούν να αγνοηθούν οι απαιτήσεις γνώσεως του σεισμικού φαινομένου. Οι γνώσεις για τις στρώσεις οδοστρώματος και τη σταθεροποίηση πρανούς μπορούν να αποκτηθούν δια της πείρας, ο υπολογισμός σε σεισμό όχι.

Ο κ. Καλτσέτης παρασύρεται από τον θαυμασμό του για το Βρετανικό σύστημα, για να απαξιώσει το Ελληνικό. Οδηγείται έτσι σε ανεπίτρεπτο υπαινιγμό για την κατάπτωση των Τεμπών, υποθέτω πως πιστεύει ότι έγινε επειδή οι Έλληνες μηχανικοί δεν ξέρουν σταθεροποίηση πρανών, ενώ δεν θα γινόταν αν ήταν Βρετανοί. Θα του θυμίσω ότι ο επι κεφαλής της Κοινοπραξίας ήταν Ιταλός μηχανικός, 58 ετών, με πολύ μεγάλη εργοταξιακή πείρα. Και δεν θα παρασυρθώ να του απαριθμήσω βλάβες (μεγαλύτερες ή μικρότερες) τεχνικών έργων, με μηχανικούς πάσης εθνικότητας, ακόμα και Βρετανούς, από σεβασμό προς το επάγγελμα και τις αγωνίες του.

Αναρωτιέμαι αν ο κ. Καλτσέτης ή ο Βρετανός εξεταστής του ICE θα έδινε Άδεια ασκήσεως του επαγγέλματος του Πολιτικού Μηχανικού σε κάποιον απόφοιτο που δεν ξέρει αν τα σίδερα πάνε πάνω ή κάτω σε μια διατομή, ή πόσα κιλά τσιμέντο έχει ένα κυβικό μέτρο σκυροδέματος, ή με ποια υλικά γίνεται το σκυρόδεμα. Απαντήσεις που δεν χρειάζονται «θεωρία Ελληνικού Πολυτεχνείου» αλλά χρειάζονται (**και** κατά την αντίληψη του Κ. Καλτσέτη) για την άσκηση του επαγγέλματος.

Δεν συμφωνώ ότι πρέπει να παίρνουν Άδεια ασκήσεως επαγγέλματος οι απόφοιτοι του ΗΒ, απλώς και μόνο επειδή ακολούθησαν Βρετανική εκπαίδευση, συμφωνώ όμως απολύτως (και το έχω ήδη προτείνει) να δίνεται η Άδεια σε όσους εξ αυτών την έχουν εξασφαλίσει στο ΗΒ και με τις προϋποθέσεις που χορηγείται εκεί.

Εξακολουθώ να πιστεύω ότι οι εξετάσεις αυτές πρέπει να είναι αυστηρότερες, να γίνονται με γραπτές ερωτήσεις και γραπτές απαντήσεις, και το προϊόν τους να αποστέλλεται στους καθηγητές των εξεταζομένων (ακόμα και στους Βρετανούς), για να βλέπουν το αποτέλεσμα της δουλειάς τους

και να αισθάνονται υπερηφάνεια, ή τύψεις, ή ντροπή, όταν χρειάζεται. Και για να αποκτήσουν ευθύνες και οι εξεταστές.

Σε ένα ακόμα σημείο θα διαφωνήσω με τον κ. Καλτσέτη, στον απόλυτο θαυμασμό του για τους Βρετανούς συμβούλους που «έχουν κατασκευάσει πλήθος μεγάλων έργων ανά την υφήλιο». Μεταξύ αυτών υπάρχουν και μερικοί, που τους γνωρίσαμε στη χώρα μας, οι οποίοι ήταν αισθητά κατώτεροι του δέοντος, και όσοι συνάδελφοι ασχολούνται με το αντικείμενο θα καταλάβουν και θα με δικαιώσουν, δεν επιθυμώ να πείσω τους άλλους.

Σχόλιο Εκδότη

Τελικά όλοι συμφωνούμε διαφωνώντας! Ίσως είναι ίδιο της φυλής μας ...

Προφανώς δεν μπορούμε να κατηγορήσουμε συλλήβδην όλα τα πανεπιστήμια - πολυτεχνεία του Ηνωμένου Βασιλείου για το χαμηλό επίπεδο της εκπαίδευσης που παρέχουν στους πολιτικούς μηχανικούς. Τουναντίον, ένας πολύ μεγάλος αριθμός πανεπιστημίων - πολυτεχνείων κατατάσσονται στην παγκόσμια πρωτοπορία (ο εκδότης αλλά και πολλά μέλη της ΕΕΕΕΓΜ έχουν ίδια εμπειρία). Απ' την άλλη πλευρά, δεν μπορούμε να μην παραδεχθούμε, επίσης, ότι το επίπεδο των γνώσεων πάρα πολλών Πολιτικών Μηχανικών αποφοίτων πανεπιστημίων του Ηνωμένου Βασιλείου είναι εξαιρετικά χαμηλό. Καθημερινά συνάδελφοι με μετέχουν στις εξεταστικές επιτροπές για την χορήγηση της άδειας άσκησης επαγγέλματος το αναφέρουν. Συνήθως οι απόφοιτοι αυτοί προέρχονται από τα πάλαι ποτέ Polytechnics, τα οποία, για μη εκπαιδευτικούς λόγους, μετονομάστηκαν Πανεπιστήμια!

Το πρόβλημα αυτό στο Ηνωμένο Βασίλειο ελάχιστα επηρεάζει τους επαγγελματίες μηχανικούς, δεδομένου ότι, όπως α-ναφέρει και ο κ. Καλτσέτης, προκειμένου αυτοί να ασκήσουν το επάγγελμα θα πρέπει να πληρούν συγκεκριμένες προϋποθέσεις, δηλαδή η κατοχή πανεπιστημιακού διπλώματος - πτυχίου και η τριχρόνη εργασιακή εμπειρία υπό την επίβλεψη έμπειρου μηχανικού, ενώ στη συνέχεια είναι υποχρεωμένοι να υποστούν επαγγελματικές εξετάσεις κάθε άλλο παρά χαμηλού επιπέδου.

Αντίθετα, στην Ελλάδα θεωρούμε ότι μετά από πέντε χρόνια σπουδές ο απόφοιτος μιας Σχολής Πολιτικών Μηχανικών γνωρίζει τα πάντα και μπορεί, μετά από μια παρωδία επαγγελματικών εξετάσεων, να βγει στο επάγγελμα και να «μελετήσει» / υπογράψει την στατική / αντισεισμική μελέτη ενός ουρανοξύστη! Θεέ και Κύριε!

Προφανώς η κατάσταση αυτή πρέπει να αλλάξει. Δεν μπορεί οι ιατροί να ειδικεύονται για πολλά χρόνια, οι δικηγόροι να ασκούνται για κάποιο χρονικό διάστημα πριν από τις επαγγελματικές εξετάσεις τους και οι μηχανικοί να δικαιούνται υπογραφής αμέσως μετά την αποφοίτησή τους. Πριν από χρόνια είχα κάνει, μαζί με άλλους δύο συναδέλφους που μετείχαμε στην ίδια εξεταστική επιτροπή του ΤΕΕ, πρόταση για την ουσιαστικοποίηση (αυστηροποίηση) των εξετάσεων, αλλά όπως και πολλές άλλες παρόμοιες «θάφτηκε», ενώ η πρόταση μου για ασκούμενους / δόκιμους μηχανικούς θεωρήθηκε σαν συνδικαλιστική αυτοκτονία! Ο λαϊκισμός στο απόγειό του.

Πιστεύω ότι έφθασε πλέον ο καιρός να αντιμετωπίσουμε με άλλα μυαλά την κατάσταση: να επιβάλουμε την άσκηση των αποφοίτων των πολυτεχνικών σχολών (π.χ. τετραετής με δύο χρόνια στον μελετητικό τομέα και δύο χρόνια στον κατασκευαστικό τομέα), να επιβάλουμε την διεξαγωγή ουσιαστικών επαγγελματικών εξετάσεων και να αποδεχθούμε, τέλος, το γεγονός ότι δεν είναι απαραίτητο να έχουν δικαίωμα υπογραφής όλοι οι απόφοιτοι των πολυτεχνείων, όπως άλλωστε συμβαίνει στις περισσότερες αναπτυγμένες χώρες του κόσμου. Με τον τρόπο αυτό θα αντιμετωπισθεί και το

πρόβλημα της «ανωτατοποίησης» των ΤΕΙ και της διεκδίκησης από τους αποφοίτους τους επαγγελματικών δικαιωμάτων μηχανικών.

Τέλος, όσον αφορά στα επαγγελματικά δικαιώματα αποφοίτων ξένων πολυτεχνείων / πολυτεχνικών σχολών, συμφωνώ με την κοινή άποψη των «διαφωνούντων» συναδέλφων ότι μπορούν να δίνονται ελεύθερα σε όσους εξ αυτών τα έχουν εξασφαλίσει στην χώρα όπου εδρεύει το πολυτεχνείο / πολυτεχνική σχολή και με τις προϋποθέσεις που χορηγούνται εκεί.

Lessons from the Haiti earthquake

Roger Bilham,
Department of Geological Sciences, University of Colorado,
Boulder, Colorado 80309-0399, USA
roger.bilham@colorado.edu

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Abstract

Roger Bilham, one of the first seismologists to visit Haiti after last month's earthquake, calls for UN enforcement of resistant construction in cities with a history of violent tremors.

With an official death toll of 230,000 and thousands still buried beneath collapsed structures, the Haiti earthquake of 12 January was more than twice as lethal as any previous magnitude-7.0 event (Fig. 1). In my visit to the region in the weeks after the earthquake, the reason for the disaster was clear in the mangled ruins — the buildings had been doomed during their construction. Every possible mistake was evident: brittle steel, coarse non-angular aggregate, weak cement mixed with dirty or salty sand, and the widespread termination of steel reinforcement rods at the joints between columns and floors of buildings where earthquake stresses are highest.

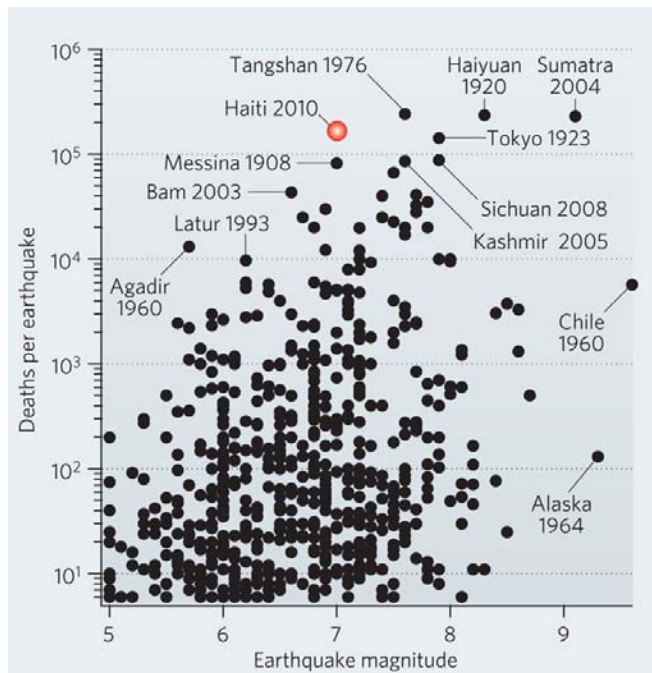


Figure 1: Deaths from earthquakes since 1900. The toll of the Haiti quake is more than twice that of any previous magnitude-7.0 event, and the fourth worst since 1900 (refs 10, 11).

For earthquake engineers¹, the damaged city constitutes a nightmare of diabolical proportions. Arguably, the amplification of surface seismic waves crossing the soft sedimentary plains on which most dwellings were constructed contributed to their collapse. Partly because of this, and partly because of the westward propagation of the rupture, damage was less on the bedrock hills south of the city, and far more

on the coastal plains near Léogane 30 kilometres to the west. But the survival of top-heavy water towers amid areas of pancaked ruins in low-lying areas illustrates that the disaster could have been averted had sound construction practices been adhered to throughout the region.

The death and injury of about 15% of more than 2.5 million people in Port-au-Prince and its urban agglomeration, and the roughly 1.5 million people now homeless, is a consequence of many decades of unsupervised construction permitted by a government oblivious to its plate-boundary location. Seismologists have written and spoken extensively about the possibility of damaging earthquakes occurring on this part of the Caribbean plate boundary. Even had there been listeners empowered to act on these warnings, it is clear in hindsight that the monumental problem of retrofitting killer buildings would never have taken precedence over Haiti's economic woes.

The lessons from this tragic event are manifold — for seismologists, for the construction industry and for the international development community. Community leaders responsible for the safety of their citizens need to act on seismologists' forecasts of future earthquakes, based as they are on a history of repeated damage from previous events.

More shocks soon?

Of the many questions that now arise, one of immediate concern is whether other large shocks are imminent. The 12 January mainshock and its aftershocks occurred on the Enriquillo Fault that runs east-west bordering the northern edge of the Caribbean tectonic plate. Earthquakes cause this fault to slip an average of 8 millimetres a year², with the remaining 12 millimetres a year of the Caribbean Plate's eastward motion being absorbed by a parallel fault system in northern Hispaniola³ (Fig. 2). In 1751, a violent earthquake to the east of the city tumbled nearly all the buildings of Port-au-Prince. In 1770, the reconstructed city was again demolished, possibly by the segment that ruptured this year^{4,5}. Since 1770, this fault has been locked, 'holding back' almost precisely the amount of Caribbean Plate motion that slipped, about 2 metres, on 12 January. So the good news is that the most recent earthquake seems to have released all the elastic energy accumulated on this segment of the plate boundary since 1770.



Figure 2: Earthquake history of the island of Hispaniola. Positioned close to the edge of the Caribbean Plate, the countries of Haiti and the Dominican Republic are always at risk of earthquakes.

Two unsettling aspects of the earthquake make this calculation less reassuring. The first is that the field searches of the area around the epicentre found no rupture of the surface above the plate-boundary fault. This is consistent with radar images from space taken before and after the earthquake⁶ showing that rupture started more than 8 kilometres underground, but ended at least 2 kilometres below the surface. Offset roads, fences and streams are usually

the smoking gun of surface rupture, and it is rare for large earthquakes to show none. However, there are several precedents, for example the 1989 magnitude-6.9 Loma Prieta earthquake in California and the magnitude-7.6 Bhuj earthquake in India in 2001.

The absence of surface rupture is dire news for those geologists who are eager to dig up the traces of former earthquakes in the long and deep rift south of Port-au-Prince that marks the northern edge of the Caribbean Plate (Fig. 2). By excavating a surface fault, it is possible to read the story of successive earthquakes back in time, through the offset of datable geologic units, sometimes for thousands of years. With such a record of past earthquakes, it is possible to calculate the probable interval and size of future ones. But if this recent earthquake left no record of its passage, then many more will be missing from the palaeoseismic record.

Moreover, the absence of a surface rupture means that elastic energy is still stored in the uppermost few kilometres of the fault. Such pent-up energy will be released, either abruptly, adding to the severity of a future earthquake, or more benignly as aseismic creep⁷ — slow sliding of the shallow layers of a fault, above the deeper region where bigger jolts occur. Surface scars within the rift valley that marks the northern edge of the Caribbean Plate suggest that previous earthquakes have repeatedly ruptured the surface in the segment that recently slipped. It is very probable that these were larger earthquakes than last month's. Many thousands will have occurred before historical records began with the arrival of Christopher Columbus.

Building pressure

Of greater concern is that adjacent segments of the fault to the east and west of the recent subsurface rupture are now near breaking point because of stress transferred to them. Earthquakes on these adjoining segments would be as large or larger than the 12 January event⁸. Calculations show a 1–2% chance of magnitude-7 earthquakes in these segments before 22 February⁹. Such forecasts are not an exact science and contiguous earthquakes induced in this way are often delayed months or years by processes that are poorly understood. Yet there is no doubt that the recent shock has enhanced the risk of another earthquake. Disquieting as this news is, a rupture of these segments now would be less disastrous to the flattened capital than one in 20–30 years, after it has been reconstructed, given that buildings are presently abandoned and survivors and rescuers alike live in tents.

Many more cities lie in the path of damaging earthquakes^{10, 11}, and some of them, like Port-au-Prince and Tokyo (devastated by an earthquake in 1923), are capitals whose destruction could paralyse an entire nation. Kathmandu, Tehran, Istanbul and Srinagar are notable for their seismic settings and for the uneven application of appropriate building codes. Most islands in the northern and eastern Caribbean owe their existence to seismic processes on or near the edge of the Caribbean Plate. It is a matter of when, not whether, future earthquakes will shake the cities on these plate boundaries.

The catastrophic earthquakes that have occurred since 1999, in Turkey, Taiwan, Sumatra, Kashmir and Sichuan, demonstrate that elementary engineering guidelines for earthquake resistance in crucial civil structures (schools, hospitals and fire stations,) have been alien concepts to local authorities, or have been ignored. About 80% of all schools collapsed in the Port-au-Prince area, and a similar percentage in the 2005 Kashmir earthquake. Police stations and jails must be added to this trilogy of crucial structures. Never before have more than 4,000 criminals been loosed into the mayhem of post-seismic recovery, as occurred this

year in Haiti, which also lost a substantial fraction of its police force.

Since the turn of the century, earthquakes have directly or indirectly (including tsunami) claimed the lives of more than 640,000 people, four times more than in the preceding two decades, and proportionately more than the global increase in population would anticipate. If buildings are not made earthquake resistant, the toll is likely to continue to rise as cities grow in population. Urban earthquakes also bring a huge financial burden to the world. As of 9 February, at-most US\$2.5 billion of financial aid¹² had been pledged to Haiti to assist its earthquake recovery efforts. Even if half of this aid goes into reconstruction of the estimated 250,000 damaged dwellings and thousands of commercial and civic structures, the sum will amount to less than \$5,000 per structure. Given that less-destructive earthquakes in the developing world have typically cost \$3 billion–\$10 billion¹¹, earthquake-proof reconstruction in Haiti is likely to cost an order of magnitude more than has been promised so far, even using local materials and local manpower.

Because construction projects are likely to offer employment opportunities for many Haitians in the coming decades, earthquake engineers^{1, 13} have already articulated the importance of training contractors and labourers in sound construction methods. Even more pressing than additional aid for reconstruction is the need to introduce an adequate building code and a cadre of building inspectors empowered to enforce it.

The future global burden of local earthquakes could be significantly reduced if minimal construction guidelines were mandated in all the world's cities, and especially in those with a history of previous earthquakes. The projected doubling in world population means that we are constructing more buildings now than at any time in our history^{10, 11}. In recent earthquakes, buildings have acted as weapons of mass destruction. It is time to formulate plans for a new United Nations mission — teams of inspectors to ensure that people do not construct buildings designed to kill their occupants.

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Dam Safety: Review of Geophysical Methods to Detect Seepage and Internal Erosion in Embankment Dams

Ken Y. Lum and Megan R. Sheffer

Several non-intrusive geophysical methods are available to facilitate early detection of seepage, piping, and internal erosion in embankment dams. A review of these methods shows where they can be applied and indicates work needed to further improve the use of each.

Internal erosion is the second largest cause of failure of earthfill dams worldwide. Damages resulting from internal erosion can lead to expensive remediation. Typical dam safety surveillance consists of visual inspections supported by limited instrumentation. However, internal erosion can become quite advanced before the problem is detected via these means. Recently, interest has grown regarding the use of non-intrusive geophysical techniques to facilitate early detection of anomalous seepage, piping, and internal erosion.

To date, the use of geophysical methods to investigate seepage in dams has produced mixed results, partly because the application of these methods is not well-understood and partly because false positives cannot be tolerated. Although geophysical anomalies are easily detected, often what these anomalies represent and their implications are not clear. The application of geophysical methods to dams is in its early stages, and adapting geophysical techniques to geotechnical investigations and dam safety surveillance requires more refinement to answer specific engineering questions.

These needs prompted the launch of a collaborative research project under the auspices of CEATI's Dam Safety Interest Group (DSIG) to study the current state-of-practice regarding geophysical methods applied to embankment dams. The objective of this project was to evaluate, adapt, and/or develop some of the most promising geophysical techniques as investigation and monitoring tools to detect seepage and internal erosion.

Four techniques were selected for additional research and development:

- Temperature measurement;
- Self-potential;
- Electrical resistivity; and
- Seismic methods.

Temperature measurement

Temperature measurement makes use of natural seasonal temperature variations to locate areas of preferential seepage. Temperature in the saturated part of an embankment dam primarily is governed by the temperature of the water seeping from the reservoir. However, the air temperature from above and geothermal heat flow from below also influence temperature distribution in the dam. Geothermal heat flow is relatively constant, but air and reservoir temperatures vary seasonally and create temperature "waves" that penetrate the dam. Conductive air temperature variations typically penetrate about 10 meters below the dam surface along the crest and downstream slopes. Upstream, reservoir water exhibits seasonal fluctuations that are influenced by stream inflows and mixing. Stratification often exists in large reservoirs, and variations up to about 20 degrees Celsius (C) can occur in the upper tens of meters of the reservoir, with little seasonal fluctuation at depth. Figure 1 shows the effect of seasonal fluctuations on a vertical temperature profile measured in a deep reservoir in northern British Columbia.

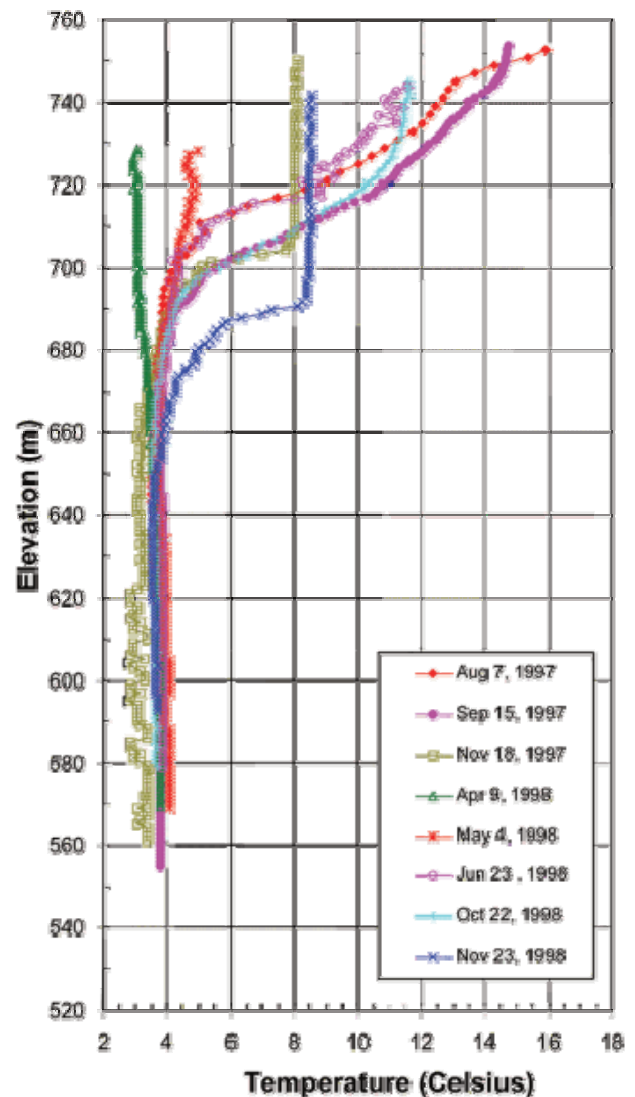


Figure 1. The top elevation of these vertical temperature profiles, measured in the reservoir impounded by a dam in British Columbia, corresponds with the reservoir level. Seasonal fluctuations in temperature that are evident in the upper 60 meters of the reservoir facilitate the detection of higher-permeability zones in the embankment dam.

The temperature within an embankment dam can be measured at discrete points by using thermistors (such as those integrated into vibrating wire piezometers) or by profiling the water column inside standpipe piezometers or existing casings. Distributed temperature measurements using optical fibers bring the promise of improved spatial coverage and enable monitoring with an accuracy of 0.01 to 0.1 C at spacings of about 1 meter over a continuous fiber of 10 kilometers or more. Costs of readout units are US\$25,000 to US\$75,000 (depending on specification requirements).

Data can be interpreted qualitatively or quantitatively. As part of the DSIG research project, a user-friendly time lag software package called DamTemp was enhanced. This software has the capability to use measured temperatures to identify and estimate the seepage flows in a zone of potential damage.

As an extension to the DSIG research work, practical guidance for temperature data measurement and evaluation procedures have been documented in a field manual.¹

With significant advances in temperature monitoring and interpretation tools over the past two decades, temperature measurements are rapidly gaining acceptance as a useful

method for monitoring seepage in embankment dams. This is particularly true in Sweden and other European countries.

Self-potential method

Self-potential (SP) is a passive technique that measures naturally occurring electrical potentials in the ground. This is the only one of these four geophysical techniques that responds directly to fluid flow. Water flowing through the pore space of soil generates electrical current flow. This electrokinetic phenomenon is called streaming potential and gives rise to SP signals that are of primary interest in dam seepage studies.

Field data acquisition

SP is measured by determining the voltage across a pair of non-polarizing electrodes using a high-impedance voltmeter. This inexpensive and deceptively simple data acquisition procedure requires special care and attention in order to reliably interpret and correct for sources of electrical noise that can mask the signal of interest. All noise sources – including time-varying telluric currents associated with solar and atmospheric activity, stray currents, and the corrosion of buried metal – must be recognized and measured. These noise sources can mask the relatively small signals associated with seepage anomalies. For this reason, telluric measurements and magnetic surveys should be carried out to assist in interpreting the SP data. Typically, SP anomalies on the order of tens of millivolts are associated with seepage anomalies of interest, although anomaly amplitudes largely depend on site-specific conditions.

The objectives of the survey and the nature of site conditions dictate the choice of SP survey configuration and layout. Distance between electrodes typically ranges from several meters to tens of meters, depending on the resolution required. Unlike other geophysical techniques, pre-assembled sets of SP survey equipment are not commercially available, and widely accepted data quality-control standards and procedures had not been established for the SP method. As a result of this research, guidance on obtaining high-quality SP data in support of dam seepage investigations has been comprehensively documented in an SP field data acquisition manual.²

SP data interpretation

Interpretation of SP measurements to infer seepage patterns and concentrated seepage flows ranges from simple qualitative to more advanced quantitative numerical modeling approaches.

Zones of preferential flow can be inferred qualitatively using patterns in the electrical potential distribution. Interpretation of seepage-related features is aided by taking the difference between two data sets collected at different pool levels. This process reduces the influence of non-seepage sources – such as electrical potential fields associated with buried metal pipes and concrete rebar – and thus facilitates the identification of seepage-related anomalies. Distinct anomalies can be interpreted using simple geometric source modeling to estimate the location and depths of seepage-induced electrical current sources. This information can be used in conjunction with other site information to further delineate the extent and cause of the seepage, or to help guide more detailed investigations.

The current state-of-the-art in SP data interpretation is application of more advanced numerical modeling techniques to interpret characteristics of the hydraulic regime from the SP data. A three-dimensional (3D) forward modeling software package called SP3D was developed as part of the DSIG project. This program enables an interpretation of hydraulic head patterns from the geophysical data using a 3D seepage model of the dam. This level of data interpretation requires estimates of the hydraulic conductivity, elec-

trical resistivity, and cross-coupling coefficient of the embankment materials.

A lack of available data on the electrical resistivity and cross-coupling coefficient of well-graded soils prompted a laboratory study to measure these parameters. A unique apparatus was developed to perform streaming potential and resistivity measurements on the same soil specimen to derive the cross-coupling coefficient. Both unidirectional and cyclic flow methods were used to perform streaming potential measurements. The cyclic method was shown to be a valid test method and the most efficient technique for measuring the streaming potential coupling coefficient in soils.

The influence of soil and fluid properties on the cross-coupling coefficient was investigated for typical embankment soils. The results show that this coefficient does not vary considerably in saturated soils as compared to other properties such as electrical resistivity.³ This suggests that practitioners may not need to characterize the cross-coupling coefficient to the same degree as electrical resistivity for practical SP field data interpretation.

Practical guidelines for interpreting SP data resulting from dam seepage investigations have been developed.⁴

Figure 2 illustrates the temporal variations evident in an SP data set collected using an array of electrodes installed along the crest of a dam in British Columbia. This monitoring array was deployed to obtain information about the seasonal SP time variation within the dam and to assess the long-term performance of the prototype system. The data shown in Figure 2 are all referenced to a common base station at the center of the dam crest. The SP signals vary with changes in the seepage flow through the dam as the reservoir level cycles.

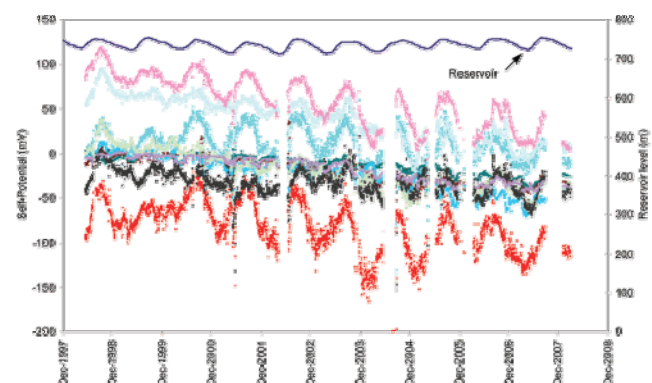


Figure 2. Each of these self-potential profiles from a dam in British Columbia corresponds to potential difference measured between a given electrode and a base electrode positioned at the center of the dam crest. There is a strong correlation between the self-potential data and seasonal reservoir levels.

Electrical resistivity

The direct current resistivity method has well-established data acquisition and interpretation techniques for standard survey configurations. The method uses pairs of electrodes to inject current into the ground and measure the resulting electrical potential distribution. Its application to dam seepage investigations is two-fold. The method may be used to monitor spatial and/or temporal variations in electrical resistivity in response to changing soil conditions caused by internal erosion and anomalous seepage. The method also may be used to characterize the electrical resistivity of the subsurface for the purposes of interpreting SP data.

Inverse modeling methods are preferred for interpreting an electrical resistivity distribution from the geophysical data. The interpretation of electrical resistivity data acquired using a single line of electrodes along the crest of an embankment poses a challenge due to the sloping geometry of the dam. Two-dimensional interpretations may misrepresent the true resistivity at depth. However, monitoring applications are not adversely affected as the focus of these investigations is to detect changes in resistivity with time, which may be linked to the development of internal erosion in the core of the embankment.

A report is available that provides detailed, practical guidance on resistivity survey design and equipment, data acquisition, and data interpretation for embankment dams.⁵

Embankment and reservoir conditions are dynamic. Fluctuations in pool levels, seasonal temperatures, and total dissolved solids all affect the electrical properties of the embankment, particularly its electrical resistivity. Long-term monitoring affords an increased sensitivity to temporal changes and enables more effective identification of local changes that may be linked to the development of internal erosion. In long-term monitoring applications, a large amount of data is collected and processed, such that efficient data handling becomes a special requirement. Case histories of long-term monitoring measurements in Sweden, using electrical resistivity, temperature, and SP methods, are available. These case histories illustrate the significant effect of seasonal variations on the measured data and provide insight for the design and installation of permanent monitoring arrays.⁶

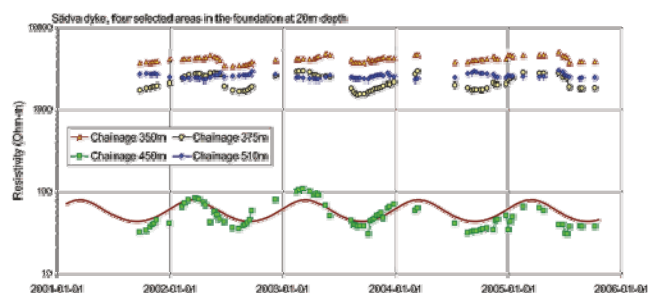


Figure 3 shows temporal and spatial variations in resistivity interpreted from data collected using a long-term monitoring array of electrodes installed along the crest of a dam in Sweden. Values of resistivity at a depth of 20 meters below the crest have been interpreted from the raw data measured from the array at four stations along the dam crest. The lower resistivity and higher variation evident in the profile at location (chainage) 450 meters indicates the presence of an eroded zone.

Seismic methods

Common seismic techniques include refraction, reflection, downhole, and cross-hole methods. With all these techniques, the time required for seismic energy to propagate from its source to a receiver is measured. If the length of the travel path is known, the velocity of the seismic energy can be derived. The seismic velocity can be used to garner information about soil stiffness and density. In dam seepage applications, internal erosion can cause low-stress conditions, which can manifest as zones of low seismic velocity.

Cross-hole seismic tomography has been used to better define the configuration of sinkholes at WAC Bennett Dam in northern British Columbia. Results suggested that a through-dam seismic configuration not requiring drill holes also might be capable of detecting sinkholes and/or zones of internal erosion. This procedure makes use of the geometry of the dam to image conditions beneath the crest by

propagating seismic waves from the upstream to the downstream slope, or vice versa.

Two types of body waves can propagate through a medium. Compressional or P-waves relate to changes in the volume of a medium. Shear or S-waves relate to the distortional changes of a medium. (Surface waves, such as Rayleigh and Love waves, exist in an elastic half-space but are less commonly exploited for geotechnical purposes.)

Generally, shorter wavelength sources provide better resolution, thus S-waves are preferred for geotechnical applications. However, S-waves tend to attenuate more rapidly than P-waves, and it is more difficult to generate high-energy S-waves. Seismic vibrator sources (e.g. Vibroseis) have been shown to generate and propagate S-wave energy across distances of more than 120 meters in a zoned earthfill dam.

Interpretation of through-dam data can range from simple to complex. In the common station gather approach, the travel path is assumed to be a straight line between source and receiver. The simplicity of this interpretation is at the cost of resolution, and only the average velocity between the source and receiver is obtained. For repeat testing or ongoing monitoring, this may be sufficient to detect a change in condition. If a change is detected, more sophisticated data interpretation and more comprehensive field testing could be initiated.

The seismic velocities measured from the field testing can be used to infer density, stress, and saturation conditions.⁷ It is interesting to note that P-waves should not have been capable of detecting the sinkholes at WAC Bennett Dam due to their longer wavelength. However, P-wave testing clearly detected an anomaly, which was interpreted and confirmed as a zone of lower stress surrounding the sinkholes.

Considerations

Geophysical methods are useful as non-destructive remote sensing tools that can provide information over large volumes as compared to point measurements. However, the anomalies of interest that are associated with internal erosion in embankment dams often are very small. The effectiveness of geophysical techniques to detect changes in seepage conditions is improved through repeating surveys or adopting a long-term monitoring approach. In addition, application of more than one geophysical technique will provide added confidence in the interpretation and detection of anomalous features.

The CEATI study showed that complex inter-relationships exist between various parameters such as water content, porosity, total dissolved solids, mineralogy, temperature, electrical resistivity, coupling coefficient, and SP.⁸ Not recognizing some of the fundamental relationships and carrying out a one-time survey without supporting information could lead to misleading and often disappointing results.

Geophysical techniques applied to the detection of seepage and internal erosion in embankment dams are at various stages of development. Temperature appears to be one of the most-developed and best-understood techniques. With the recent advances in improved accuracy and resolution in measuring temperatures along fiber optic cables, there are exciting possibilities.

For dam safety applications, SP and resistivity methods generally appear to hold more promise than seismic methods as non-intrusive techniques applied at the surface of a dam. However, in specific settings, cross-hole seismic techniques could prove indispensable.

Although the understanding of the SP and resistivity methods as applied to embankment dams has come a long way in recent years, more research is required before these

techniques can enter into standard practice and be applied with confidence on a routine basis. It is imperative that the dam owner and practicing engineer recognize the limitations and the care required in planning, executing, and interpreting the results. Geophysical data interpretation is non-unique and should be constrained by incorporating all available site information and integrating the interpretation of complementary data sets. Thus, strong cooperation between the geophysicist and engineer is essential to improve the interpretation and usefulness of the results.

Notes

1. Johansson, S., and P. Sjodahl, "A Guide to Temperature Measurements for Seepage Investigation and Monitoring of Embankment Dams," T062700-0214, CEATI, Montreal, Quebec, Canada, 2009.
2. Corwin, R.F., "Self-Potential Field Data Acquisition Manual," T992700-0205B, CEATI, Montreal, Quebec, Canada, 2005.
3. Sheffer, M.R., "Laboratory Testing of the Streaming Potential Phenomenon in Soils for Application to Embankment Dam Seepage Investigations," T992700-0205B/2, CEATI, Montreal, Quebec, Canada, 2005.
4. Corwin, R.F., "Interpretation of Self-Potential Data for Dam Seepage Investigations," T992700-0205B/3, CEATI, Montreal, Quebec, Canada, 2007.
5. Dahlin, T., P. Sjodahl, and S. Johansson, "A Guide to Resistivity Investigation and Monitoring of Embankment Dams," T992700-0205B/4, CEATI, Montreal, Quebec, Canada, 2008.
6. Johansson, S., J. Friborg, T. Dahlin and P. Sjodahl, "Long-term Resistivity and Self-Potential Monitoring of Embankment Dams – Experiences from Hällby and Sädva Dams, Sweden," T992700-0205C, CEATI, Montreal, Quebec, Canada, 2005.
7. Gaffran, P., and M. Jeffries, "A Study of Through-Dam Seismic Testing at WAC Bennett Dam," T992700-0205E, CEATI, Montreal, Quebec, Canada, 2005.
8. Johansson, S., J. Friborg, J. Claesson, T. Dahlin, G. Hellstrom, and B. Zhou, "A Parameter Study for Internal Erosion Monitoring," T992700-0205A, CEATI, Montreal, Quebec, Canada, 2005.

CEATI's geophysical methods research

In 1999, a group of dam owners, engineers, and geophysicist from Canada, the U.S., and Europe met to evaluate the state of practice and identify research needs in the use of geophysical methods. Participants in the "Internal Diagnostics for Embankment Dams" workshop identified temperature, self-potential (SP), resistivity, and seismic techniques as having the greatest potential for identifying anomalous seepage and deteriorating conditions within embankment dams. This led to initiation of the CEATI Dam Safety Interest Group (DSIG) research project, "Investigation of Geophysical Methods for Assessing Seepage and Internal Erosion in Embankment Dams." The project was sponsored by BC Hydro, Elforsk AB, Great Lakes Power Ltd., Hydro-Quebec, Manitoba Hydro, New Brunswick Power Generation Corp., New York Power Authority, Ontario Power Generation, and the U.S. Department of the Interior's Bureau of Reclamation.

Results of the research project are documented in nine reports:

- Johansson, S., J. Friborg, J. Claesson, T. Dahlin, G. Hellstrom, and B. Zhou, "A Parameter Study for Internal Erosion Monitoring," Report No. T992700-0205A, 2005.
- Corwin, R.F., "Self-Potential Field Data Acquisition Manual," Report No. T992700-0205B, 2005.
- Sheffer, M.R., "Laboratory Testing of the Streaming Potential Phenomenon in Soils for Application to Embankment Dam Seepage Investigations," Report No. T992700-0205B/2, 2005.
- Johansson, S., J. Friborg, T. Dahlin and P. Sjodahl, "Long-term Resistivity and Self-Potential Monitoring of Embankment Dams – Experiences from Hällby and Sädva Dams, Sweden," Report No. T992700-0205C, 2005.
- Hayles, J.G., G.J. Hicks, and R. Wittebolle, "Engineering Seismic Surveys at a Test Embankment near Seven Sisters, Manitoba," Report No. T992700-0205D, 2005.
- Gaffran, P., and M. Jeffries, "A Study of Through-Dam Seismic Testing at WAC Bennett Dam," Report No. T992700-0205E, 2005.
- Corwin, R.F., "Interpretation of Self-Potential Data for Dam Seepage Investigations," Report No. T992700-0205B/3, 2007.
- Dahlin, T., P. Sjodahl, and S. Johansson, "A Guide to Resistivity Investigation and Monitoring of Embankment Dams," Report No. T992700-0205B/4, 2008.
- Johansson, S., and P. Sjodahl, "A Guide to Temperature Measurements for Seepage Investigation and Monitoring of Embankment Dams," Report No. T062700-0214, 2009.

Two computer programs also were developed for interpreting temperature and SP data:

- DamTemp: Software Package for Evaluation of Temperature Field in Embankment Dams, developed by S. Johansson, HydroResearch AB, www.hydroresearch.se.
- SP3D: Software Package for Three Dimensional Modelling of Self-Potentials Caused by Seepage Flow, developed by University of British Columbia Geophysical Inversion Facility (UBC-GIF), www.mirageosience.com.

For additional information about the CEATI Dam Safety Interest Group, participation in the group, or obtaining the geophysics reports and software, contact Chris Hayes, (1) 514-866-5370; E-mail: chris@ceatech.ca.

Ken Lum, a principal engineer at BC Hydro, is project manager for CEATI's research project. Megan Sheffer, a senior engineer at BC Hydro, is a principal investigator in the study.

This article has been evaluated and edited in accordance with reviews conducted by two or more professionals who have relevant expertise. These peer reviewers judge manuscripts for technical accuracy, usefulness, and overall importance within the hydroelectric industry.

(HydroWorld weekly, 23 March 2010)

ΑΝΑΣΚΟΠΗΣΗ ΓΕΓΟΝΟΤΩΝ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ



ΣΥΛΛΟΓΟΣ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ ΕΛΛΑΔΑΣ Ημερίδα «Σχεδιασμός Αντιστηρίξεων Θεωρία – Μέθοδοι - Παραδείγματα Εφαρμογής»

Η ημερίδα διεξήχθη με εξαιρετικά μεγάλη συμμετοχή την Τετάρτη 14 Απριλίου 2010 με το ακόλουθο πρόγραμμα:

- 14.00 – 14.30 Προσέλευση - Παραλαβή Υλικού
- 14.30 – 14.45 Χαιρετισμοί
- 14.45 – 15.30 Χρήστος Τσατσανίφος, Πρόεδρος Ε.Ε.Ε.Ε.Γ.Μ. «Περιεχόμενα και Αξιολόγηση Γεωτεχνικών Μελετών»
- 15.30 – 16.15 Μιχάλης Καββαδάς, Αν. Καθηγητής Ε.Μ.Π. «Σχεδιασμός αντιστηρίξεων με τον EC7»
- 16.15 – 17.00 Γεώργιος Μπουκουβάλας, Καθηγητής Ε.Μ.Π. «Αντισεισμικός Σχεδιασμός τοίχων αντιστήριξης – EC8»
- 17.00 – 17.30 Ζερβογιάννης Χαράλαμπος, Πολ. Μηχανικός «Παρουσίαση έργων αντιστήριξης»
- 17.30 – 18.00 Νάσκος Νικόλαος, Δρ. Πολ. Μηχανικός, Κωνσταντάκος Δημήτρης, MSc Πολ. Μηχανικός «Εφαρμογές αγκυρωμένων τοίχων αντιστήριξης και οπλισμένου εδάφους»
- 18.00 – 18.30 Ερωτήσεις - Συζήτηση

Αθήνα 16 Απριλίου 2010

Δελτίο τύπου Σ.Π.Μ.Ε. για διεξαγωγή ημερίδας στην
Αθήνα με θέμα

«Σχεδιασμός Αντιστηρίξεων Θεωρία – Μέθοδοι –
Παραδείγματα Εφαρμογής»

Με μεγάλη επιτυχία πραγματοποιήθηκε Ημερίδα που διοργάνωσε ο **Σύλλογος Πολιτικών Μηχανικών Ελλάδας (Σ.Π.Μ.Ε.)** με θέμα: «Σχεδιασμός Αντιστηρίξεων Θεωρία – Μέθοδοι – Παραδείγματα Εφαρμογής» την Τετάρτη 14 Απριλίου 2010 στο Ξενοδοχείο «Τιτάνια». Στην ημερίδα παρευρέθησαν περίπου 200 συνάδελφοι.

Από το Διοικητικό Συμβούλιο του Σ.Π.Μ.Ε. παρόντες ήταν ο Πρόεδρος **Ζυγούρης Νίκος**, η Β' Αντιπρόεδρος **Κώστα**

Κάλλη, ο Ταμίας **Καρλαύτης Αριστείδης** και οι σύμβουλοι **Μπαρδάκης Βασίλης**, **Κοτζαμπασάκης Γιάννης** και **Μήλης Νίκος**.

Τις εργασίες της ημερίδας άνοιξε με χαιρετισμό ο Πρόεδρος του Σ.Π.Μ.Ε. **Ζυγούρης Νίκος** ο οποίος αναφέρθηκε στην σοβαρότητα με την οποία θα πρέπει να αντιμετωπίζονται οι βαθιές εκσκαφές και οι αντιστηρίξεις καθώς και την ανάγκη για αναβάθμιση του ρόλου του Γεωτεχνικού Μηχανικού. Τόνισε επίσης ότι δεδομένης της εφαρμογής των Ευρωκωδίκων ο Σ.Π.Μ.Ε. αναπτύσσει πρόγραμμα επιμόρφωσης και κατάρτισης σε όλη την Ελλάδα πάνω σε θέματα του επαγγέλματος του πολιτικού μηχανικού.

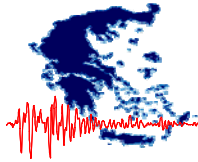
Κύριοι ομιλητές στην ημερίδα ήταν οι συνάδελφοι.: **Χρήστος Τσατσανίφος, Πρόεδρος Ε.Ε.Ε.Ε.Γ.Μ.** ο οποίος παρουσίασε τα στοιχεία τα οποία θα πρέπει να περιέχονται σε μια γεωτεχνική μελέτη καθώς και τρόπους αξιολόγησης αυτών, τονίζοντας ότι μόνο ένας Πολιτικός Μηχανικός – Γεωτεχνικός είναι σε θέση να κάνει σωστή αξιολόγηση αυτών των στοιχείων. **Ο Μιχάλης Καββαδάς, Αν. Καθηγητής Ε.Μ.Π.**, ο οποίος ανέπτυξε τον σχεδιασμό αντιστηρίξεων με τον EC7, ο **Γεώργιος Μπουκουβάλας, Καθηγητής Ε.Μ.Π.**, ο οποίος αναφέρθηκε στον Αντισεισμικό Σχεδιασμό τοίχων αντιστήριξης με χρήση του EC8, ο συν. **Χαράλαμπος Ζερβογιάννης, Πολιτικός Μηχανικός**, ο οποίος έκανε παρουσίαση έργων αντιστήριξης, και τέλος οι συν. **Νικόλαος Νάσκος Δρ. Πολ. Μηχανικός & Δημήτρης Κωνσταντάκος MSc Πολ. Μηχανικός**, οι οποίοι αναφέρθηκαν στις εφαρμογές αγκυρωμένων τοίχων αντιστήριξης & οπλισμένου εδάφους.

Μετά τις παρουσιάσεις, ακολούθησε ανοιχτή συζήτηση των ομιλητών με τους παρευρισκόμενους όπου έγιναν παρεμβάσεις και σχόλια πάνω στο κείμενο που παρουσιάστηκε.

Τα πρακτικά της ημερίδας διανεμήθηκαν σε CD και λόγω του μεγάλου όγκου τους διατίθενται στα γραφεία του ΣΠΜΕ



ΣΠΜΕ



ΕΛΛΗΝΙΚΟ ΤΜΗΜΑ ΑΝΤΙΣΕΙΣΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Διαλέξεις Nicolas SITAR & Γιώργου ΓΚΑΖΕΤΑ

Την Τρίτη 20 Απριλίου 2010 πραγματοποιήθηκε στην Αίθουσα Εκδηλώσεων της Πρυτανείας ΕΜΠ διάλεξη του Nicolas Sitar, καθηγητή στο U.C. Berkeley και Επισκέπτη Καθηγητή στο ΕΜΠ με τίτλο : «Ο Σεισμός M_w 8.8 της Χιλής : Σεισμολογική, Γεωτεχνική, Δομοστατική Αναγνώριση».

Ακολούθησε παρουσίαση απ' τον Καθηγητή Γ. Γκαζέτα με θέμα : «Ποιοτικές Συγκρίσεις των Πρόσφατων Σεισμών : Ιταλίας (L' Aquila), Αϊτής, Χιλής».

Τις διαλέξεις παρακολούθησε πολυπληθές ακροατήριο, που συμμετέσχε ενεργά στην επακολουθήσασα συζήτηση.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

CPT'10 2nd International Symposium on Cone Penetration Testing, May 9 - 11, 2010, Huntington Beach, California, USA.

The Seventeenth South Asian Geotechnical Conference, Taipei, Taiwan, May 10 - 13, 2010, www.17seagc.tw

ITA - AITES 1010 World Tunnel Congress and 36th General Assembly "TUNNEL VISION TOWARDS 2020", Vancouver, Canada, May 14 - 20, 2010, www.wtc2010.org

12^ο Διεθνές Συνέδριο της Ελληνικής Γεωλογικής Εταιρείας, Πάτρα, 19 - 22 Μαΐου 2010, www.synedra.gr



SYMPOSIUM

New Techniques for Design and Construction in Soft Clays
Brazil, 22 and 23 May 2010

www.geotec.coppe.ufrj.br/ssc2009/index.html

A number of techniques are presently available for site investigation, design and construction in soft clays. The range of the different techniques is quite wide and varies from country to country. This symposium is aimed to be a forum to discuss these techniques. With this purpose, specialists from different countries have been invited to present their experiences.

MAIN TOPICS

- Deep mixing
- Granular piles
- Investigation techniques
- Light weight fill
- Monitoring and performance
- Numerical and physical modeling
- Piled embankment
- Soil Improvement techniques
- Soil-pile interaction
- Harbours and nearshore facilities

CONTACT

Mário Vicente Riccio Filho - ssc2010@coc.ufrj.br



78th ICOLD Annual Meeting & International Symposium "DAMS AND SUSTAINABLE WATER RESOURCES DEVELOPMENT", 23 - 26 May 2010, Hanoi, Vietnam, www.vncold.vn/icold2010

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

Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics and Symposium in Honor of Professor I. M. Idriss, May 24 - 29, 2010, San Diego, California, USA, 5geoeqconf2010.mst.edu

11th International Conference "Geotechnical Challenges in Urban Regeneration", 26th - 28th May 2010, ExCel London, www.geotechnicalconference.com/page.cfm/Link=20

Tenerife 2010 Cities on Volcanos, 3rd International Workshop on Rock Mechanics and Geo-engineering in Volcanic Environments, Canary Islands, 30th of May and 1st of June 2010, www.citiesonvolcanoes6.com

BRATISLAVA 2010 14th Danube-European Conference on Geotechnical Engineering, Bratislava, Slovakia, 2nd - 4th June 2010, www.decge2010.sk

NUMGE 2010 7th European Conference on Numerical Methods in Geotechnical Engineering June 2 - 4, 2010, Trondheim, Norway, www.ivt.ntnu.no/numge2010

2010 MOSCOW - International Geotechnical Conference GEOTECHNICAL CHALLENGES IN MEGACITIES, 7 - 10 June 2010, Moscow, Russia www.GeoMos2010.ru

2nd ISRM technical and cultural field trip to Switzerland, 13 - 14 June 2010, ISRM website: www.isrm.net

International Conference Underground Construction Prague 2010 Transport and City Tunnels, 14 - 16 June 2010, Prague, Czech Republic, www.ita-aites.cz

Rock Mechanics in Civil and Environmental Engineering, European Rock Mechanics Symposium (EUROCK 2010) ISRM Regional Symposium on Rock Mechanics, Lausanne, Switzerland, 15 - 18 June 2010, lmr.epfl.ch

7th International Conference on Physical Modelling in Geotechnics, Zurich, Switzerland, 28 June - 1 July 2010, www.icpmg2010.ch



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

The themes of the conference are focusing on geotechnics and geosynthetics for slope such as:

- Engineering Geology
- Landslide
- Information Technology for Landslide Management
- Rainfall-Induced Slope Failure
- Slope Stability and Stabilization Methods
- Slope Safety and Management
- Slope Design and Construction
- Instrumentation and Technology
- Numerical Analysis and Modeling
- Geosynthetics for Slope Stability and Remediation
- Erosion Control for Slope
- Other Infrastructures Related to + Slope



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

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

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

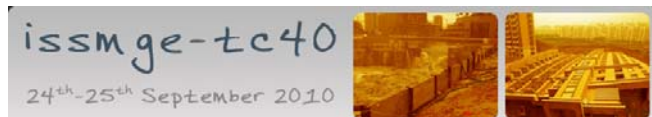
Pipelines Conference 2010, August 28 - September 1, 2010, Keystone Resort & Conference Center, Keystone, (Dillon) Colorado,
content.asce.org/conferences/pipelines2010/call.html

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

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

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

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



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

Forensic Geotechnical Engineering is a relatively new discipline. It involves detailed identification of the type of distress a structure has undergone, determination of the cause of distress by studying the history of the built structure from design stage to distress stage and finally pinpointing the causes of distress. The usual "standard" methods of the evaluation of subsoil behavior, the analysis and design provided through these methods are not adequate for this "back analysis". This workshop is intended to bring together experts who have analyzed various types of case histories to discuss and develop guidelines for practice.

The TC 40 Committee in cooperation with the Hungarian ISSMGE National Committee and the Hungarian Chamber of Engineers is pleased to invite you to Budapest, the wonderful Capital city of Hungary for the International Workshop (ISSMGE TC40 Hungary 2010), which is to be held at the Budapest University of Technology and Economics from 24th to 25th September, 2010.

Topics:

- Failures, Disputes, Causes and Solutions in Geotechnics
- Systemic Failure in Civil Engineering - its Causes and Avoidance
- Geotechnical Education - Presentations of Case Histories
- Slope Failures on Flood Protection Dikes

Participants of the workshop will have the opportunity to discuss and comment on the presentations. The workshop consists of two days:

1. Invited lectures
2. Discussion and workshop

Information on regarding the Scientific Programme
Mr. József Mecsi
E-mail: jmecsi@hotmail.com

Information on regarding the Registration, Accommodation and Social Programme
Tensi Aviation Kft.
Ms. Edit Hartung, Ms. Agnes Farago
7621 Pécs, Teréz u. 17.
Tel.: +36 72 510 498, 513 983
Fax: +36 72 510-497
E-mail: afarago@tensipecs.hu, hartung.edit@tensipecs.hu



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

Tunnels and Tunnelling International and the British Tunnelling Society are proud to announce their second jointly organised conference, following the overwhelming success of last years event.

This one-day event will feature presentations from both the UK, and the international tunnelling communities with an unbridled focus on 'technical' content.

After years of attending such events, and in a time when picking the right conference for you is vital, we know we can provide content that a tunnelling attendee will actually want from a day's lectures. We will be avoiding the less specific 'brochure' type programmes and marketing style presentations, focussing instead on topics that will benefit you as an engineer.

We will also be encouraging open and frank discussion between presenters and delegates on subjects close to the heart of the tunnelling industry.

Jon Young
Editor, Tunnels and Tunnelling





**6^ο Πανελλήνιο Συνέδριο Γεωτεχνικής
και Γεωπεριβαλλοντικής Μηχανικής
29 Σεπτεμβρίου – 1 Οκτωβρίου 2010, Βόλος**

http://portal.tee.gr/portal/page/portal/INTER_RELATIONS/INT_REL_P/SYNEDRIA_EKDHLWSEIS/2010/6thGeotechnic

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

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

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

Χρόνος και Τόπος διεξαγωγής

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

Θέματα του Συνεδρίου

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

Επίσης θα εξετασθούν γεωτεχνικά προβλήματα της Μαγνησίας. Πιο συγκεκριμένα, τα επί μέρους θέματα του συνεδρίου θα είναι τα ακόλουθα:

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



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

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



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

OBJECTIVES

The Conference objective is to provide a forum for presenting the state-of-the-art with respect to mill tailings and mine waste, and to discuss current and future issues facing the mining and environmental communities.

BACKGROUND

Tailings and Mine Waste '10 is the next of a series of symposia on mill tailings management started at Colorado State University in 1978. The primary purpose of the Conference is to provide a forum for members of the mining community, engineers and scientists serving the mining industry, regulatory groups, and other interest groups concerned with environmental issues related to tailings and mine waste management. Issues of environmental science and engineering, geochemistry, geotechnics, hydrogeology, milling, mining, mining engineering, tailings management,

and other topics related to tailings and mine waste will be covered in focused sessions.

WHO SHOULD ATTEND

Mine and mill managers, engineers involved with tailings management and reclamation, geotechnologists, geoenvironmentalists, regulatory personnel, consulting engineers, researchers, and other interested groups have found the Tailings and Mine Waste Conference to be an exciting place to present ideas, learn of new developments, make contacts in their professional fields, and discuss problems of mutual interest.

SCOPE OF CONFERENCE

The program will include sessions by practitioners and recognized experts on the general themes of the Conference. The Conference also will include exhibits of equipment and instrumentation and short courses. The following general topics on new developments, case histories, and current methods of analysis, design, and construction or remediation are the focus for presentations.

Mill Tailings

- . Material physical properties
- . Geochemical characteristics
- . Paste and filtered applications
- . Co-disposal and co-mingling
- . Mine backfill applications
- . Long-term consolidation
- . Cover placement and settlement
- . Liquefaction, seismic stability, and deformation
- . Tailings transport and discharge

Waste Rock, Ore, and Other Mined Materials

- . Heap leach operations
- . Waste rock facilities
- . Soil cleanup and site remediation
- . Acid generation and metals mobility
- . Groundwater remediation
- . Abandoned mine reclamation

Containment Systems

- . Geosynthetic liners
- . Clay and composite liner systems
- . Leak detection and leachate collection systems
- . Groundwater protection
- . Water management and water balance

Permitting Issues

- . State and local regulations
- . EPA regulation changes
- . BLM and USFS guidelines and requirements
- . International standards and guidelines
- . Local community negotiation and approvals
- . Sustainable development issues
- . Public interaction and project scheduling

Current Issues

- . Site selection and characterization
- . Revegetation establishment and monitoring
- . Ecological and human health risk assessment
- . Physical and chemical monitoring of performance
- . Wetland protection and establishment

Specific Issues

- . Oil sands processing and tailings facilities
- . Uranium mining and milling and in-situ recovery
- . Coal mining issues and mine waste management
- . Energy facilities ash disposal

For more information contact

Linda Hinshaw,
Department of Civil and Environmental Engineering,
Colorado State University,
1372 Campus Delivery, Fort Collins, CO 80523-1372 USA.
Telephone: (970) 491-5049 Fax: (970) 491-7727
Email: Linda.Hinshaw@colostate.edu
Web Site: www.tailingsandminewaste.org



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

Sir Alan Muir Wood, who died in 2009, was one of the most eminent Civil Engineers in recent times. He was a Fellow of the Royal Society, a Fellow of the Royal Academy of Engineering and a Past President of the Institution of Civil Engineers. He was a founder member of the British Tunnelling Society and the International Tunnelling Association.

The British Tunnelling Society is holding a Symposium in his memory. The themes under discussion will be centred on Tunnelling, Coastal and Geotechnical Engineering with contributions on recent case histories of tunnelling and geotechnical interest, tunnel design, research advances in geotechnical engineering and the modelling of catastrophic coastal flooding.



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

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

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



Grußwort des Vorsitzenden der DGGT

Sehr geehrte Damen und Herren,
liebe Kolleginnen und Kollegen,

im Namen der Deutschen Gesellschaft für Geotechnik lade ich Sie herzlich nach München zur **31. Baugrundtagung mit Fachausstellung Geotechnik** ein – der Jubiläumstagung **60 Jahre DGGT**. Diese Tagung, mit der wir unser Jubiläum begehen, findet vom 3. - 6. November 2010 statt.

Sechs Jahrzehnte DGGT, 31 Baugrundtagungen sowie 50 Tagungen und Symposien der Fachsektionen sind zusammen mit einer Vielzahl von Empfehlungen, Merkblättern und Entwürfen aller Grundbaunormen des DIN eine erfolgreiche Bilanz. Den Vortragenden der Tagungen und allen an der Erstellung der Empfehlungen, Merkblätter und Normen Beteiligten sei an dieser Stelle herzlich für ihr ehrenamtliches Engagement gedankt. Unser Dank gilt auch allen Mitgliedern und Förderern für die Unterstützung der Arbeit unserer Gesellschaft.

Die Baugrundtagung ist der alle zwei Jahre wiederkehrende Höhepunkt im Leben der DGGT. Sie zeichnet sich durch ein attraktives und wissenschaftlich hochrangiges Vortragsprogramm und eine interessante Fachausstellung aus. Die Themenschwerpunkte unserer Jubiläumstagung lauten:

- Verkehrswegebau
- Spezialtiefbau
- Bodenmechanik und numerische Methoden in der Geotechnik
- Ingenieurgeologie
- Geothermie
- Internationale Projekte
- Forschung, Entwicklung und Innovationen
- Nachhaltigkeit: Klimafolgen, neue Energien und Energieeffizienz

Wir werden auch weiterhin den Nachwuchs fördern und die entstandene Tradition des „Forum für junge Geotechnik-Ingenieure“ fortführen. Hier bekommen junge promovierte und diplomierte Geotechnik-Ingenieure die Gelegenheit, ihre Forschungsergebnisse aus Wissenschaft und Praxis vor Fachpublikum zu präsentieren. Sie sind herzlich eingeladen, kostenlos an dieser Spezialsitzung teilzunehmen.

Des Weiteren werden mit dem Carl-Rappert-Grundbaupreis drei besonders qualifizierte junge Nachwuchskräfte für ihre wissenschaftlichen Leistungen ausgezeichnet.

Bitte besuchen Sie auch die begleitende Fachausstellung. An dieser Stelle darf ich mich ganz herzlich bei allen ausstellenden Unternehmen bedanken. Nur durch Ihre Unterstützung ist es uns möglich, unsere Baugrundtagung in diesem Rahmen durchzuführen.

Gelegenheiten zum Erfahrungs- und Gedankenaustausch und zum Knüpfen von persönlichen und geschäftlichen Kontakten in entspannter Atmosphäre bieten der Festabend

sowie die im Anschluss an die Tagung stattfindenden Exkursionen.

Die Räumlichkeiten des Internationalen Congress Centers bieten für unsere Jubiläumstagung beste Voraussetzungen und einen idealen Standort. In München vereinigt sich in gelungener Weise die Professionalität einer Wirtschafts- und Forschungsmetropole mit Kultur und Gastlichkeit und die zahlreichen Sehenswürdigkeiten und kulturellen Einrichtungen genießen internationales Renommee.

Umgeben von der sprühenden Lebendigkeit der bayerischen Metropole, erwarten wir Sie zu einer interessanten, attraktiven und rundum genussvollen Baugrundtagung.

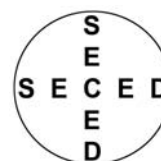
Mit herzlichen Grüßen

Ihr

Prof. Dr.-Ing. Manfred Nußbaumer
Vorsitzender der DGGT

Kontakte

Deutsche Gesellschaft für Geotechnik e.V.
Gutenbergstraße 43
45128 Essen
Tel.: +49 (0)201 78 27 23
E-Mail: service@dggt.de



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

The 2010 SECED Young Engineers Conference aims to bring together young engineers from both industry and universities to meet and interchange ideas related to the study and practice of earthquake engineering and civil engineering dynamics. The conference will focus on:

- Structural dynamics (experimental, numerical, practical)
- Geotechnical earthquake engineering (experimental, numerical, practical)
- Seismology and risk assessment
- Seismic retrofit

A number of world leading academics and practitioners will be presenting key-note lectures associated with each of these areas.

Confirmed speakers include: Prof. Ahmed Elghazouli (Civil and Environmental Engineering, Imperial College London), Dr Stavroula Kontoe (Civil and Environmental Engineering, Imperial College London) and Rob Smith (Arup).

Prizes and Sponsorship

£100 and £50 prizes will be given to the two best papers presented at the Conference. (To qualify for prizes, the lead

author and presenter must have been under 35 years old by 1st January 2010). We are looking for sponsorship for the event. If you are interested in sponsoring the event please visit for information on sponsorship packages: <http://www.cege.ucl.ac.uk/events/yec/sponsorship>

Call For Abstracts

Deadline for receiving abstracts: Friday 14th May 2010

Abstracts should be limited to a maximum of 500 words and should include contact details of the corresponding author and affiliation of co-authors.

Send your abstracts by email to the following email address: secedyec@cege.ucl.ac.uk

Contact

Please contact Ms. Bhupinder Sehra for any enquiries

Email: secedyec@cege.ucl.ac.uk

Tel: +44(0)20 7679 4428



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

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

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

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



1–3 December 2010, Sutera Barbour, Sabah, Malaysia
seminar.spaceutm.edu.my/geotropika2010

The challenges of geotechnical and transportation engineers in today's world are complex, daunting and often extremely demanding. Notwithstanding, engineers have to balance innovation with sustainability because the consequences of unsustainable development and their attendant environmental impact are far too serious. Therefore, the organising committee of 'Geotropika 2010' has chosen an appropriate, appealing and relevant theme that draws attention to sustainability in today's world for a better tomorrow.

The conference theme is "Sustainability in Geotechnical and Transportation Engineering". As we continue to consume the earth crust exponentially and deplete its natural re-

sources dangerously in our quest for qualitative life, there is an urgent need to pause and take inventory of the environmental impact of our actions. In urban areas, qualitative has given way to quantitative life as we attempt to meet increasing transportation demand and their attendant environmental problems. The problems of emission of greenhouse gases which contribute to climate change, air, water and noise pollutions are real; their damaging effects must be mitigated.

At GEOTROPIKA 2010 we shall be discussing issues on sustainability in geotechnical and transportation engineering. It is a portal for all professionals, practising engineers, researchers, and students to access myriad of innovations and exchange ideas on ground breaking research outcomes. It is supported by Public Works Department, Malaysia, Construction Industry Development Board, Malaysia and the Institution of Engineers Malaysia (IEM). It follows a long tradition of robust conference organisations, precision planning and successful implementation.

Secretariat GEOTROPIKA 2010

School of Professional and Continuing Education
(UTMSPACE)

Universiti Teknologi Malaysia

No. 40-50, Jalan Kebudayaan 1

Taman Universiti

81300 Skudai

Johor

Malaysia

Email : geotropika2010@spaceutm.edu.my
geotropika2010@gmail.com

Tel : 07 - 521 8170/8159

: 07 - 521 1355



**VII Congresso Suramericano de Mecánica de Rocas -
ISRM South American Regional Symposium 2010
2 – 4 December 2010, Lima, Peru**

Following the success achieved in the Seminar on Geo-engineering Applied to Mining and Construction, which was held in Lima, Peru, in February 2010, the Peruvian Society of Geo-engineering is pleased to announce that is currently organizing the 7th South American Congress on Rock Mechanics, which will take place in Lima, Peru, from December 2 to 4, 2010 and will be co-sponsored by the International Society for Rock Mechanics (ISRM) and the Peruvian Institute of Mining Engineers (IIMP).

The aim of this forthcoming congress is to offer a space where the world's most respected experts in the field of rock mechanics can share their experiences with their South American colleagues and discuss with them the most recent advances in this important discipline of engineering.

Most South American countries share the challenge of having to design and build a variety of complex engineering works (roads, tunnels and hydro-power stations) within the

Andes, as well as mining the vast mineral resources hosted by this important mountain range, which means that civil and mining engineers working in this part of the world have been able to accumulate a rich and valuable technical experience in surface and underground engineering in rugged and difficult rock environments.

Call for technical papers has already been launched, the deadline for submission of abstracts having been set at May 30, 2010. If you are interested in participating in the Congress and/or in submitting a technical paper, you are kindly invited to contact the Organizing Committee at eventos@iimp.org.

TOPICS

- Geotechnical data collection and research.
- Geotechnical design for Underground mining, Open Pit, Tunnels, Caves and Foundations.
- Performance during Operation and Monitoring

Carlos G. Soldi
President of the Organising Committee

Contact Person: Antonio Samaniego
Address: Grimaldo del Solar 875, Lima 18, PERU
Telephone: +511-2414077, Fax: +511-4465892
E-mail: asamaniego@sys.com.pe



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



ISSMGE TC40
Forensic Geotechnical Engineering
An International Symposium
on
FORENSIC GEOTECHNICS OF
VIBRATORY AND NATURAL HAZARDS
December 14-15, 2010, Mumbai, India

Forensic Geotechnical Engineering involves detailed identification of type of distress a structure is subjected to, determine the cause of distress by studying the history of the built structure from design stage to distress stage and finally pinpoint the causes of distress/failure.

Committee (TC-40) on Forensic Geotechnical Engineering (FGE), a body of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), the Indian Geotechnical Society (IGS) New Delhi and Indian Institute of Technology (IIT), Bombay are pleased to invite you to the International Symposium on Forensic Geotechnics of Vibra-

tory and Natural Hazards, to be held in Mumbai on 14-15 December 2010. This symposium aims at providing interactive platform for the experts, engineers and professionals working in the area of Geotechnical engineering from different parts of the world to discuss the role of Forensic Geotechnical Engineering in fostering new knowledge from unforeseen or unanticipated events.

Failure of geotechnical structures due to earthquakes, tsunamis and hurricanes lead to significant damages to population and structures. Difficulties involved in reconstruction have always been a challenge to the geotechnical fraternity. Failure analysis as per forensic principles of collapse of structures such as bridges, dams, pavements and other infrastructure facilities contributes to better understanding of the effect of these phenomena. It helps in improving analysis procedures, and develop guidelines for design of disaster resistant structures. Similarly, understanding the effect of vibratory loading due to machinery and / or construction operations on the performance of structures in the context of geotechnical failure is another variant that poses significant challenges. These aspects need to be examined using Forensic Geotechnical Engineering principles. The normally adopted standard procedures of testing, analysis, design and construction that are used in Design Engineering are not adequate for the Forensic Analysis in majority of cases. It helps in identifying what went wrong when, why and by whom. In addition, risk, vulnerability and legal issues are also examined.

Conference Themes

- Assessment of the nature and magnitude of disturbing forces.
- Survey and characterization of distress.
- Design and perform suitable laboratory and/or situ tests to evaluate appropriate geotechnical parameters/characteristics for the prediction of actual/observed behaviour of geotechnical structure.
- Back analysis: Selection of theoretical model and methods of analyses.
- Monitoring and Instrumentation
- Risk and Vulnerability Assessment.

All correspondence relating to the symposium shall be sent to **Prof. G L Sivakumar Babu**
Organizing Secretary
Department of Civil Engineering
Indian Institute of Science, Bangalore – 560 012
Email: gls@civil.iisc.ernet.in
Phone: 080 2293 3124/ 2360, Fax: 080 2360 0404.

<http://www.geoengineer.org/events/FGEBrochure2010.pdf>



5th International Conference on Earthquake Geotechnical Engineering, Santiago, Chile, 17 – 20 January 2011,
www.5icege.cl

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

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



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

In recent years, significant advances have been made in the areas of risk, vulnerability and uncertainty modeling, analysis and management. The objective of the ICVRAM 2011 is to provide a forum for experts and decision makers involved in vulnerability and risk analysis and management to share information on current and emerging hazards and research results affecting the built environment. ISUMA 2011 will complement ICVRAM 2011 by providing in-depth coverage on uncertainty modeling and analysis that would offer opportunities for cross-pollination. As we make advancements in technology, exploit resources, and step into new realms of human endeavors, we are exposed to new hazards. The novelty of the situation with its attendant uncertainties can pose a challenging situation for experts and also decision makers charged with providing technical assistance and policy recommendations. This conference and subsequent publications will help transition intellectual discussions into robust frameworks for handling emerging vulnerabilities and risks, and provide the leadership and initiative required to respond to national and international disasters.

Conference Topics:

- Enterprise-related risks
- Genetic and evolutionary algorithms
- Global risk issues
- Ignorance and knowledge analysis
- Insurance, risk transfer and management
- Integrative risk management
- Natural and human-caused hazards
- Performance analysis and measurement
- Uncertainty modeling and analysis
- Risk analysis of interdependent systems
- Risk-to-benefit and benefit-to-cost analysis
- Rough sets, fuzzy sets, and approximate reasoning
- Security risk analysis
- Soft computing and the generalized theory of uncertainty
- Uncertainty modeling and analysis

One of the ICVRAM technical sessions will be dedicated to Ground Engineering Risk Assessment and Management. With margins in the construction industry at historic lows, and with costs of failing to accurately predict ground conditions becoming increasingly high, the importance of proper assessment and management of the variety of ground-related risks is paramount.

Papers to be presented at this session will address ground engineering risk assessment, the management of risk, reliability and related issues – from research to case studies. Topics to be covered include but are not limited to landslides and man-made slope instability, mining and tunneling, expansive and collapsible soils, sinkholes, soil-structure interaction, seismic geotechnical engineering and forensic geotechnical engineering.

The session on "Ground Engineering: Risk Assessment and Management" (Session ID #4) is under the general topic "Natural and Human-Caused Hazards".

For additional information, you may contact:

- Mihail Popescu at popescu@pbworld.com
- Phoon Kok Kwang at cvepkk@nus.edu.sg



GEDMAR2011 Geotechnical and Highway Engineering - Practical Applications – Challenges and Opportunities at the Future 3rd International Conference on Geotechnical Engineering for Disaster Mitigation and Rehabilitation 2011 combined with 5th International Conference on Geotechnical and Highway Engineering 4 - 6 May 2011, Semarang, Central Java, Indonesia, reliability.geoengineer.org/GEDMAR2011

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

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

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

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

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

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

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

euroGEO5 5th European Geosynthetics Conference, 16 - 19 September 2012, Valencia, Spain, www.eurogeo5.org



24th WORLD ROAD CONGRESS
MOBILITY, SUSTAINABILITY AND DEVELOPMENT
26 - 30 September 2011, Mexico City, Mexico
www.piarcmexico2011.org

The World Road Association (AIPCR/PIARC) since 1909 celebrates every four years, the World Road Congress, an event which invites professionals of roads and transportation to present and discuss presentations between the country members and looking forward to identify, develop and share responsible solutions for today's problems.

An event that great personalities of the world of roads attend; general directors, first level executives of companies related with this activity, in all the world. A congress that has counted with the presence of several dozens of ministers in charge of the road infrastructure and the transport by highways in their respective countries.

You are cordially invited to the celebration of the XXIV World Road Congress.

The World Road Association waits for you in Mexico City from September 26th to 30th of 2011.

The main topic of the Congress is: Mobility, Sustainability and Development

The general structure of the congress will be revised in the next meeting of the world wide congress for roads which will be held in Korea, September 2009.

The proposal includes the following:

Strategic Themes

In accordance with the strategic plan 2008-2011, the strategic topics will be:

- Sustainability of the Road Transport System.
- Improving Provision of Services.
- Safety of the Road System.
- Quality of Road Infrastructure.

To deal with these themes, the Congress will be structured as follows:

- Inauguration
- Introduction session.
- Closing and Ministers ceremonies and special plenary sessions; a total of 6.
- Strategic direction sessions; 4.
- Technical sessions; 18.
- Special sessions; 13.
- Technical visits
- Accompanying persons program
- A gala dinner

CONTACT INFORMATION

Camino a Santa Teresa 187
Col. Parques del Pedregal
México, 14010, D.F.
Tel. +52 (55) 5528 3706
info@aipcrmexico2011.org
www.aipcrmexico2011.org • www.piarcmexico2011.org



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

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

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



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

Contact Person: Mr Mikael Hellsten
Address: P.O. Box 5501, SE 11485 Stockholm, SWEDEN
Telephone: +46 87626220, Fax: +46 87626239
E-mail: eva.friedman@svebefo.se



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



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



EUROGEO5 - 5th European Geosynthetic Conference 16 -19 September 2012, Valencia, Spain www.eurogeo5.org/index_i.html

The International Geosynthetic Society (IGS) is a global association, nonprofit, which includes most of the businesses of geosynthetics and a number of personal members associated with these materials: Public Administrations, Teachers and Students of Universities and Polytechnics, Consultants, Manufacturers, Traders, Installers and Great Builders.

The primary objective of the IGS is outreach. All actions undertaken are directed to the construction industry and the environment have a greater knowledge of geosynthetic materials and their potential uses. In this sense, the IGS organizes different types of events on a global, continental or national level.

IGS is organized into national chapters. The Spanish Chapter of the IGS was founded in 2000 at the hands of Vicente

Cuellar, former Director of the Geotechnical Laboratory of CEDEX and my predecessor as President of this Chapter.

Spanish Chapter currently consists of over 50 individual and corporate members of the majors sector companies, having organized and participated in several events during these years: Technical Conferences about Landfills and Reinforcement with CEDEX, about various uses of Geosynthetics together with autonomous government of Castilla-Leon, Andalusia, Canary Islands, Valencia, among others. The National Symposium Geosynthetics with ATC; participation in geotechnical, hydraulics and environment conferences.

We have also taught Basic Courses of Geosynthetics in Universities and Polytechnics, especially designed for students in the final classes and graduate.

Spanish chapter has been in charge of organizing the next European Geosynthetics Conference 'EUROGEO' in 2012. In this sense it has decided to celebrate the month of September in Valencia.

Since Spain IGS we are pleased to invite to participate in this unique event in Europe which we are responsible. We need help from all those involved in prescribing, manufacturing, installation or use of Geosynthetics materials in Spain for Eurogeo 2012 will be a success. To do this we count on your cooperation. Join IGS Spain today and will receive significant benefits in the assistance and participation of the conference in Valencia.

I remain at your disposal for any further query

Receive a cordial greeting on behalf of all members of the IGS Spain,

Ángel Leiro López
Spain IGS-President

CONFERENCE CONTACT: info@eurogeo5.org
Nacho Redecilla 619 94 44 10
Ianire Mancisidor 660 72 78 50

IGS Spanish Chapter www.igs-espana.com



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

World Conference



THE GENIUS OF ARCHIMEDES

*23 Centuries of Influence on
Mathematics, Science, and Engineering*
Syracuse (Sicily) Italy, 8-10 June 2010
www.archimedes2010.org

This World Conference will celebrate the extraordinary achievements and enduring influence of Archimedes, and it will take place in the ancient City of Syracuse where Archimedes lived and worked 2300 years ago.

The Conference will bring together researchers and academicians from the broad ranges of Mathematics, Engineering, and Science. Historians of Science are also invited to participate.

The three-day meeting will take place in the ancient city of Syracuse (Ortygia) on the island of Sicily. A richly appealing social program will surround the Conference, including the opportunity to view an ancient Greek play in the city's 2500-year-old Greek Theatre—where Archimedes himself enjoyed dramatic performances in the third century BC!

Topics of the Conference

Original, unpublished papers demonstrating the sequence, progression, or continuum of Archimedean influence from ancient to modern times will be considered for presentation at this Conference. Some examples of possible presentation topics drawn from the works of Archimedes are the following:

Hydrostatics (buoyancy, fluid pressure and density, stability of floating bodies)

Mechanics (levers, pulleys, centers of gravity, laws of equilibrium)

Pycnometry (measurement of volume and density)

Integral Calculus (Archimedes as the father of the integral calculus, method of exhaustion, approximation of pi, determination of areas and volumes)

Mathematical Physics (Archimedes as the father of mathematical physics, Law of the Lever, Law of Buoyancy, Axiomatization of Physics)

History of Mathematics and Mechanics (Archimedes' influence in antiquity, the middle ages, the Renaissance, and modern times; his influence on Leonardo da Vinci, Galileo, Newton, and other giants of science and mathematics)

Ancient Machines and Mechanisms (catapults, water screws, iron hands, compound pulleys, planetaria, water clocks, celestial globes, the Antikythera Mechanism)

Archimedean Solids (their rediscovery in the Renaissance and their applications in materials science and chemistry)

Archimedean Legends (how stories of golden crowns, eureka moments, naked runs, burning mirrors, steam cannons, etc., have influenced us through the ages, whether true or not)

The Cattle Problem (how its 18th century rediscovery inspired the study of equations with integer solutions)

Teaching the Ideas of Archimedes (how his life and works have influenced the teaching of science, mathematics, and engineering).

The Co-Chairs of the Conference are:

- Professor Marco Ceccarelli, University of Cassino, Italy, ceccarelli@unicas.it
- Professor Stephanos A. Paipetis, University of Patras, Greece, paipetis@mech.upatras.gr

For further information contact
information@archimedes2010.org

ΠΡΟΣΚΛΗΣΕΙΣ ΓΙΑ ΕΡΕΥΝΗΤΙΚΕΣ ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ

2010 and awards will be announced on, or before, August 1, 2010. Review of the proposals is by the nine-person Board of Directors of GSI. For further information on the Institute and this particular program, visit us at the following site: www.geosynthetic-institute.org and click on "GSI Fellowships and Projects".

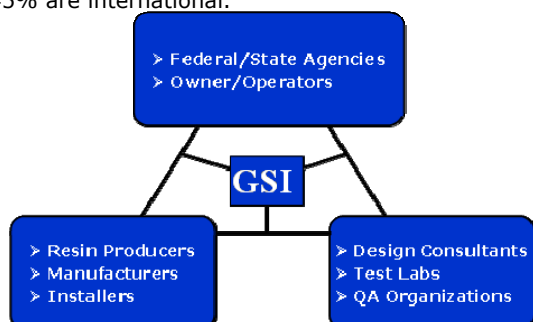
*Reported by
Robert M. Koerner and Jamie R.
Koerner, IGS members*

(IGS Newsletter, March 2010)



Geosynthetic Institute (GSI) Fellowships Request for proposals

The Geosynthetic Institute (GSI) is a consortium of organizations interested in, and involved with, geosynthetics. All types of polymeric geosynthetic materials are involved: geotextiles, geomembranes, geogrids, geonets, geocomposites, geosynthetic clay liners, geopipe and geofoam. The organizations include federal and state governmental agencies, facility owners, designers, consultants, QC and QA organizations, testing laboratories, resin and additive suppliers, manufacturers, manufacturer's representatives and installation contractors. GSI currently consists of 71 member organizations of which ca. 45% are international.



The Geosynthetic Institute (GSI) is delighted to announce our third annual worldwide call for requests-for proposals (RFPs) focusing on "innovative" geosynthetics research and development projects. This will be the Third Class of awardees, the first two being in 2008 and 2009. There will be multiple awards made, each for \$10,000 per year, and they are renewable, pending an annual written report, to a total amount of \$20,000 per student. It is important to note that students must have completed their candidacy examinations leading to a doctoral degree in engineering or science.

The proposals must be submitted in the following four page format (with no exceptions).

Page 1 Letter of recommendation from student's department head or advisor

Page 2 Title and detailed abstract

Page 3 Student's resume

Page 4 Documentation of completed candidacy examination

The RFPs for the 2010-2011 academic years must be submitted to both of the undersigned by e-mail by June 15,



Πρόσκληση για συμμετοχή στις Τεχνικές Επιτροπές (Technical Committees) της ISSMGE

www.issmge.org/web/page.aspx?pageid=142568

Ο Γενικός Γραμματέας της ISSMGE Καθηγητής R. N. Taylor απέστειλε στις εθνικές ενώσεις μέλη της ISSMGE πρόσκληση για την εκδήλωση ενδιαφέροντος συμμετοχής των μελών τους στις Τεχνικές Επιτροπές της ISSMGE για την περίοδο 2010 – 2013. Τα ονόματα των ενδιαφερομένων θα πρέπει να σταλούν στον Γραμματέα μέχρι την 25^η Μαΐου 2010. Καλούνται τα ενδιαφερόμενα μέλη της ΕΕΕΕΓΜ να εκδηλώσουν το ενδιαφέρον τους μέχρι την 20^η Μαΐου 2010 αποστέλλοντας επιστολή στην γραμματεία της ΕΕΕΕΓΜ, συνοδευόμενη από πολύ σύντομο βιογραφικό τους σημείωμα (έως 10 γραμμές) σχετικό με τα «γεωτεχνικά» τους προσόντα.

Οι Τεχνικές Επιτροπές για την περίοδο 2010 – 2013 είναι οι ακόλουθες:

Fundamentals

TC101 Laboratory Stress Strength Testing of Geomaterials
TC102 Ground Property Characterization from In-Situ Tests
TC103 Numerical Methods in Geomechanics
TC104 Physical Modelling in Geotechnics
TC105 Geo-Mechanics from Micro to Macro
TC106 Unsaturated Soils

Applications

TC201 Geotechnical Aspects of Dykes and Levees, Shore Protection and Land Reclamation
TC202 Transportation Geotechnics
TC203 Earthquake Geotechnical Engineering and Associated Problems
TC204 Underground Construction in Soft Ground
TC205 Limit State design in Geotechnical Engineering
TC206 Interactive Geotechnical Design
TC207 Soil-Structure Interaction and Retaining Walls
TC208 Stability of Natural Slopes
TC209 Offshore Geotechnics
TC210 Dams and Embankments
TC211 Ground Improvement
TC212 Deep Foundations
TC213 Geotechnics of Soil Erosion
TC214 Foundation Engineering for Difficult Soft Soil Conditions
TC215 Environmental Geotechnics
TC216 Frost Geotechnics

Impact on Society

TC301 Preservation of Historic Sites
TC302 Forensic Geotechnical Engineering
TC302 Coastal and River Disaster Mitigation and Rehabilitation
TC304 Engineering Practice of Risk Assessment and Management
TC305 Geotechnical Infrastructure for Megacities and New Capitals

Νέα online βάση πληροφοριών για άρθρα γεωτεχνικής μηχανικής

<http://geolifi.geoengineer.org>

New searchable online database of geoenvironmental papers!

Special Announcement

March 2010

Geoengineer.org is very excited to announce the launch of the Geoenvironmental Literature finder, **GEOLIFI**!

In Geoengineer.org we recognize that access to the most recent geoenvironmental information is becoming more important and that practicing engineers have essentially no systematic access to this information.

The **Online Geoenvironmental Library** is a popular tool within Geoengineer.org and intends to provide access to publications available online at no cost. However such a database, will always be incomplete, because many publications are not (and will not be) available online.

Thus, Geoengineer.org undertook a 2-year development project to establish GEOLIFI. GEOLIFI intends to become the most comprehensive, searchable online database of geoenvironmental papers published worldwide not only in journals, but also in conferences, symposia, workshops, and even magazines and reports. GEOLIFI is established in cooperation with publishers, conference organizers as well as professional geoenvironmental organizations and is available at: <http://geolifi.geoengineer.org/>.

The database allows searches to be performed using not only author names or paper titles, but also abstracts! The ultimate goal is to collect and disseminate unprecedented numbers of papers in an effective manner. The database as of today includes over 2,000 papers, most of them not otherwise available online, and will continue to expand on a daily basis. Geoenvironmental engineers are able to query the database, identify relevant publications and purchase them immediately. Many of these publications would not be otherwise available, except by subscribing to a journal or purchasing the proceedings.

We hope you will find this resource valuable.

On behalf of the Geoengineer.org team,

Dimitrios Zekkos, Ph.D., P.E.
Managing Director of Geoengineer.org
Assistant Professor, [Geotechnical Group](#).
Department of Civil and Environmental Engineering
The University of Michigan, Ann Arbor

Acquiring geotechnical papers has never been easier!
It is as easy as:



About GEOLIFI

How it Works in 4 easy STEPS

Search: Papers that are included in GEOLIFI, are archived and fully searchable at no cost. You can search for papers using either a simple or a more advanced library search.

Add to Wish List: Once you have identified the paper of your interest click the "Add to Wish List" button that appears at the bottom right hand corner of that page. The paper will automatically be added in you wish list. You may also continue searching the database and add more papers to the wish list or you may proceed to check out.

Purchase: To purchase papers you will need to enter your login information that have been provided during the [registration process](#). As soon as you are logged in, you will be redirected to Paypal, a secure online payment system, where you can complete your payment by using any credit card and no extra cost for you. Note that you do not need to have a PayPal account in order to make a payment. Just fill out the online form and follow the instructions provided. Geoengineer.org does not collect credit card information.

Download: You will receive an Electronic Invoice & Delivery Sheet within one hour that will contain the details of your order. To download the purchased products, access your personal GEOLIFI account. The publication will be available on your account for 30 days. After this period the download link becomes inactive. Each paper can only be downloaded once. Once the paper has been downloaded the link is deactivated.

The programme for 8 other topics are under preparation: Monitoring for Tunnelling, Small Diameter Utility Tunnels, Tunnelling Innovations, Tunnelling Design, Numerical Simulation of Tunnels, Immersed Tunnels, Geo investigation for Tunnelling, Going underground: right or wrong ?; they will be discussed during the next meeting of the Committee in Vancouver next May.

You will find enclosed a form we would like to ask you to fill up if you are interested in becoming one of the lecturers for any of these topics; you will also have the possibility to propose other topics of your expertise. Please send it back to the Secretariat with a short Resume (half page maximum) as soon as possible, before Vancouver would be fine.

When you will participate to actions organized by the Foundation, your expenses will be covered (travel, accommodation and food) and you will receive a fee which will contribute to your expenses for the preparation of your pedagogical supports. We will send you later the instructions for the presentation (template and copyright)

Best Regards,

Andre Assis
Chairman of the ITA-CET Committee

Secrétariat de l'AITES - ITA Secretariat
c/o EPFL - Bât. GC - Station 18 - CH - 1015 Lausanne
Tel + 41 21 693 23 10 - Fax + 41 21 693 41 53
secretariat@ita-aites.org - www.ita-aites.org



**INTERNATIONAL TUNNELLING AND
UNDERGROUND SPACE ASSOCIATION**



The ITA-CET Committee is starting to create the data base of the potential lecturers and corresponding topics of expertise; this data base will be used to prepare the next Seminars, Workshops and Training Sessions which will be organized by the Foundation ITACET.

The Portfolio of the Foundation contains presently the technical programme of 7 topics already accepted by Committee: Mechanized Tunnelling, Conventional Tunnelling, Sprayed Concrete, Risk Management, Health and Safety during Construction, Operational Safety and Waterproofing; you can find the detailed programme in the Foundation website: www.foundation.itacet.org.



**ITA Committee on Education and Training
(ITA-CET)**

ITA-CET Lecturer

Name:
Country / Address:
Telephone: E-mail:
Level of education:
Institution: Position:
Language(s): Ability to teach in English: Yes ☐ No ☐
Other language(s) of Teaching:
Chosen Topics:

• Conventional Tunnelling	<input type="checkbox"/>
• Health and Safety in Tunnel Construction	<input type="checkbox"/>
• Management of (User) Safety in Underground Facilities	<input type="checkbox"/>
• Mechanized Tunnelling	<input type="checkbox"/>
• Risk Management in Tunnelling	<input type="checkbox"/>
• Sprayed Concrete in Underground Structures	<input type="checkbox"/>
• Waterproofing	<input type="checkbox"/>
• Monitoring for Tunnelling	<input type="checkbox"/>
• Small Diameter Utility Tunnels	<input type="checkbox"/>
• Tunnelling Innovations	<input type="checkbox"/>
• Tunnelling Design	<input type="checkbox"/>
• Numerical Simulation of Tunnels	<input type="checkbox"/>
• Immersed Tunnels	<input type="checkbox"/>
• Geo investigation for Tunnelling	<input type="checkbox"/>
• Going underground: right or wrong ?	<input type="checkbox"/>

Other topics of interest:
.....
.....
Date: Signature:

AITES-ITA / ITA-CET Committee - c/o EPFL - Bât. GC - Station 18 - CH-1015 Lausanne - Switzerland
Fax : +41 21 693 41 53 - Tel : +41 21 693 23 10 - secretariat@foundation-ita-cet.org - www.foundation-ita-cet.org





Πρόσκληση για συμμετοχή σε Ομάδα Εργασίας της INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

Ο Εκτελεστικός Διευθυντής της ITA έστειλε στις εθνικές επιτροπές μέλη της την παρακάτω επιστολή – πρόσκληση για στελέχωση της Ομάδας Εργασίας (Working Group) WG9 Seismic Effects:

Dear President,

Further to the General Assembly in Budapest, it has been decided to launch a working group on seismic effects.

This working group will meet for the first time in Vancouver on Sunday May 16, 2010, from 14h00 to 18h00.

The Member Nation China, which is at the origin of this new group, proposes Professor Wenge Qiu to be the Animateur.

Enclosed you will find the proposal concerning the objectives and the working modes of this new working group.

We invite you to have this information circulated among your members and especially among those who shall participate to WTC 2010 and to the meetings of ITA, in order to enable them to participate to this group if they wish to. You may also tell them that the publications of WG9 that has treated this subject from 1979 to 1985 are available on ITA website at : http://www.ita-aites.org/cms/ita-aites-home/publications/wg-publications/workinggroups/datum_2008/05/28/working-group-9-seismic-effects.html

I stay at your disposal for any question you may have.

With my best regards,

The Executive Director

Olivier Vion

Planning of ITA working group 9: Seismic effects

2010~2011

To re-launch ITA working group 9: Seismic effects; to determine group members, in addition to Gary KRAMERT (Canada) and Marco RUSSO (Switzerland), being interested in this working group; experts from US and Japan are to be invited to take part in this group through ITA secretary office.

During the WTC2010 in Canada, the former research papers and reports are to be discussed about whether they should be amended or make new report/supplement. The working group is anticipated to start seismic effect and damage of existing tunnels and underground structures in different countries:

China will pay close attention to investigate relative tunnel damages by 5.12 Wen Chuan earthquake, especially focusing on long mountain tunnel at great depth and seismic resistance when crossing active fault. The other typical cases of tunnel damage as Haiti, Chile, Japan and Chinese Taiwan earthquake are also to be studied by relative countries or regions. The former investigation and research pa-

pers, norms and regulations about seismic effects are to be collected, as well as new progress reports.

The work by WG9 should focus on three aspects as follows:

1. Seismic damage classification on tunnels by big earthquake
2. Seismic response mechanism of tunnel support structure and analysis method
3. Tunnel support structure type and design method

2011~2012

To discuss achievements done in last year, preparing annual report.

To arrange workshop in MN country.

2012~2013

To submit research draft report to discuss and prepare final report.

To arrange workshop in MN countries.

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Major rock slide closes I-70 in western Colo. About 20 boulders scattered along road, closing 17-mile stretch of highway

Βραχοπτώσεις, και μάλιστα επαναλαμβανόμενες, δεν συμβαίνουν μόνο στα Τέμπη! Το πρόβλημα με την δική μας περίπτωση έγκειται στο ότι με το κλείσιμο των Τεμπών δεν υπήρχαν εναλλακτικές διαδρομές του βορράς – νότος οδικού άξονα της χώρας ικανές να φέρουν ασφαλώς και ανέτως τον κυκλοφοριακό φόρτο. Απεδείχθη, έτσι, η ανάγκη ολοκλήρωσης του οδικού άξονα Λάρισα – Κοζάνη, ο οποίος κατασκευάζεται εδώ και 30 χρόνια!!!



Rock slide shuts down Colorado interstate

March 8: Officials say it may take weeks to reopen a 17-mile stretch of Interstate 70.

DENVER - A rock slide punched gaping holes in a bridge and left huge boulders on Interstate 70, closing a 17-mile stretch of the highway in western Colorado.

The slide struck around midnight Sunday near Hanging Lake Tunnel in Glenwood Canyon, a deep, narrow chasm about 110 miles west of Denver, the Colorado Department of Transportation said.

No injuries or damage to vehicles were reported.

All lanes were closed from Glenwood Springs east to the town of Dotsero. Up to 25,000 vehicles a day travel that section of highway, department spokeswoman Stacy Stegman said.

The slide blocked the main route between the Denver airport and the Aspen Skiing Co.'s four Aspen-area resorts, but company spokeswoman Meredith McKee said resort operations weren't disrupted.

Officials haven't determined how long the highway will be closed. Because of the rugged terrain, the shortest detour adds about 200 miles around the mountainous Flat Tops Wilderness Area.

The largest hole in the roadway was 10 feet by 20 feet. About 20 boulders ranging from three to 10 feet long were scattered on the highway, with the largest weighing 66 tons, officials said.

Crews began drilling holes in the boulders to insert explosives and blast them into smaller pieces to be hauled away.

Some lanes could then be reopened, but Stegman didn't know how long it would take to finish roadway repairs and reopen all the lanes. The westbound lanes were the most badly damaged.

A 1995 rock slide on I-70 in Glenwood Canyon killed three people.

A slide on Thanksgiving Day in 2004 closed the highway and required nearly \$700,000 worth of repairs. No one was hurt because the highway had previously been closed for an unrelated crash.

The Union Pacific Railroad said its tracks through the canyon weren't affected. The tracks carry freight trains and Amtrak's California Zephyr.

Monday editions of the Glenwood Springs Post Independent and the Aspen Times were delivered late because the slide struck between their towns and their printing plant in the town of Gypsum.

(Samantha Abernethy, MSNBC / The Associated Press στο ASCE SmartBrief, March 9, 2010)



Quakes unrelated, seismologists say

LONDON — Experts say there is nothing unusual about the latest spate of earthquakes in Haiti, Chile and now Turkey, but their devastation illustrates how growing construction along the world's fault lines can lead to massive casualties.

Seismologists say that although one powerful quake can conceivably raise the risk for others elsewhere, the recent string of quakes is probably just coincidence.

Bob Holdsworth, an expert in tectonics at Durham University, said Monday that "I can definitely tell you that the world is not coming to an end."

Bernard Doft, the seismologist for the Royal Netherlands Meteorological Institute, says there is no direct connection between the lethal quakes that have struck Haiti, Chile and Turkey.

"These events are too far apart to be of direct influence to each other," he said.

Although the Haitian quake occurred along a fault that had seen no major event for 250 years, both Chile and Turkey are prone to devastating quakes.

"It was by accident that it happened at approximately the same time," he said.

More than half the cities with at least 1 million people are on active plate boundaries, which are where quakes tend to happen, said University of Colorado geologist Roger Bilham. Unfortunately, despite past quakes, people continue to put up poorly constructed new buildings, said Bilham, who just returned from Haiti and observed these bad practices.

Monday's quake in Turkey had a 6.0 magnitude. On average, there are 134 earthquakes a year that have a magnitude between a 6.0 and 6.9, according to the U.S. Geological Survey. This year is off to a fast start with 40 so far — more than in most years for that period of time.

But that's because the 8.8 quake in Chile generated a large number of strong aftershocks, and so many occurring this early in the year skews the picture, said Earle.

"Years that have large quakes are likely to be higher in overall seismicity," Earle said. The Chilean quake was the sixth strongest since 1900.

(Raphael G. Satter, ASSOCIATED PRESS στο ASCE SmartBrief, March 10 2010)



Chile Considers Concrete Code Changes

The good news for Chileans is that less than 1% of the 10,000 buildings three stories or taller, constructed since Chile's 1985 earthquake, will have to be demolished as a consequence of the magnitude-8.8 Maule earthquake that struck on Feb. 27. The bad news is that the type of structural damage observed in many of the bearing-wall concrete frames of 12- to 26-story buildings is calling into question the effectiveness of Chile's building code, which does not require confinement reinforcing steel for concrete members. A code change in the future is likely, say engineers who inspected the damaged areas.



In roughly 20 multistory concrete buildings, below-grade bearing walls buckled or were crushed in Chile's magnitude-8.8 quake.

Of the 10,000 buildings three stories or taller built since 1985 in the area affected by the Maule quake, there were 2,000 buildings nine stories or taller. The total number of collapsed buildings is roughly five, says Rene Lagos, owner of the Santiago-based structural firm that bears his name. There are another estimated 50 buildings that will have to be demolished, he adds.

"In the U.S., in a maximum-considered earthquake, we talk about 10% of buildings being damaged beyond repair, not 1%," says Jack Moehle, professor of structural engineering at the University of California, Berkeley, and the leader of the Earthquake Engineering Research Institute's 30-member team that toured affected areas in Chile. "The buildings did really well," he adds.

The trip, from March 10-20, was sponsored by the National Science Foundation. The multidisciplinary teams of four or five studied seismic performance of all types of engineered

structures, building components and interior finishes, hospitals and the impact of the tsunami.



Edge of flag wall shows wide spacing of confinement hoops and lack of seismic hooks anchored in the confined core.

Most high-rise apartment buildings in Chile have bearing-wall concrete frames, rather than shear wall frames more common in the U.S. Still, many lessons can be learned from the Maule quake, says Moehle.

The Earthquake Engineering Research Institute now is waiting for drawings of a selection of Chile's buildings and recordings of ground motions during the quake. The buildings then will be computer-modeled using the American Concrete Institute's "ACI 318" code. The goal is to determine whether U.S. codes are too conservative or need to be ramped up. "This is a good testing ground for our building code," says Moehle.

In Chile, the "Seismic Design Code NCh 433-1996," which provides minimum requirements for life safety, is a translation of "ACI 318-95." But there are some exceptions to the code. One allows the use of fewer confinement hoops, ties and hooks in walls.



This wall has a lack of confinement ties within its plane.

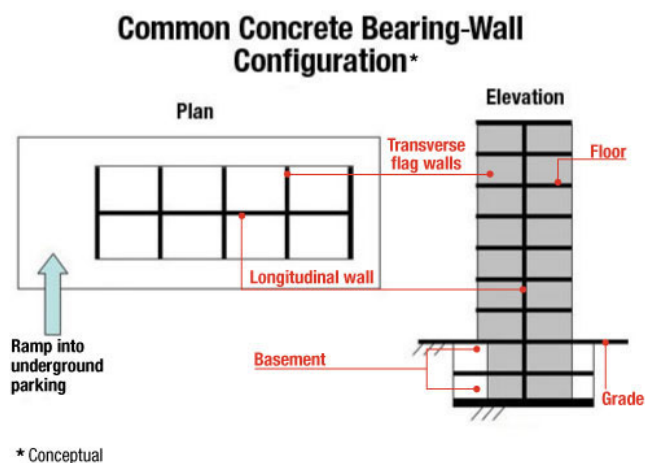
Engineers are not required to confine walls because of the "satisfactory behavior of our buildings during previous

quakes," says Lagos, whose buildings did not suffer structural damage in the quake.

The more recent "Reinforced Concrete Structural Design Code (NCh 430-2008)," which is based on "ACI 318-05" with some exceptions, requires walls to be special structural walls. Frames must be special-moment-resisting frames, and the use of intermediate moment frames is allowed only if the structure has enough walls. The inconsistency between the two standards was solved in the "2010 Seismic Design Code," approved in 2009 but still not official, according to Augusto Holmberg F., CEO of the Instituto del Cemento y del Hormigón de Chile, or the Chilean Cement and Concrete Institute. The new code adopts the criteria established in the new "RC Design Standard."

Taller, More Slender

In the years since Chile's 1985 quake, buildings have gotten taller, while walls have become more slender—wall thickness often having dropped to 15 cm from 30 cm, says Moehle. Architectural demands, especially on narrow lots, have resulted in basement parking. There, walls have been reduced in length from the walls above to create access ramps for vehicles in a configuration called flag walls ([see drawing](#)).



"This creates a stress concentration," says Moehle. "Axial stresses are very high in some walls," he adds.

In addition, quake ground motions were at or exceeded code levels for vibration periods between one and two seconds. "Put this together and many buildings were overloaded, with resulting compression failures," says Moehle.

Shorter basement walls were crushed, and buildings listed somewhat. One 18-story building listed 22 cm at the roof; the confinement exception was followed in this case. "Many of the damaged buildings did not have confining steel," he adds.

Not all Chilean engineers followed their code's minimum requirements. Some followed the "ACI 318" provisions completely. Their buildings fared well in the quake, says Moehle.

Residents of the damaged buildings are afraid to re-inhabit them and want them demolished, says Moehle. However, contractors already are shoring them.

"This type of damage, in the majority of cases, is repairable and will be repaired, no matter how tall the building is," says Lagos. "The problem is, who will pay for [the repairs]," he adds.

Moehle draws a lesson from the Chile experience for U.S. seismic engineers, saying tried-and-true code traditions

should not be tampered with lightly. The engineer is concerned about the very big moment-resisting frames used more commonly in recent years by U.S. seismic engineers. A building's seismic resistance is provided often by only one or two framing lines and a few bays. "Be careful," he warns design engineers. "Don't gain too much confidence in your techniques."

(Engineering News-Record, March 31, 2010 by Nadine M. Post to ASCE SmartBrief, April 2 2010)



New test assesses gas drilling effects on soils

Researchers have developed the Cornell Soil Health Test to evaluate soil response to management on different types of land. It's intended to assess changes due to gas drilling work.



This installation of a pipeline right-of-way for gas shows how construction related to gas drilling can impact soil health. The Cornell Soil Health Test assesses such effects.

The construction necessary to extract natural gas from the Marcellus Shale in southern New York could affect the soil around drilling sites and pipeline right-of-ways, says a Cornell soil expert who has helped develop a new soil health test to assess such impacts.

"Soil is sensitive to heavy construction, and while there are a lot of construction standards and practices, there isn't really a standardized way to measure construction impacts on soil behavior," said Robert Schindelbeck, a Cornell extension associate in crop and soil sciences and member of the Cornell Soil Health Team.

To fill in that information gap, Schindelbeck and his team have developed the Cornell Soil Health Test (CSHT), a set of tests designed to evaluate soil response to management on different types of land.

Prior to the CSHT, soil tests typically only measured the chemical composition of the land, which essentially indicates which nutrients are available in the soil sample. However, those traditional measurements gave no indication of the overall "life" of the soil, and how well it could sustain proper functioning after being disturbed by construction, farming or other activities.

With the CSHT, testers can compare soil measurements from a construction site with those from adjacent, undisturbed areas to evaluate whether chemical, biological and

physical attributes of the soil have been affected by construction.

These issues are taking on particular importance now as the state, landowners and environmental groups debate whether and how wetlands, fallow and agricultural lands could be adversely affected by drilling, road and pipeline construction associated with extracting natural gas from the Marcellus Shale. Healthy soil is necessary for filtering and storing water, protecting the land surface and for supporting plant growth.

"When drilling companies are constructing any sort of right-of-way, it can affect the land and the area around it," said Schindelbeck. "The state already has established different construction and reclamation standards for varying land use types, with more sensitive land uses having stricter soil protection standards for construction activity. Developers must document how they will meet these standards."

(PhysOrg.com, April 1, 2010 by Rebecca Lesser στο ASCE SmartBrief, April 2 2010)



Landslide causes train derailment in Italy; nine dead

A train derailment in northern Italy (at Castelbello, near the northern city of Bolzano, in the East Alps region) has killed nine people. At least 28 people were injured, seven seriously. The train was a small diesel train with two carriages, traveling on the Val Venosta line. The railway is one of the region's newest, inaugurated in 2005.

As photographs from the scene seem to indicate, there had been a landslide in the area before the accident happened. One of the carriages was forced off the tracks.



It happened just after nine o'clock this morning (σ.σ. 12.04 .2010) on a section of single track in the mountainous region of Alto Adige on the border with Austria, between the towns of Malles and Merano. The regional three-carriage train came off the rails at around 9:00 am (0700 GMT) when the landslide hit the front passenger car near the city of Bolzano, and leaving one car dangling precariously over the Adige river, a rescue official said. Only a line of trees prevented the train from being swept into the river several metres below. Firefighters used cables to prevent it from slipping further down the mountainside.

Another train had passed in the other direction without incident just two minutes before the landslide struck in the rugged mountain area, he said.



"The operation posed immediate difficulties given that the first car was dangling between the rails and the Adige River... and the second was invaded by mud and debris," he added.

The front car of the train lodged between two large trees which stopped it from falling into the river below between the towns of Laces and Castelbello.

The wagon was left hanging precariously over the river and firefighters used cables to prevent it from slipping further down the mountainside.



Rescue workers had to climb up from the forested riverbank to reach the train, comprising a passenger carriage at each end and a locomotive in the middle.

The some 400 cubic metres of mud covered around 15 metres of track, according to a local geologist, Ludwig Noessing. Stephano Mamani, head of Bolzano's emergency services stated "Both carriages were filled with debris from the landslide and the rescue operation is very difficult." The mud from the slide entered the train's cars, suffocating the passengers, an official said.

A field hospital was set up nearby, media reports said.

"We are speechless over this catastrophe, whose magnitude and causes are not completely clear yet," the head of the Bolzano provincial council, Dieter Steger, said in a statement.

Consumer advocacy group Codacons, calling the accident "a massacre of innocents," demanded an investigation into any "omissions or neglect on safety or maintenance over the entire rail line."

Police have located the train's badly damaged "black box," reports said.

Thomas Widmann, transport adviser to the provincial government, said the landslide appeared to have been caused by an irrigation pipe that had burst a few days earlier, soaking the hillside above the track. Some reports said that the pipe had burst, while others suggested that a tap had been opened. Authorities say they are looking into why the pipe burst. However, failure of a catch fence designed to retain falling debris appears to have been a major factor, according to New Civil Engineer.

Italian Transport Minister Altero Matteoli expressed "condolences to the victims families", but refused to make any "hypothesis about responsibilities for the cause."

Prosecutors in Bolzano have opened an investigation.

Monday's accident was the worst in Europe since a Belgian train crash in February in which 18 people died when two rush-hour commuter trains collided outside Brussels.

Italy suffered its worst rail accident in 20 years last June, when 29 people died after a freight train ferrying liquefied petroleum gas derailed in Viareggio, on Italy's northwest coast, causing a series of explosions. The force of the blast brought down two small blocks of flats, where many of the victims lived.

Italian prosecutors are investigating whether water from an irrigation system could have caused a landslide that derailed a train, killing nine people.

Eight people are expected to be summoned for questioning, Italian papers have reported.

The head of the local prosecutors office was quoted as saying that two orchard owners and six employees of the local irrigation system had been placed under investigation for questioning.

He stressed that it was not yet clear whether they were to blame.

(CNN, Euronews, Reuters, YAHOO News, ABC News, BBC News, Wikinews, April 12, 2010)



After Haiti, Chile earthquakes, B.C. bridges monitored for seismic events

Seismic instrumentation for monitoring bridges and other structures is being installed in B.C. and an online system is being developed in partnership with Chile to plan how best to respond when critical infrastructure is damaged by earthquakes.

"I am interested in looking at the performance of schools, hospitals and the instruments that are used to measure ground motion in relation to the damage around those in-

struments," said Carlos Ventura, a structural engineer and researcher at University of British Columbia (UBC).



The Chile earthquake caused the liquefaction of soil under an approach to a bridge (Rob Simpson).

"We are getting ready to have web-based tools fully operational to get data from various sites in B.C. Then we are going to send some instruments to Chile and, once they are connected to the Internet, we will get data from that system as well."

As the director of the Earthquake Engineering Research Facility, Ventura has an interest in earthquake engineering, structural dynamics, instrumentation and structural testing.

Ventura was part of a Canadian Earthquake Reconnaissance Team that went to Chile in March for 10 days to see firsthand how various types of structures behave under seismic conditions.

"We have been exchanging information and knowledge on the issue of monitoring," said Ventura.

"The next step is to start looking at how we connect information here with data in Chile. Chile has earthquakes, so we can use their data to test the tools we are developing here."

Chile experienced an 8.8 Richter-scale earthquake and resulting tsunami on Feb 27.

"New technology and Internet-based data sharing has to be tested before it is released to the public," said Ventura.

"The best way to do this is to use real data, which is why we are working with the Chileans."

Before the earthquake in Chile, the B.C. Ministry of Transportation and UBC were developing the BC Smart Infrastructure Monitoring System (BCSIMS).

This system uses strong motion instruments to measure ground shaking and provide maps on the Internet for emergency response.

BCSIMS "does a health run, which take a model of a bridge and looks at stress and displacement," said B.C. Ministry of Transportation seismic engineer Sharlie Huffman.

"It generates new calculations after an event like an earthquake. But it doesn't matter what is done to damage the bridge. If sufficient damage is done to structurally compromise the bridge, the instruments will pick it up."

Huffman said the Chilean strong-motion-network is an older model that does not use the Internet. Data is retrieved over the phone or by going out to the site.

For this reason, BCSIMS is sending 10 instruments to Chile to see how they will react to an earthquake.

This data will be used to develop a post-earthquake prioritization and emergency response plan for B.C.

The B.C. system currently monitoring the WR Bennett Bridge in Kelowna, Queensborough Bridge, Second Narrows Bridge and the Pitt River Bridge.

The system is also installed at a handful of elementary and high schools.

Without a monitoring system, the only method used to inspect buildings after an earthquake is a visual response that checks for cracks or leaning.

In the future, BCSIMS will install a more comprehensive network that includes bridges, roads and public buildings such as hospitals.

(Richard Gilbert, Daily Commercial News, April 21, 2010)



What caused Richmond sinkhole? Answer may lie in steel culvert pipe below



A sinkhole near the Creek View apartment complex on Via Verdi in Richmond, Calif. on Thursday, April 22, 2010. (Dean Coppola/Staff)

Engineers remained at a loss to explain how an enormous sinkhole opened in a Richmond street last week, as most evidence remains buried in muck.

Nor could they offer a firm time estimate for repairs, or whether they likely will encounter another.

The 40-by-60-foot crater about 20 to 30 feet deep formed swiftly last week, engulfing cars, sidewalk and part of Via Verdi. A corrugated steel culvert pipe beneath the road may have played a role in the collapse, but it's unclear to what extent.

"We're still investigating why it happened," interim City Engineer Edric Kwan said. "This is the first time we've ever seen a sinkhole in Richmond."

Sinkholes rarely stir up dust in California, at least compared with limestone-filled Gulf of Mexico states such as Texas

and Florida. Town-swallowing subterranean caverns generally form because groundwater erodes limestone bedrock with spectacular efficiency.



A sinkhole near the Creek View apartment complex on Via Verdi in Richmond, Calif. on Thursday, April 22, 2010. (Dean Coppola/Staff)

"There are different kinds of sinkholes, and they are caused by different things," said Leslie Gordon, spokeswoman for the U.S. Geological Service. "Those caused by limestone erosion do not occur around here."

Forgotten mine-shaft collapses also happen in coal country, not so much in California, Gordon added. But plenty of physical forces exist to cause unexpected elevation dips.

"Whatever was underneath it is no longer there, whether through erosion or chemical reactions or some mechanical change, and so the surface layer gave way," Gordon said. "That's the most simple way to think about a sinkhole."

Civic engineers, particularly in the East, also see a nexus between sinkage and moldering infrastructure beneath the streets. A 2008 report by the New Jersey Department of Transportation, for example, found that corrugated steel culvert pipes begin to deteriorate after about 30 years.

"A pipe collapse may result in the above roadway settling, or itself collapsing, which would prove very costly in terms of traffic delays and roadway repair," notes the abstract. New Jersey is developing a plan for maintenance and replacement of its venerable pipes.

A 22-by-16-foot corrugated steel culvert pipe runs beneath Via Verdi, Kwan said, allowing San Pablo Creek to cross below the road. Kwan estimated its age to be about 30 years.



Workers look into a sinkhole near the Creek View apartment complex on Via Verdi in Richmond, Calif. on Thursday, April 22, 2010. (Dean Coppola/Staff)

The sinkhole definitely crushed the pipe, but investigators will not know whether its failure caused the sinkhole, or vice versa, until thoroughly clearing out the pit, which still contained a car Thursday.

Work continues, weather permitting. City crews and a private contractor hired to excavate and build a temporary road for residents living farther up Via Verdi contend with sporadic rain. Plastic and fabric sheathed the site Thursday morning.

Residents now use a temporary, one-lane gravel path built on the shoulder of the road. Crews hooked up portable streetlights to direct traffic. Several blocks of suburban, single-family housing and two townhouse complexes sit beyond the sinkhole on streets adjoining Via Verdi.

The city contacted neighboring Rolling Hills Memorial Park about building a longer-term, two-lane road through part of the cemetery's property, Kwan said, but parties haven't reached an agreement.

(Karl Fischer, Contra Costa Times, 23.04.2010)

Modular homes made from recycled plastic

A Welsh company, Affresol, has developed the technology to build affordable low carbon homes from recycled waste plastic and minerals -- including packaging and manufacturing waste. Each house consists of approximately 18 tonnes of material that would otherwise be destined for landfill.

The first of the modular buildings has been ordered by Worcester Bosch, a UK manufacturer of domestic heating and hot water systems, for its plant in Warndon, Worcestershire. Supplying Affresol with plastic recovered from recycled boilers will enable the heating specialist to achieve a zero waste policy.



Each modular house uses approximately 18 tonnes of material that would otherwise be destined for landfill

Affresol has developed a material called Thermo Poly Rock (TPR) from recycled plastics and minerals for use as a structural building product. The patented process uses a low energy cold process which converts the plastics into a strong structural element.

The TPR panels are bolted together to form the load bearing frame of the house, which can be externally clad using a material of choice (brick, block or stone), and the interior insulated and plastered as standard. The roof is tiled from recycled materials.

Outlining the benefits, managing director Ian McPherson said TPR is stronger and lighter than concrete, waterproof, fire retardant, does not rot and has excellent insulation properties.

A sustainable code 4/5 home built using TPR can be up to 12% cheaper than standard build, the TPR superstructure can be erected on site within four days. The houses have an estimated life cycle of more than 60 years and the TPR elements are 100% recyclable at the end of life.

The company has spent the last two years working with Cardiff and Glamorgan universities, the Building Research Establishment (BRE) and the Carbon Trust developing the product.

The Welsh Assembly Government also provided support through the Single Investment Fund in the test and devel-

opment stage, setting up an automated production facility and in the final stages leading up to accreditation.

Finance Wales, a provider of commercial funding to businesses in Wales and a subsidiary company of the Assembly Government, has also provided debt investment in the business

McPherson said: "Our management team and business partners believe there is tremendous potential for this new product particularly with the growing focus on carbon reduction, low energy affordable homes and sustainability."

Affresol forecast building 3,000 homes per annum – recycling 40,000 tonnes of waste – with the main market being affordable homes for social housing.

(Anthony Clark, Plastics & Rubber Weekly (UK) from ASCE SmartBrief on Sustainability, March 1, 2010)



Haiti in the aftermath – recycling a city?

People looked on in shock at the horrific devastation in Haiti. The capital city of Port Au Prince looked like it was hit by a giant wrecking ball. Whatever has been left standing by the 7.0 earthquake and numerous after-shocks is likely cracked beyond repair and will have to be demolished.

Close up shots from news footage reveal low quality concrete, cement and mud block construction. A closer look shows little or no rebar and lightweight wire mesh reinforcement. Port Au Prince, the largest city and principle port, developed slowly from Colonial times on a well laid out grid pattern, but with barely any construction codes or standards. Because it has been a historically poor country, building was done on the cheap. Many structures were also weakened by earlier earthquakes, hurricanes, civil strife and fires.



Greg Moro, operations manager for Independence Recycling of Florida (IRF) has been working on a plan to move two mobile crushing and screening plants to Port Au Prince to recycle earthquake debris for use in new construction. "I have had three groups approach us about going down to Haiti. One is a group from Utah, Proactive Energy Concepts, is working through retired General Leslie Clark to put a package together to go to Haiti for a 10-year recovery program. The first part of their program is demolition and clean-up, providing salt-

water desalinization and wind and solar energy. We fit into the early phase of this program and don't know how long we would be there. They want us to demolish buildings and recycle them into whatever useable products we can make, for example aggregates to be used in new concrete for future development."

IRF operates six receiving yards for construction and demolition debris in Florida serviced by three mobile crushing plants. Through the collection of concrete, block, rock and other aggregate based materials IRF produces recycled aggregates and road base for reused in new construction. The crushers are moved from yard to yard to handle stockpiles and are also moved to customer locations for major on-site crushing and recycling projects. Depending on the economy, IRF recycles approximately three million tons of concrete and asphalt per year.

IRF is one of nine DiGeronimo Companies, which includes Independence Excavating, headquartered in Cleveland, that has 10 mobile crushers in its fleet as part of a diversified national capability in heavy industrial construction, site development, concrete, demolition and environmental solutions. The DiGeronimo family is also involved in aggregate distribution and manufacturing construction equipment, including the fabrication of IROCK crushers.

"I would say a quarter of a percent of what we crush is waste. We might crush 40,000 tons of concrete and only have one or two 20-yard dumpsters of trash that we pay to take to a landfill. All of the steel gets recycled and 95 percent of our production is sold to the private sector. Incoming raw material is about 50/50 private and government. In Florida, for example, DOT instituted a new spec to use recycled aggregate for roads, but there are two problems. One, the engineers are not writing the road specs, and two, there's not enough raw material to crush to keep up with the orders if they would start using it. We are not nearly seeing the demolition material in our yards as we did three years ago," said Moro.

Moving mobile crushers to Haiti and providing all the support logistics to keep them operational will be a large undertaking. Each mobile crusher requires between 9 and 11 heavy-haul loads to move from one location to another. A crusher will have to be moved from a Florida location to a port, loaded on a roll-on-roll-off vessel, off loaded in Port Au Prince and trucked to a work site. Typically, it takes about a day and half to set up a plant, but in Haiti it will undoubtedly take longer.

For concrete demolition debris, one crusher realistically can process between 1,800 to 2,400 tons per day, and crush asphalt at anywhere from 3,000 to 4,000 tons a day. Magnets remove ferrous metals during the screening process, which are recycled as scrap.

"We are geared for larger jobs, 20,000 tons and up. We are also known for delivering a product that always meets the spec. We take material through the crusher and then we put it through a screen plant. If a material comes through oversized, the screen captures it and it is sent back on a return to be re-crushed. We can screen down to sand if required," said Moro.

Recycling construction materials from natural disasters seems to make economic and environmental sense, but is rarely practiced in the United States. "In most cases after a hurricane they are in such a hurry to get things cleaned up that they don't sort the material and everything gets landfilled and you lose the concrete and other salvageable material," Moro lamented.



PHOTO COURTESY OF INDEPENDENCE RECYCLING OF FLORIDA
For concrete demolition debris, one mobile crusher can process between 1,800 to 2,400 tons per day, and crush asphalt at anywhere from 3,000 to 4,000 tons per day.

After the 2004 Hurricane Charlie hit Florida, clean-up companies were paid by the yard, so most every yard that went to landfills resulted in wasted material that could have been recycled and it resulted in end of life for several landfills. "After Charlie I was sitting here thinking we were going to get a lot of concrete to recycle, but they were not sorting it and most all was landfilled. We had a high school that was damaged by Charlie. They tore it down and brought it to us and we weighed all the material that came in. The school got LEED credits for bringing it to a certified recycler. Then we sold back the crushed material to the school as road base under asphalt parking lots, which they also earned the high school LEED credits for using recycled material," Moro cited as an example of an ideal disaster recycling scenario.

Recycling construction and demolition materials on-site in Port Au Prince makes better sense. As a remote island nation, importing anything is highly expensive, particularly tons of construction materials. Besides, much of the port facilities were damaged by the earthquake and what remains can be put to more urgent needs.

"From what I've heard about Haiti, they are planning to quadrant off the city and move out the population. Companies will go in, scrape the earth clean and build it back up again with hurricane and earthquake resistant structures," said Moro.

The economics of recycling C&D material vary depending on the nature of the project. The bigger the project, the better the economies of scale and Port Au Prince may prove to be huge. In the United States, recycled aggregate usually costs less per ton than virgin.

"If virgin DOT specified No. 57 stone, ¾ inch rock, costs \$20 a ton, recycled aggregate may be \$17 or \$18. But if you own the debris it's a completely different story. Recently they were tearing down an old football stadium and called us in to crush on site and make two inch aggregate to use as road base for the parking lot. Doing it that way on-site is much faster and cheaper than buying virgin," Moro noted.

In Florida, IRF routinely takes concrete highway and house slabs and large chunks from bridge demolition which contains large aggregate and crushes it back into smaller aggregates and road base. "After looking at the concrete they have in Haiti, you don't see a lot of aggregate. A lot of it looks like small, pebbly stuff which is very well suited to sidewalks, house slabs and many other building applications that use pump mix. We can crush it down to any size. They will have to decide what they want to use it for," said Moro.

For Haiti, IRF is planning on bringing two complete crusher packages including screen plants, loaders and

excavators with hammers and densifiers. IRF was told to bring experienced crews to get the plants up and running quickly. The plan is to eventually cross-train Haitians to do some of the work. At first Haitians will do more of the manual labor like picking debris not wanted in the crusher, but some Haitians may be trained as equipment operators.

"If we go to Haiti, the biggest challenge is we would have to be completely self-sustaining. We'd have to supply our own housing and all the resources to support our people and our equipment," Moro said.

(Mike Breslin, American Recycler from ASCE SmartBrief on Sustainability, March 2, 2010)



Photocatalytic concrete lets buildings clean themselves

A new type of "smartcast" concrete lets buildings use the sun's energy to clean themselves of grime and pollution. The latest example of this new photocatalytic concrete can be found on the new Sun Life Financial Center in Waterloo, Ontario. The rooftop sports Hanson Hardscapes' formula of special aggregates mixed with TX Active photocatalytic white cement.



DAVIDE LUSSETTI : Rome's Dives in Misericordia Church was one of the first buildings to use a special form of self-cleaning photocatalytic concrete.

A recently completed major renovation of the Sun Life Financial Centre in Waterloo is one of a small, but growing number of projects where special cement has been incorporated so that buildings can harness the sun to self clean and de-pollute themselves.

The financial centre's concrete "smartcast" roof top pavers were manufactured by Hanson Hardscapes using a unique formula which includes special aggregates and admixtures with TX Active photocatalytic white cement.

First used in 2001 in the construction of a landmark church in Rome, the cement has been used in the construction of several prestigious architectural-style buildings in Europe and has now established a foothold in the North American construction market.

The cement, which contains titanium dioxide, speeds up the natural oxidation process in the concrete, says Dan Schaffer, product manager for Essroc, the North American subsidiary of the Italcementi Group, the developer.

It's a process known as photocatalysis, in which a substance known as a photocatalyst uses light to expedite the rate of a natural oxidation process, he explains.

"There's nothing magical about it. Essentially sunlight is being used as a strong agent to oxidate primary pollutants such as sulphur dioxide, VOCs and carbon monoxide."

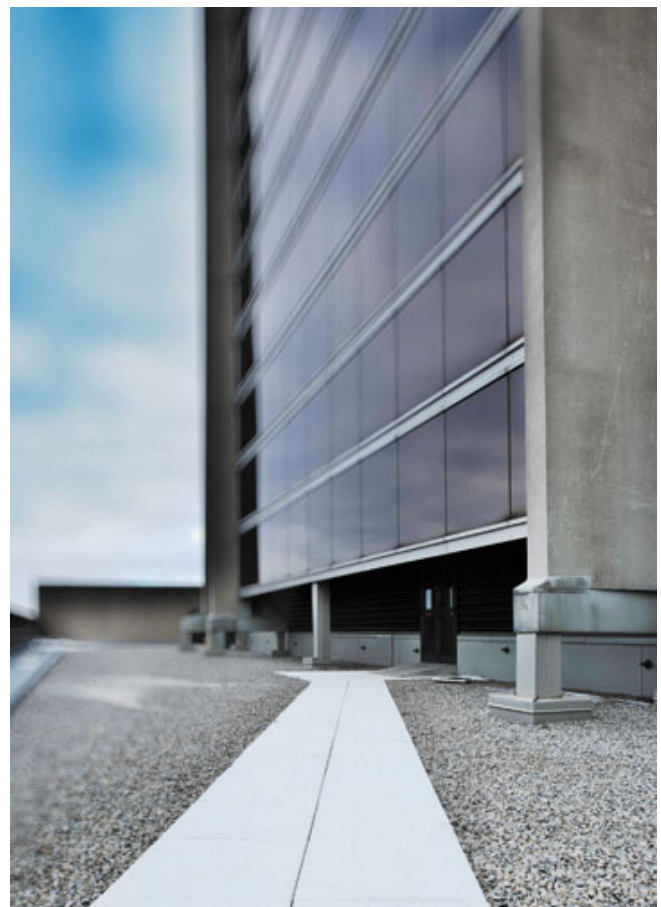
The photocatalytic action destroys the various organic air pollutants such as car exhaust fumes, industrial and residential emissions that come in contact with the concrete surface. As a result, buildings can maintain its original appearance, he says.

The cement was used for the first time in the production of the precast panels that form the three distinctive "sails" of Rome's Dives in Misericordia Church, designed by American architect Richard Meier.

It was created by the Italcementi Group to meet the rigid specifications of the architect and Vatican officials who wanted a church that would maintain its appearance in Rome's smoggy environment, says Schaffer.

The successful application subsequently led to its use in the building of a police headquarters in Bordeaux France and sparked a major independent technical study on its uses by members of the PICADA PROJECT, a non-profit organization comprised of manufacturers and research testing laboratories, says Schaffer.

It was introduced in North America in 2007 and been used in the construction of approximately 20 buildings such as a 75-foot high- Bell Tower at a college in Georgia. "At that height, keeping the precast panels clean through conventional methods would be difficult and costly," he says.



HANSON HARDSCAPES : The material is also used in the rooftop pavers of the Sun Life Centre in Waterloo, Ont.

All of the buildings are in the United States, with the exception of the Sun Life Centre. Hanson Hardscapes chose the cement for the centre's rooftop pavers because it will contribute to the inherent qualities of its own smartcast pavers, says vice president Leo Steffler.

For now the cement is only manufactured at Essroc's Virginia plant. But Schaffer is confident more plants will be opened in other parts of North America once the product becomes better known and used.

"It is becoming more and more accepted by architects and engineers. The feedback has been very positive."

The one big drawback is the price, which averages out to be additional \$1 per square for every square inch of thickness. But it's only used in the face mix and certainly wouldn't be used for hidden concrete structures. Some of its applications would include concrete sidewalks, architectural precast panels and concrete roof tiles, says Schaffer.

(Daily Commercial News (3/12) Dan O' Reilly, correspondent from ASCE SmartBrief March 12, 2010)



Ανακύκλωση: Εμπόριο «μπάζων» Α.Ε.

Την ώρα που στην Ελλάδα τόννοι από μπάζα οικοδομών σωρεύονται σε ρέματα και δάση, στη Νέα Υόρκη μια οργάνωση πουλάει φθηνά οικοδομικά υλικά από δεύτερο χέρι. Κι έτσι βγαίνουν όλοι κερδισμένοι: ιδιοκτήτες και περιβάλλον.



Ταλαιπωρήθηκα αρκετά για να το βρω, ένα κρύο μεσημέρι του Γενάρη. Είναι μια αποθήκη 1.700 τετραγωνικών μέτρων, κρυμμένη σε μια ήσυχη μεσοαστική γειτονιά του Queens. «Build It Green» έγραφε στον τοίχο με μπογιά - και πράγματι «εδώ πωλούνται πάσης φύσεως υλικά»: από πόρτες σπιτιών από τα προάστια και παντζούρια μιας παλιάς pub, μέχρι μοκέτες, ηλεκτρικά είδη, εντοιχισμένα ντουλάπια, σκηνικά από το τελευταίο σόου της Μαντόνα στον ΟΗΕ, ένας τόνος γυφτοσανίδες από την ανακαίνιση του αεροδρομίου JFK, ένα μαρμάρينو γλυπτό τζάκι vintage και όλα τα είδη υγιεινής σε «πολύ καλή κατάσταση». Είναι όλα «δεύτερο χέρι»! Κάποιοι τα πούλησαν εδώ όταν έπαψαν να τα χρειάζονται ή ανακαίνισαν το σπίτι τους και κάποιοι άλλοι τα αγοράζουν, τώρα, πάμφθηνα για να ανακαινίσουν το δικό τους. Η εποχή της οικονομικής κρίσης, η οικολογική συνείδηση, το επιχειρηματικό δαιμόνιο της Νέας Υόρκης - και η απάντηση: Χτίσ' το πράσινο!

Ο Τζάστιν, ένας χαμογελαστός 30άρης με φόρμα εργάτη, με υποδέχεται στο γραφείο του, που θυμίζει ακατάστατο γραφείο ενός παλαιοπώλη: Αφίσες εποχής, αστεία και πολύχρωμα αντικείμενα που... διακρίθηκαν μέσα στη μεγάλη μάζα

της ανακύκλωσης και κέρδισαν μια ζηλευτή θέση στο δωμάτιο με τους υπολογιστές. Βγαίνουμε έξω. Ο χώρος είναι αχανής και ψηλοτάβανος, μια τεράστια αποθήκη με παράθυρα κοντά στην οροφή και λάμπες φθορίου. Μια ομάδα που θυμίζει συμμορία ράπερ ξεφορτώνει ένα φορτηγό. Κατεβάζουν μια άσπρη πόρτα, λίγο «χτυπημένη», αλλά όχι άχρηστη. Με ένα φιλομάζεμα (γυαλόχαρτο, στοκάρισμα, βάψιμο) μπορεί άνετα να αντικαταστήσει την πόρτα του σπιτιού σου, που από την υγρασία δεν κλείνει καλά.

Κατεβάζουν κι άλλες πόρτες, καμιά δεκαπενταριά. Τις τοποθετούν τη μία πίσω από την άλλη, σε μια μεριά της αποθήκης που υπάρχουν κι άλλες - πρέπει να είναι πάνω από πεντακόσια κομμάτια. Πιο δίπλα, είναι μαζεμένες καμιά δεκαριά λεκάνες και νιπτήρες. Και πιο κάτω μια σειρά από φυγεία, κουζίνες, πλυντήρια. «Είναι δύσκολο να διατηρήσεις την τάξη μέσα 'δω, με όλα αυτά τα αταίριαστα συμπράγκαλα, το προσπαθούμε...» μου λέει ο Τζάστιν καθώς προχωράμε πιο μέσα. Αριστερά, ένας σωρός από πράσινα παλιά παντζούρια και πλάι τους μια ξύλινη διακοσμητική, ιρλανδέζικη άρπα - που κάποτε έστεκε μπροστά στο Teddy's Bar. Λειτουργούσε στην παραλιακή ζώνη του Μπουρκλιν μέχρι πέρυσι το φθινόπωρο, οπότε έβαλε λουκέτο.

Τα έσοδα επιδοτούν περιβαλλοντικά σεμινάρια

Το «Build It Green» ιδρύθηκε το 2004, επιδοτούμενο από το Community Environmental Center, μια κρατική οργάνωση που υποστηρίζει «πράσινες» πρωτοβουλίες. Αυτό που κάνουν είναι απλό: Με έρευνα και μέσω συνεργατών τους, μαθαίνουν ποια σπίτια ή σκηνικά ή κατασκευές κ.λπ. κατεδαφίζονται ή ανακαινίζονται στην περιοχή της Νέας Υόρκης. Στη συνέχεια επικοινωνούν με τους ιδιοκτήτες και τους προτείνουν την εναλλακτική λύση: «Αντί να πληρώσουν εταιρεία κατεδάφισης ή συλλογής μπάζων, να πάρουν εμάς, δωρεάν.



Εμείς θα ξηλώσουμε προσεκτικά όλα τα ανακυκλώσιμα υλικά της κατασκευής και ό,τι μπορεί να ξαναχρησιμοποιηθεί. Στη συνέχεια, θα τα διαθέσουμε ως "μεταχειρισμένα" σε λιανική ή χονδρική. Με τα έσοδα θα επιδοτήσουμε σεμινάρια για περιβαλλοντική επιμόρφωση σε σχολεία». Το μόνο «αδύνατο σημείο»: ότι η διαδικασία του B.I.G. απαιτεί περίπου τον διπλάσιο χρόνο από την κατεδάφιση (μέχρι το συνεργείο με το γερανό να ξηλώσει ένα-ένα τα παράθυρα και τις πόρτες, τα ντουλάπια της κουζίνας και την ξύλινη εσωτερική σκάλα, τη στέγη και τις μοκέτες...). Όμως, το «τσάμπα» σε συνδυασμό με το «eco friendly» τούς σώζει. Οι περισσότεροι το προτιμούν χωρίς δεύτερη σκέψη.

Μειώνει τους 16.500 τόνους μπάζων της Νέας Υόρκης

Κι αν σκεφτεί κανείς ότι κάθε μέρα «πετιούνται» 16.500 τόννοι από άχρηστα οικοδομικά υλικά μόνο στην πολιτεία της Νέας Υόρκης, τα οποία θα κατέληγαν στη χωματερή του Στάτεν Αϊλαντ και αποτελούν και το περίπου 50% του όγκου των απορριμμάτων της μητρόπολης, τότε η επιχείρηση του Τζάστιν αποκτά έναν πολύ σοβαρό λόγο ύπαρξης. Η τάση έχει εξαπλωθεί ραγδαία, την τελευταία δεκαετία, απ' άκρη σ' άκρη στις ΗΠΑ. Και με δεδομένα τα τεράστια μεγέθη της χώρας, είναι ένας κλάδος που κάθε χρόνο τζιράρει δισεκατομμύρια από το τίποτα. Πουλώντας «σκουπίδια», που όμως είναι ακόμα «ζωντανά», άρα δεν είναι σκουπίδια.

Δύο γυναίκες, μαμά και κόρη, μπαίνουν διστακτικά στην αποθήκη. Κοιτάζουν γύρω-γύρω. Ο Τζάστιν μού ζητά συγγνώμη και πάει να τους μιλήσει. Ψάχνουν μια ξύλινη πόρτα

για το υπνοδωμάτιο της μικρής. Έχουν μαζί τους τις διαστάσεις σε ένα κομμάτι χαρτί, ο φίλος μου τους δείχνει πού να κοιτάξουν. Δεν θέλουν να τις φωτογραφίσω, κανείς δεν ποζάρει χαμογελαστός μέσα σε ένα «second hand store». Μια άλλη πιτσιρίκα, Αφροαμερικάνα, γύρω στα 25, πηγαίνει προς το ταμείο με ένα μακρύ κομμάτι ξύλο (που κάποτε ήταν πάτωμα και, όπως φαίνεται, θα ξαναγίνει) στα χέρια της. «Βρήκες αυτό που ήθελες;» τη ρωτάμε. «Ναι, για να κλείσω αυτή την τρύπα στο παρκέ του σαλονιού μου, είναι σχεδόν το ίδιο χρώμα. Θα το κόψω στο μέγεθος που πρέπει και δεν θα φαίνεται τίποτα, θα 'ναι μια χαρά...» Χαμογελάει πλατιά και μας χαιρετάει. Η τιμή είναι 3 δολάρια. Όντως, μια χαρά...

(Κείμενο - Φωτογραφίες: ΑΧΙΛΛΕΑΣ ΠΕΚΛΑΡΗΣ / Η ΚΑΘΗΜΕΡΙΝΗ / ΟΙΚΟ, 11 Μαρτίου 2010)



Cool roof coating: Mechanism kept under wraps

SAN FRANCISCO — The American Chemical Society held a news briefing March 21 to feature a new energy-saving technology. It's an ostensibly "smart" coating for roofing materials that knows when to reflect heat, like in summer time, and when to instead let the sun's rays help heat a structure.

Roofing materials already exist that can reflect the sun's rays. But they always reflect, says Kyle Ungvarsky, an engineer with United Environment & Energy of Horseheads, N.Y. In contrast, his company's new material can be tuned to stop reflecting when it's advantageous to do so.

He reported that bench-scale testing found that compared to conventional "cool roof" technologies, UEE's climate-responsive material should be able to reduce rooftop temps "by 50 to 80 percent" in warm weather, and actually increase roofing temperatures by "up to 80 percent" during cold seasons.

"The coating is mainly made of recycled waste cooking oils" and can be sprayed onto existing asphalt shingles or some other roofing material. Depending on how it's been chemically "tuned" for the local climate, Ungvarsky said, the novel coating can effectively "read a thermometer." When the outdoor temperature reaches some set point, he said, the coating undergoes a phase change that switches its optical properties from reflecting to transmitting solar ultraviolet and infrared radiation onto the roofing material below.

Cool concept, but how does it do that? The patent-pending technology is "proprietary," Ungvarsky says, so he couldn't divulge details.

A colleague at the briefing asked what makes this new material conceptually different from commercially available window coatings that can reflect — or not. He wouldn't say, except to reaffirm that this technology was for roofs. Which we already knew. Any chance that his company had published anything on the phase-change optical coating, that reporter asked? Nope.

As I'm puzzling over how this oil might alter its transmissivity it occurs to me: Is there something embedded in the oily polymer that does the thermostat reading and optical presto-change-o trick? Yes, Ungvarsky admits. The oil isn't tunable by itself, but instead depends on some proprietary additive.

At which point the briefing was called to an end. The entire event lasted 8.5 minutes.

I see our job as science journalists to help demystify science by reporting on new concepts, new developments and how things work. We can't hope to do that when all we're offered is black-box science. And I don't blame Ungvarsky, a young engineer with his company. He was undoubtedly instructed to offer a superficial description of the new technology. One that might invite nibbles from companies interested in partnering with UEE on a new line of commercial products. Indeed, Ungvarsky said as much.

But I am disappointed that the ACS wasted one of its few preset opportunities for reporters to meet with presenters over a project so short on details.

I visited the company's poster, this evening, when it went up. It didn't say much more than Ungvarsky shared at the briefing. But I did pick up a potential clue as to the tuner. The poster was part of the ACS' cellulose division, which would suggest that the mystery additive contains, was fashioned from, or in some way resembles cellulose.

If that technology truly performs as UEE claims, that could be great. Cooling down roofs all over a warm metro area, Ungvarsky points out, could do a lot to diminish the heat-island effect associated with today's urban areas.

On a smaller scale, the new coating could also make working conditions better for roofers. My dad and I replaced the shingles on my house many years back. And I can attest that even in early April, when the backyard was about 65°F, the temperature two stories up atop that dark asphalt was scorching and the roofing shingles gooey. Which makes it easy to damage them, not to mention get tarry deposits all over your clothes and hands.

I happened to mention this to a commercial roofer in our area, a few years back, and he agreed that his crews can easily encounter blistering working conditions that exceed 130°F in summer. I bet they would love to see cool roof technologies transform the rooftop landscape. And if UEE has its way, smart coatings for roofing could debut within three years.

(Janet Raloff / Science News from ASCE SmartBrief, 23 March 2010)



Europe Could Go 100% Renewable By 2050

Earlier this month, the European Commission reported that the EU was on track to get 20 percent of its electricity from renewable sources by 2020. (Some countries, like Germany and Austria, are flying past their targets; others, like Italy, have lagged behind.) But how much further could Europe go? A new report from PricewaterhouseCoopers finds that the continent could get *all* of its electricity from renewable sources by mid-century—although it would take a major upgrade to the electrical grid:

A "super-smart" grid powered by solar farms in North Africa, wind farms in northern Europe and the North Sea, hydro-electric from Scandinavia and the Alps and a complement of biomass and marine energy could render carbon-based fuels obsolete for electricity by 2050, said the report.

The goal is achievable even without the use of nuclear energy, the mainstay of electricity in France, it said. ...

Achieving all-renewables electricity will depend less on new technology than on revamping Europe's legal and regulatory framework, the report argued: "Most of the technical components are available in principle already today."

Here's an earlier post on the Desertec proposal to put a bunch of concentrated solar plants in northern Africa and wire the electricity up to Europe. It's feasible, though not easy—the PWC report notes that the project would depend on unifying the European power market and then integrating it with North Africa's. Then again, that doesn't sound like that much more of a headache than the alternative: Under a variety of business-as-usual scenarios, the EU's projected to import about 70 percent of its energy by 2050, including loads of natural gas from Russia, which hasn't always been the most stable of suppliers. So the EU has plenty of reasons beyond climate change to want to decarbonize.

(Bradford Plumer / The New Republic, March 30, 2010
News from ASCE SmartBrief on Sustainability, 31 March 2010)

- Newer replacement materials may be scarce or of lesser quality. An example is the structural timbers used in many old mill buildings. These timbers are frequently larger and longer than those commercially available today. Also their old growth strength is greater than wood from newer forests.
- Demolition disposal costs continue to escalate as solid waste landfills are closed and new landfills are plagued by permitting issues.
- Commodities such as steel, copper and aluminum are becoming more expensive and substantial energy can be saved by recycling.

A final consideration in deconstruction is schedule. The deconstruction process is more labor intensive than demolition, therefore time must be provided in the construction schedule to allow for the process.

In the final analysis the cost, time, and environmental considerations will be the determining factors.

(Reed/ACP Construction Data, March 30, 2010 from ASCE SmartBrief, 31 March 2010)



Building Deconstruction

A component of the "Green" movement is deconstruction. Rather than demolishing a structure and delivering the debris to landfill, deconstruction provides for the careful removal and reuse or recycling of building materials. The materials can be stored and reused on the existing site thus eliminating transportation charges. The alternative is to sell or donate the deconstructed materials.

Typical materials considered for deconstruction include the following:

- Interior doors and frames
- Structural framing
- Casework
- Brick masonry
- Plumbing fixtures
- Wood strip flooring
- Roof sheathing boards and metal roofing

The decision to deconstruct is based upon several factors; the first is a site assessment. This involves evaluating the materials based upon type, quality level and condition, quality and installation method. Another aspect of site assessment is the adequacy of the site to store and clean/process the materials. The second consideration is the potential market for the materials if they are not being reused for the project. The current price for new materials must be compared to the potential sale price of the deconstructed material. That price is based upon the condition and quality of the deconstructed material. The presence of local salvage retailers and the ability to market and cost of transporting the materials is also a consideration. Safety is a key concern in the planning and executing of a deconstruction project.

Aside from the LEED incentives/credits for deconstruction there are a number of other reasons to deconstruct.

In search of an earthquake-proof building

- Engineers say technology exists to stop buildings from collapsing during quakes
- The technology isn't spread evenly across the globe, however
- "Base isolation" technology puts buildings on floating pads
- Other simple building techniques reduce the chance of building collapse



Many buildings in Chile withstood a stronger earthquake than one in Haiti, which toppled concrete structures.

(CNN) -- It's a sobering fact: Earthquakes alone don't kill people; collapsed buildings do.

But can people engineer buildings that wouldn't crumble when subjected to the rumblings of the Earth?

In the wake of the Haiti and Chile earthquakes, such a question has more importance now than any time in recent memory.

The simple answer is yes. The technology exists to make buildings nearly earthquake-proof today. However, installing those safer buildings all over the world isn't so simple. Neither is figuring out who will pay.

In a handful of interviews, engineers who work on earthquake-resistant buildings said current technologies prevent well-designed buildings from cracking when the ground shakes beneath them.

As the earthquakes in Haiti and Chile show so graphically, the real issue may be that adoption of these building technologies -- many of which require only simple changes to building materials or composition -- is far from equitable.

"Most disasters are created by human beings. It's how we build and where we build that creates the hazard, the disaster," said Michael Armstrong, senior vice president of the International Code Council, a nonprofit group that develops building codes for countries to adopt. "Earthquakes, hurricanes, fires, floods are going to occur, but there are ways in terms of where we build and how we build that can reduce the impact."

In Chile, an 8.8-magnitude earthquake on Saturday has so far killed more than 700 people. On January 12, a less powerful earthquake, one measuring 7.0, killed more than 200,000 in Haiti.

The difference in those death tolls comes from building construction and technology, scientists and engineers have said. In Haiti, buildings were constructed quickly and cheaply. Chile, a richer and more industrialized nation, adheres to more stringent building codes.

How it works

Technology designed to keep buildings from collapsing works essentially in two ways: By making buildings stronger, or by making them more flexible, so they sway and slide above the shaking ground rather than crumbling.

The latter technology employs an idea called "base isolation."

For about 30 years, engineers have constructed skyscrapers that float on systems of ball bearings, springs and padded cylinders. They don't sit directly on the ground, so they're protected from some earthquake shocks. In the event of a major earthquake, they sway up to a few feet. The buildings are surrounded by "moats," or buffer zones, so they don't swing into other structures.

"You actually take the foundation of building and you put it either on almost like springs or on a mechanism so it is allowed to move a little bit with the earthquake," said Armstrong of the building code council.

Well-designed buildings with base-isolation systems ensure that no lives will be lost, no matter the strength of an earthquake, said Michael Constantinou, a professor of civil engineering at the University at Buffalo, State University of New York.

More difficult than perfecting the technology, he said, is figuring out how large of an earthquake will hit a certain area.

"The issue is estimating correctly the seismic demand," he said. "I don't think there is a problem with the technology."

Mehmet Celebi, a senior research civil engineer at the U.S. Geological Survey, said there have been striking examples where buildings made with base isolation survived earthquakes while others did not. He said a University of Southern California hospital in Los Angeles, for example, survived a 1994 earthquake "absolutely unharmed."

A neighboring hospital building that did not use the isolation technology suffered considerable damage, he said.

New developments

Still, some engineers are developing technologies to improve on this idea of semi-floating buildings.

Bill Spencer, a civil engineering professor at the University of Illinois, said electronic sensors that detect seismic shaking can tell the building how to react to avoid damage.

"It's in the spirit of the anti-lock braking systems in cars," he said. "They measure the dynamic behavior of the car and adjust the braking force to get it to do what you want it to do."

Celebi said buildings with those sensors have been built in Japan but not in the United States. Some use accelerometers, which are also found in newer smart phones, to detect motion.

"If they exceed a certain level, then the damper system goes into action and reduces the amount of shaking" in the building, he said.

Old ideas

Others are trying to make earthquake-safe buildings less expensive.

New buildings with earthquake-resistant technology cost about 5 to 10 percent more than those built without the precautions, engineers said.

The cost of retrofitting old buildings to modern earthquake standards is much more expensive but has been tried in certain cases, such as when the city of San Francisco retrofitted its city hall with base-isolation technology.

That project, which included other improvements, cost a total of \$293 million, [according to the San Francisco Chronicle](#).

High costs keep countries such as Haiti from adopting the latest building techniques and technologies, said Nicholas Sitar, professor of civil and environmental engineering at the University of California at Berkeley.

He said making buildings more basic might actually make them stronger and would cost less than high-tech upgrades.

"Sometimes it's very simple," he said. "Simple square buildings that are relatively stout will do very well [in earthquakes]. The problem is that most architects and people don't like to live in square structures with square windows."

Awareness

Engineers pointed to other simple solutions, such as reinforcing concrete buildings with steel rods and bolting wooden buildings to their foundations, as ways to prevent mass casualties in earthquakes.

But such measures still aren't taken in many parts of the world, Armstrong said.

"There's a way to reduce the risk," he said. "The countries that have not adopted the codes tend to be poorer countries and perhaps the degree of sophistication or commitment to code enforcement is also an issue in these countries."

It would be a start for more developing countries to adopt building codes that include measures about earthquake resistance, he said, but that wouldn't fix everything.

Armstrong said people all over the world, and with all job types, from city planners to construction workers, need to be aware of technologies and building methods that prevent buildings from collapsing in earthquakes.

"You can write a really good code, but you'd better have the capacity to enforce it," he said. "You've got to have people on the ground who are trained and certified in codes and are willing to enforce the codes."

(John D. Sutter, CNN from ASCE SmartBrief March 3, 2010)



Developing Earthquake-Proof Buildings

Destructive earthquakes in Haiti and Chile recently highlight the importance of engineering and testing earthquake-proof systems.

The 8.8-magnitude earthquake that struck Chile last week was much more powerful than the 7.0-magnitude earthquake that struck Haiti in mid-January. Yet it caused only a fraction of the casualties (fast approaching 800) compared with the 300,000 people estimated to have died in Haiti. Some [seismologists](#) suggest that one reason for the difference in the death tolls is that buildings in Haiti were constructed quickly and cheaply, while Chile enforced building codes for earthquake-resistant structures after a 9.0-magnitude earthquake in 1960.

"Since the turn of the century, earthquakes have directly or indirectly (including tsunami) claimed the lives of more than 640,000 people, four times more than in the preceding two decades, and proportionately more than the global increase in population would anticipate," according to a recent paper in the journal [Nature](#).

"If buildings are not made earthquake resistant, the toll is likely to continue to rise as cities grow in population," [Roger Bilham](#), a professor of geological sciences at the University of Colorado and one of the first seismologists to visit Haiti after the recent earthquake there, writes.

Earthquakes generate forces that a building's structure may not be designed to endure. During a quake, the ground moves while the building resists the shaking. "Although most of the ground movement usually is horizontal, a quake can also rock a building up and down, like a rodeo rider on an angry bull," TLC's [Tremor Tech](#) says.

Hinging on the idea that building to withstand natural forces is not a losing battle, plenty of engineers and architects believe it is possible to design and construct an earthquake-proof building. At study centers throughout the country, many experts are working to develop new technologies that could minimize the dire costs of a major quake.

"Technology designed to keep buildings from collapsing works essentially in two ways," a [CNN Tech](#) report this week explains: "By making buildings stronger, or by making them more flexible, so they sway and slide above the shaking ground rather than crumbling."

These videos introduce a range of earthquake labs where engineers and scientists model earthquakes and the architectural damage such natural disasters can cause, while highlighting sites for testing systems and technologies to make manmade structures more earthquake-resistant, perhaps even earthquake-proof.

Resources

[Lessons From the Haiti Earthquake](#) by Roger Bilham, Nature, Feb. 17, 2010

[Earthquakes: Tremor Tech](#), TLC (Discovery), 2008

[In Search of an Earthquake-Proof Building](#) by John D. Sutter, CNN, March 2, 2010

[The Lab That Could Save Us All From Earthquake Destruction](#), The Infrastructurist, March 3, 2010

[... "In Recent Earthquakes, Buildings Have Acted as Weapons of Mass Destruction"](#), DemocracyNow.org, March 1, 2010

[How Earthquake-Proof Buildings Work](#) by Marshall Brain, BrainStuff (HowStuffWorks), Oct. 29, 2008



<http://news.thomasnet.com/IMT/archives/2010/03/developing-engineering-testing-earthquake-proof-buildings-wake-of-haiti-chile.html>

(David R. Butcher, [ThomasNet Industrial Newsroom](#) from ASCE SmartBrief March 5, 2010)



New, tough material is created

MANCHESTER, England, March 10 (UPI) -- British scientists say they have combined chalk and polystyrene to produce a tough new material that could make other materials more durable.

The team of scientists from the Universities of Manchester and Leeds said their technique could be used to make ceramics with high resistance to cracking -- which could, in turn, be used in crack-resistant building materials and bone replacements.

"The mechanical properties of (sea) shells can rival those of man-made ceramics, which are engineered at high temperatures and pressures. Their construction helps to distribute stress over the structure and control the spread

of cracks," said Stephen Eichhorn of the University of Manchester. "Calcium carbonate is the main ingredient of chalk, which is very brittle and breaks easily when force is applied.

"But shells are strong and resistant to fracturing, and this is because the calcium carbonate is combined with proteins which bind the crystals together, like bricks in a wall, to make the material stronger and sometimes tougher. We have replicated nature's addition of proteins using polystyrene to create a strong shell-like structure with similar properties to those seen in nature."

Although further study and testing is needed, he said the research "offers a straightforward method of engineering new and tough chalk-based composite materials with a wide range of useful applications."

The study appears in the journal *Advanced Materials*.

([United Press International](#) from ASCE SmartBrief March 11, 2010)



Tsunami generator copies wave behaviour

A unique wave-generating machine that mimics the activity of real-life tsunamis with unprecedented realism has been used successfully in an Oxfordshire laboratory.

The simulator has copied the behaviour of the first massive wave of the 2004 Boxing Day tsunami.

Developed and built with Engineering and Physical Sciences Research Council (EPSRC) funding, the tsunami generator will improve understanding of how tsunamis behave. This will aid the development of more effective evacuation guidelines for parts of the world potentially at risk from future tsunamis. It will also help improve the design of buildings in susceptible areas so they are better able to withstand the impact of such events.

The new facility has been developed jointly by EPICENTRE (the Earthquake and People Interaction Centre), based at University College London (UCL), and consulting engineering company HR Wallingford, at whose headquarters it is located.

Mounted in a 45m-long wave channel, the tsunami generator uses a pneumatic system to suck up water into a tank and then release it in a controlled way. This makes the facility fundamentally different from all other wave simulators worldwide, which generally use pistons to produce waves.

The new pneumatic technique has a range of advantages over a piston-based approach. In particular, tests by UCL researchers at HR Wallingford have shown that it can reproduce the draw-down phenomenon that is characteristic of 'trough-led' tsunamis, where the sea is sucked out first before rushing back towards the shoreline.

Within the wave channel, or 'flume', the waves created by the tsunami generator are directed over a model coastal slope, enabling their behaviour and effects to be studied in detail.

Specifically, tests with this facility will be used to enhance understanding of the water flows and forces unleashed by tsunamis. This will enable buildings and infrastructure in vulnerable parts of the world to be designed and built in ways that help them withstand these destructive events.

Moreover, because this understanding will make it easier to predict the behaviour of tsunamis at shorelines and when they move inland, the tsunami generator will make it possible to strengthen emergency and contingency planning at a regional, national and individual community level.

'Although the basic concept is actually quite simple, this is the only facility that has ever been able to replicate the draw-down phenomenon in the laboratory,' said Dr Tiziana Rossetto, EPICENTRE's director.

'We've already used the generator to mimic the 2004 Indian Ocean tsunami at a 1:75 scale. The data gathered should be validated and then made available to the scientific community within the next two years.'

The tsunami generator was designed, built and tested between 2007 and 2009. EPSRC support was supplemented by additional funding from HR Wallingford and a student-ship supported by consulting engineering company Arup.

The aim is to make the tsunami generator available for use by other researchers from all over the world.



The tsunami generator before being lowered into the flume.
The waffles (the horizontal blue bars) stop sloshing inside the tank, which gives better control of the generation of the wave

(The Engineer, 23 March 2010 from ASCE SmartBrief)

Pi Day

Pi Day and **Pi Approximation Day** are two holidays held to celebrate the mathematical constant π (pi) (in the month/day format: 3/14); since 3, 1 and 4 are the first three decimal digits of π . March 14 is also the birthday of Albert Einstein and the two events are sometimes celebrated together.

Observation

Pi Approximation Day is observed on March 14, because of the Ancient Greek mathematician Archimedes' first rough approximation of π as being 3.14. [A few years later, Archimedes was able to calculate a much-better approximation of π .] However, this may be considered misleading, as all cited dates are "approximation days" (since π is an irrational number) and 22/7 is actually a closer approximation of π than 3.14 is. Typically, March 14 is more popular for countries using the month/day format and the 22nd of July is more popular for countries using the day/month format.

Sometimes the so-called Pi Minute is also commemorated. This one occurs twice on March 14 at 1:59 a.m., and 1:59 p.m. If π is truncated to seven decimal places, it becomes 3.1415926, making Pi Second occur on March 14 at 1:59:26 p.m. [Sometimes March 14, in the year 1592 at 6:53:58 a.m. is remembered.] If a 24-hour clock is used, Pi Minute occurs just once yearly, on March 14 (3/14) at 1:59.

On March 14, 2015, the date will reflect five digits of π (3/14/15) rather than three. Pi minute will be at 9:26 on that day, and pi second will be at 9:26:53.

Celebration

There is a large variety of ways of celebrating Pi Day and most of them include eating pie and discussing the relevance of π .^[1] The first Pi Day celebration was held at the San Francisco Exploratorium in 1988, with staff and public marching around one of its circular spaces, then consuming fruit pies. The museum has since added pizza to its Pi Day menu.^[2] The founder of Pi Day was Larry Shaw,^[3] a now-retired physicist at the Exploratorium who still helps out with the celebrations.

The Massachusetts Institute of Technology often mails its acceptance (and rejection) letters to be delivered to prospective students on Pi Day.^[4]



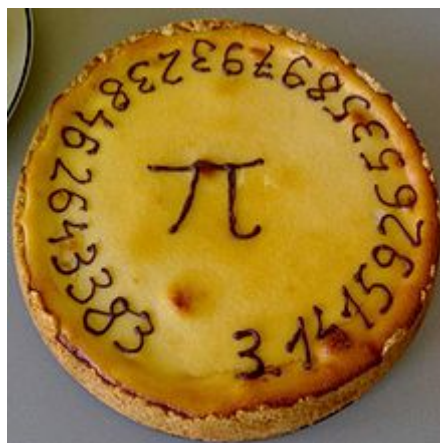
Pies for a celebration at the Massachusetts Institute of Technology



Free pies being prepared at the University of Waterloo

Some also celebrate alternative Pi Days and/or Pi Approximation Days in addition to the two listed above; these can fall on any of several dates:

- March 4: When 14% of the 3rd month has elapsed.
- April 26: The Earth has traveled two radians of its orbit on this day (April 25 in leap years), reckoning from the start of the calendar year on January 1. The distance travelled through the entire orbit around the sun, divided by the average distance to the sun, equals 2π ; two radians equals $\frac{1}{\pi}$ of our orbit. This is celebrated exactly on the 41st second of the 23rd minute of the 4th hour on April 26 or the 116th day. (In leap years, it is celebrated exactly on the 3rd second of the 2nd minute of the 12th hour on April 25 or the 116th day.) This celebration is not a Pi Approximation Day.
- November 10: The 314th day of the year (November 9 in leap years).
- December 21, 1:13 p.m.: The 355th day of the year (December 20 in leap years), celebrated at 1:13 for the Chinese approximation 355/113.



Pi Pie at Delft University

History

On Pi Day 2004, Daniel Tammet recited 22,514 decimal digits of π .^[5]

On 12 March 2009, the U.S. House of Representatives passed a non-binding resolution (HRES 224),^[6] recognizing March 14, 2009 as National Pi Day.^[7]

On March 14, 2010, Google made a Google Doodle celebrating Pi Day, with the word Google laid over images of circles and pi symbols.

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Larry Shaw, the founder of Pi Day, at the Exploratorium

From Wikipedia, the free encyclopedia



LIEBHER – Μία πολύ ενδιαφέρουσα μαγνητοσκόπηση

Στην παρακάτω ηλεκτρονική διεύθυνση (ηλ.δι.) μπορείτε να δείτε μία πολύ ενδιαφέρουσα μαγνητοσκόπηση επίδειξης αντοχής μεταλλικής κατασκευής αλλά και δυνατοτήτων μη-

χανήματος και χειριστού του. Το έστειλε στον εκδότη ο Randolph Langenbach με την ακόλουθη σημείωση:

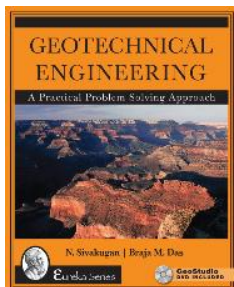
This is for all of you who participated in the debate about the Vierendeel Bridge - and the rest of you as well.

http://www.youtube.com/watch_popup?v=RobaJKGMMiE

Randolph

Randolph Langenbach, F.A.A.R.
Conservationtech Consulting
www.conservationtech.com
www.traditional-is-modern.net
6446 Harwood Avenue
Oakland, California, 94618, USA
Voice: 510-428-2252

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

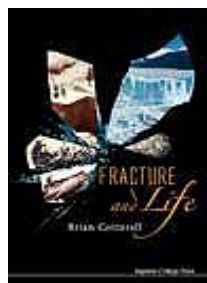


Geotechnical Engineering: A Practical Problem Solving Approach

Nagaratnam Sivakugan and Braja M. Das

Geotechnical Engineering: A Practical Problem Solving Approach covers all of the major geotechnical topics in the simplest possible way adopting a hands-on approach with a very strong practical bias. You will learn the material through several worked examples that are representative of realistic field situations whereby geotechnical engineering principles are applied to solve real-life problems. There are a few carefully selected review exercises at the end of each chapter with answers given whenever possible. Also included are closed-book quizzes that should be completed within the specified times and will make you think and point you to what you have missed.

(J. Ross Publishing, 2009)



FRACTURE and Life

Brian Cotterell

This book is an interdisciplinary review of the effect of fracture on life, following the development of the understanding of fracture written from a historical perspective. After a short introduction to fracture, the first section of the book covers the effects of fracture on the evolution of the Earth, plants and animals, and man. The second section of the book covers the largely empirical control of fracture from ancient times to the end of the nineteenth century. The final section reviews the development of fracture theory as a discipline and its application during the twentieth century through to the present time.

Contents:

- Introduction and Basic Solid Mechanics
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- Fundamentals of Fracture and Metal Fracture from 1950 to the Present
- The Diversity of Materials and Their Fracture Behaviour

- Cutting and Piercing
- Recent Developments and the Twenty-First Century

(World Scientific, March 2010)



Art of Foundation Engineering Practice

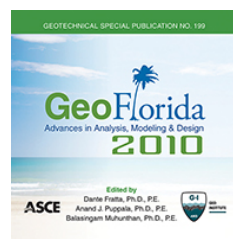
Geotechnical Special Publication 198

W. M. Camp, M. H. Hussein & J. B. Anderson (Editors)

The Art of Foundation Engineering Practice, GSP 198, honors Clyde N. Baker, Jr., P.E., S.E., Honorary Member of ASCE. For more than 50 years Clyde Baker has made distinguished contributions to the advancement of foundation engineering design, analysis, construction, and monitoring starting with the early Chicago high-rise buildings up to the world's current record-setting skyscrapers. It contains 38 technical papers contributed by professors, researchers, practicing structural and geotechnical engineers, and contractors. This book is a valuable source of information for: historical reviews of land and offshore foundations work; fundamental and advanced foundation analytical procedures; foundation design using in situ geotechnical measurements; drilled shafts in soft and hard rock; foundations in difficult soils and geologic conditions; driven piles; foundations for static and dynamic loads; testing and long-term monitoring; and case histories. It also includes a paper by Mr. Baker based on his 2009 Terzaghi Lecture.

Geotechnical engineers, structural engineers, foundation specialists, academics, researchers, geotechnologists, construction engineers, superintendents, and inspectors will find something interesting and beneficial in this book.

(ASCE, 2010)

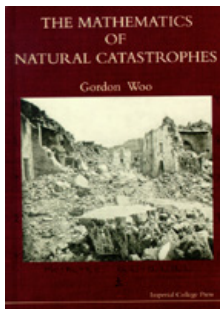


GeoFlorida 2010: Advances in Analysis, Modeling & Design (GSP 199)

D. O. Fratta, B. Muhunthan & A. J. Puppala (Editors)

This Geotechnical Special Publication contains technical papers pre-sented at Geo Florida 2010, Advances in Analysis, Modeling, and Design, in Orlando, Florida, February 20-24. These papers represent the most current thinking on key issues such as: geotechnical modeling, microbehavior of soils and granular media, soil and geotechnical system characterization, foundation engineering design problems, reliability problems in geotechnical engineering, geotechnical engineering construction problems, pavement systems, geoenvironmental engineering problems, geoenvironmental engineering problems, geohazard mitigation problems, and geotechnical engineering education. This proceedings will be valuable to all engineers and professionals involved with geotechnical engineering.

(ASCE, 2010)



THE MATHEMATICS OF NATURAL CATASTROPHES

Gordon Woo

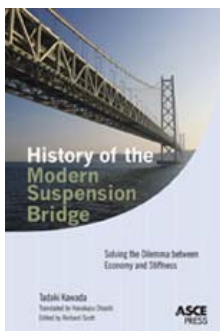
This is a unique book about natural catastrophes, focusing on the mathematical aspects of these phenomena. Although academic in style and didactic in purpose, it is practical in the treatment of the diverse issues covered, which range from hazard warning and forecasting to engineering design criteria and insurance loss estimation. Addressing as it does many mathematical topics not found together in a single volume, the book should be of value to all those with a quantitative educational interest in or professional concern for natural catastrophes.

Contents:

- A Taxonomy of Natural Hazards
- A Sense of Scale
- A Measure of Uncertainty
- A Matter of Time
- Forecasting
- Deciding to Warn
- A Question of Design
- Damage Estimation
- Catastrophe Cover
- Financial Issues
- The Third Millennium

Readership: Earth and atmospheric scientists, civil engineers, geographers, economists and applied mathematicians.

(World Scientific)



History of the Modern Suspension Bridge: Solving the Dilemma between Economy and Stiffness

T. Kawada, H. Ohashi and R. Scott

"When he was thinking about how to build a bridge across the River Tweed, Sir Samuel Brown stopped while observing a spider's web. Right at this time he discovered the suspension bridge." — Charles Bender, 1868.

The English translation of Tadaki Kawada's landmark book traces the modern suspension bridge from its earliest appearance in Western civilization only 200 years ago to the enormous Akashi Kaikyo and Storebælt bridges completed at the end of the twentieth century. *History of the Modern Suspension Bridge: Solving the Dilemma between Economy and Stiffness* examines the conflicts, the bridge collapses, the colorful personalities, and the advancements that have shaped the development of the suspension bridge.

From John Roebling and the Brooklyn Bridge to the legendary rivalry between Othmar Ammann and David Steinman, from the Tacoma Narrows Bridge collapse in 1940, which Kawada explores in depth, to the closing of London's Millennium Bridge just three days after its opening, this book is a complete history of the modern suspension bridge — with a focus on the two essential factors in suspension bridge design, economy and stiffness, which are always in competition with one another. How do engineers reinforce the suspension bridge against the elements of wind and traffic, without sacrificing economy?

History of the Modern Suspension Bridge: Solving the Dilemma between Economy and Stiffness will appeal to anyone interested in engineering history and suspension bridges. Practicing engineers will find the charts, tables, and design formulas especially valuable.

(ASCE Press, 2010)

ΠΑΛΑΙΟ ΑΛΛΑ ΕΛΛΗΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ



A CRITICAL REVIEW OF VAN

Earthquake Prediction from Seismic Electrical Signals

Sir James Lighthill (Editor)

The acronym VAN refers to Drs Varotsos, Alexopoulos and Nomicos, members of a group based in the University of Athens and led by Professor Varotsos (head of the Physics Department) which for over a decade has sought to use electric-field measurements between electrodes buried in the earth to predict earthquakes in Greece over periods of order one month or less. But is such "short-term" prediction achievable by the VAN approach (or by any other)? This book is an objective collection of the arguments for — and the counterarguments against — that approach, intended to help scientific readers arrive at their own answers to this important question, as well as to others (including that of VAN's "export" potential).

Contents:

- **What is VAN?:**
 - Introduction to the VAN Method of Earthquake Prediction (*S Uyeda*)
 - Short Term Earthquake Prediction in Greece by Seismic Electrical Signals (*P Varotsos et al.*)
 - The Telemetric System of VAN Group (*K Nomicos*)
- **Possible SES Mechanisms:**
 - Physical Mechanisms for Generation and Propagation of Seismic Electrical Signals (*D Lazarus*)
 - Laboratory Investigation of the Electrical Signals Preceding Earthquakes (*V Hadjicontis & C Mavromatou*)
 - On Electrotelluric Signals (*P Bernard & J L LeMouél*)
- **Counterarguments Against the VAN Approach:**
 - VAN: A Critical Evaluation (*R J Geller*)
 - Foreshocks Preceding VAN Signals (SES) (*K Sudo*)
 - Brief Summary of Some Reasons Why the VAN Hypothesis for Predicting Earthquakes has to be Rejected (*M Wyss*)
- **Arguments in Favour of the VAN Approach:**
 - Some Observations about the Statistical Significance and Physical Mechanisms of the VAN Method of Earthquake Prediction, Greece (*S K Park et al.*)

- Re-Examination of Statistical Evaluation of the SES Prediction in Greece (*K Hamada*)
- Anomalous Changes in Geoelectric Potential Preceding Four Earthquakes in Japan (*T Nagao et al.*)
- **Some Related Experimental Programmes:**
 - Behaviour of the Electric Potential During the Activity of Aftershocks of the M7.2 Earthquake, Japan (*Y Honkura et al.*)
 - Implementation of VAN Technique in Guatemala (*O Kulhánek*)
- **Reactions to the Review Meeting:**
 - A Seismologist's View of VAN (*H Kanamori*)
 - Some Personal Conclusions from the Meeting (*C W A Browitt*)
 - A Brief Look Back at the Review Meeting's Proceedings (*J Lighthill*)
 - Non-Seismological Fields in Earthquake Prediction Research (*V I Keilis-Borok*)
 - and other papers by distinguished authors

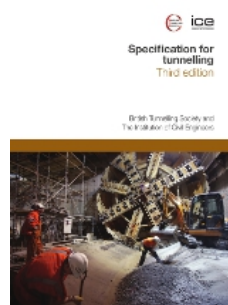
(World Scientific, 1996)

The second section of the book covers the largely empirical control of fracture from ancient times to the end of the nineteenth century. The final section reviews the development of fracture theory as a discipline and its application during the twentieth century through to the present time.

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(World Scientific, March 2010)



Specification for Tunnelling, 3rd edition

The British Tunnelling Society

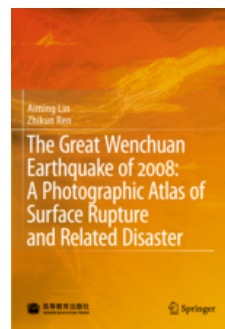
The BTS Specification for Tunnelling has become the standard industry document for tunnelling contracts, and forms the basis of tunnelling

specifications for projects throughout the world.

The specification has been revised in this third edition to reflect current industry best practice and to take account of the many advances in the field of tunnelling which have occurred over the last decade. Coverage of sprayed concrete has been expanded in recognition of its increased usage around the world and there are new sections on sprayed applied waterproof membranes and jacked box tunnelling. All references to codes, standards and other design documents have been comprehensively updated.

Drafted by an expert editorial committee with more than 250 years experience in the tunnelling industry between them, *Specification for Tunnelling, 3rd edition* will continue to be the de facto standard reference work for tunnelling in the UK and rest of the world.

(Thomas Telford Ltd, 12.03.2010)

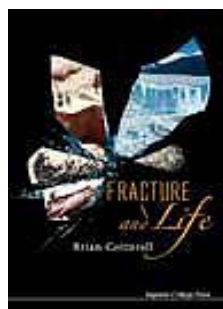


The Great Wenchuan Earthquake of 2008: A Photographic Atlas of Surface Rupture and Related Disaster

Lin, Aiming, Ren, Zhikun

"The Great Wenchuan Earthquake of 2008: A Photographic Atlas of Surface Rupture and Related Disaster" focuses on the main deformation characteristics of co-seismic surface rupture, including rupture length and slip distribution of co-seismic surface rupture caused by the Wenchuan Earthquake and its associated relief operation. The magnitude M_s 8.0 (M_w 7.9) Wenchuan Earthquake occurred on 12 May 2008 in the Longmen Shan region of China, the topographical boundary between the Tibetan Plateau and the Sichuan Basin, resulting in extensive damage throughout central and western China. This atlas contains distinct photographs obtained during the field investigation carried out immediately 2 days after the quake. The atlas is designed for geologists, seismologists and architecture engineers engaged in seismic mechanisms and surface rupture deformation characteristics of large intracontinental earthquakes.

(Springer / Higher Education Press, 2010)



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This book is an interdisciplinary review of the effect of fracture on life, following the development of the understanding of fracture written from a hi-

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Advances in Environmental Geotechnics

Proceedings of the International Symposium on Geoenvironmental Engineering in Hangzhou, China, September 8-10, 2009

Chen, Yunmin; Tang, Xiaowu; Zhan, Liangtong (Eds.)

"Advances in Environmental Geotechnics" presents the latest developments in this interdisciplinary field. The topics covered include basic and advanced theories for modeling of geoenvironmental phenomena, testing and monitoring for geoenvironmental engineering, municipal solid wastes and landfill engineering, sludge and dredged soils, geotechnical reuse of industrial wastes, contaminated land and remediation technology, applications of geosynthetics in geoenvironmental engineering, geoenvironmental risk assessment, management and sustainability, ecological techniques and case histories. This proceedings includes papers authored by core members of ISSMGE TC5 (International Society of Soil Mechanics and Geotechnical Engineering-Environmental Geotechnics) and geoenvironmental researchers from more than 20 countries and regions. It is a valuable reference for geoenvironmental and geotechnical engineers as well as civil engineers.

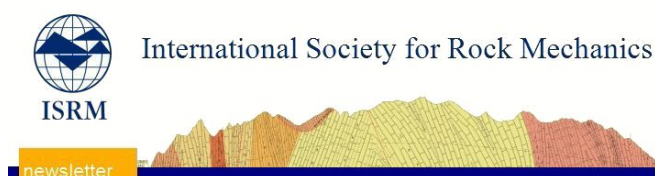
(Springer / Higher Education Press, 2010)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



www.issmge.org

Κυκλοφόρησε το Bulletin Vol. 4, Issue 1, March 2010 της International Society for Soil Mechanics and Geotechnical Engineering.



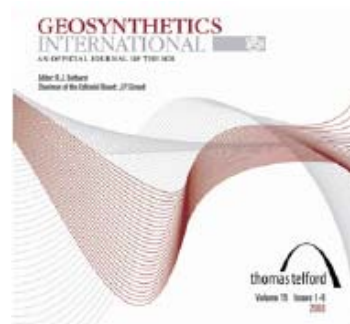
www.isrm.net/adm/newsletter

Κυκλοφόρησε το Τεύχος Νο. 9 - Μάρτιος 2010 Newsletter της International Society for Rock Mechanics.



www.geosyntheticssociety.org

Κυκλοφόρησε το Τεύχος Νο. 1, του Τόμου 26 του Newsletter της International Geosynthetic Society (Μάρτιος 2010).



Geosynthetics International

www.thomastelford.com/journals

Κυκλοφόρησε το τεύχος αρ. 1 του 17^{ου} τόμου (Φεβρουάριος 2010) του περιοδικού Geosynthetics International. Πρόσβαση μέσω της ιστοσελίδας www.icevirtuallibrary.com/content/issue/gein.



Geotextiles & Geomembranes

www.geosyntheticssociety.org/journals.htm

Κυκλοφόρησαν τα τεύχη αρ. 1 και 2 του 28^{ου} τόμου (Φεβρουάριος και Απρίλιος 2010) του περιοδικού Geotextiles & Geomembranes. Πρόσβαση μέσω της ιστοσελίδας www.sciencedirect.com/geotexmem/journal.



www.geoengineer.org

Κυκλοφόρησαν τα Τεύχη #63 και #64 του Newsletter του Geoengineer.org (Μάρτιος και Απρίλιος 2010) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωτεχνικής μηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).



**INTERNATIONAL TUNNELLING AND
UNDERGROUND SPACE ASSOCIATION**

ita@news n°33

www.ita-aites.org/cms/index.php?id=489

Κυκλοφόρησε το Τεύχος Νο. 33 – Απρίλιος 2010 των ita@news της International Tunnelling Association.



http://foundation.itacet.org/Newsletter/02_2010/newsletter_2_2010.php

Κυκλοφόρησε το Τεύχος Νο. 2 του Newsletter του ITACET Foundation.

ΕΕΕΕΓΜ

Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
Πολυτεχνειούπολη Ζωγράφου
15780 ΖΩΓΡΑΦΟΥ

Τηλ. 210.7723434
Τοτ. 210.7723428
Ηλ-Δι. secretariat@hssmge.gr ,
geotech@central.ntua.gr
Ιστοσελίδα www.hssmge.org (υπό κατασκευή)

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» Εκδότης: Χρήστος Τσατσάνιφος, τηλ. 210.6929484, τοτ. 210.6928137, ηλ-δι. pangaea@otenet.gr

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» «αναρτώνται» και στην ιστοσελίδα www.hssmge.gr