Αιθιοπία: Φυσική πηγή Dallol

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

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Αρ. 48 – ΑΥΓΟΥΣΤΟΣ 2012

22EYGEC2012

22th European Young Geotechnical Engineers Conference
August 26th to 29th, 2012, Gothenburg, Sweden

Το 22ο Ευρωπαϊκό Συνέδριο Νέων Γεωτεχνικών Μηχανικών (22EYGEC) διεξήχθη από τις 26 έως τις 29 Αυγούστου στο Gothenburg της Σουηδίας και η ΕΕΕΕΓΜ εκπροσωπήθηκε από τους συναδέλφους Αθανάσιο Ζαφειράκο και Αλέξανδρο Καλό. Το 2013 θα διεξαχθή το 5ο International Young Geotechnical Engineers Conference στα πλαίσια του 18ου International Conference on Soil Mechanics and Geotechnical Engineering στο Παρίσι τον Σεπτέμβριο. Σχετική ανακοίνωση - πρόσκληση υποβολής περιλήψεων για την επιλογή των εκπροσώπων της ΕΕΕΕΓΜ δημοσιεύθηκε στο Τεύχος Αρ. 44, Απριλίου 2012 των ΝΕΩΝ ΤΗΣ ΕΕΕΕΓΜ.

Στη συνέχεια παραθέτουμε την έκθεση των εκπροσώπων της ΕΕΕΕΓΜ στο συνέδριο της Σουηδίας.

Το 22ο Ευρωπαϊκό Συνέδριο Νέων Γεωτεχνικών Μηχανικών (22EYGEC) πραγματοποιήθηκε από τις 26 έως τις 29 Αυγούστου στο Gothenburg της Σουηδίας. Το 22EYGEC διοργανώθηκε από τη Διεθνή Ένωση Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ISSMGE) και την τοπική επιτροπή της για την Σουηδία (Swedish Geotechnical Society). Έλαβε χώρα στην Σχολή Πολιτικών Μηχανικών του Chalmers University of Technology.

Στο συνέδριο έλαβαν μέρος 50 νέοι γεωτεχνικοί μηχανικοί ηλικίας έως 35 ετών, προερχόμενοι από 26 Ευρωπαϊκά κράτη. Την Ελλάδα εκπροσώπησαν οι : Αθανάσιος Ζαφειράκος από

(συνέχεια στην Σελ. 2)

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

(συνέχεια από την σελ. 1)

το ΕΜΠ, που παρουσίασε την εργασία 'Seismic performance of caisson supported structures' και Αλέξανδρος Καλός από το ΕΜΠ, που παρουσίασε την εργασία 'Investigation of long-term creep deformations on soil strength'.

Τις εργασίες του συνεδρίου άνοιξε ο κ. Ivan Vaníček, αντιπρόεδρος της ISSMGE για την Ευρώπη, με την ομιλία 'Risk associated with geotechnical structures and Eurocode 7'. Οι προσκεκλημένοι ομιλητές από το χώρο της ακαδημίας ήταν ο κ. Stefan Larsson, καθηγητής του Royal Institute of Technology (KTH) ('Reliability analysis and design issues of ground improvement by deep mixing'), και η κα. Minna Karstunen, καθηγήτρια στο Chalmers University of Technology ('Modelling the behaviour of soft soil').

Οι εργασίες που παρουσιάσθηκαν ομαδοποιήθηκαν σε οχτώ συνεδρίες που ακολούθησαν τις εξής γενικές θεματικές ενότητες: 'Site investigations and laboratory testing' (7 εργασίες), 'Shallow and deep foundations' (6 εργασίες), 'Deep excavations and retaining structures' (6 εργασίες), 'Tunneling and underground structures' (6 εργασίες), 'Design parameters and modelling' (8 εργασίες), 'Infrastructure projects' (5 εργασίες), 'Ground improvement' (6 εργασίες) και 'Slope stability and landslides' (6 εργασίες). Τα πρακτικά του συνεδρίου συντάχθηκαν από τις Victoria Svahn και Tara Wood και διανεμήθηκαν στους συνέδρους με τη μορφή βιβλίου υπό τον τίτλο 'EYGEC 2012 - setting the scene for future European geotechnical research' (ISBN: 978-91-637-1435-1).

Πέραν των συνεδριών έγινε επίσης ξενάγηση στον χώρο του Πανεπιστημίου Chalmers αλλά και περιήγηση στην πόλη του Gothenburg. Το συνέδριο έκλεισε με επίσκεψη σε εργοτάξιο κατασκευής σιδηροδρομικής σήραγγας στο Hallandsas, 180 km νοτίως του Gothenburg.

Αθανάσιος Ζαφειράκος και Αλέξανδρος Καλός

ΑΡΘΡΟ

Στις 8 Αυγούστου 2012 δημοσιεύθηκε στις ελληνικές εφημερίδες η παρακάτω ανταπόκριση του Αθηναϊκού και Μακεδονικού Πρακτορείου Ειδήσεων για την πιθανή σχέση, βάσει της θεωρίας «ντόμινο», μεταξύ των μεγάλων καταστροφικών σεισμών που συνέβησαν στη γη τα τελευταία χρόνια.

Δεν ισχύει η σεισμική θεωρία του ντόμινο Οι μεγάλοι σεισμοί του πλανήτη δεν συνδέονται μεταξύ τους με τη θεωρία του «ντόμινο»

Κατά τα τελευταία χρόνια έχει καταγραφεί στη Γη μία σειρά πολύ μεγάλων και καταστροφικών σεισμών (Σουμάτρα 2004, Αϊτή 2010, Χιλή 2010, Ιαπωνία 2011), που αποδόθηκαν από μερικούς επιστήμονες σε πιθανή «επικοινωνία» μεταξύ τους, παρά τις μεγάλες αποστάσεις, με βάση τη «θεωρία του ντόμινο». Όμως μία νέα αμερικανική επιστημονική έρευνα έρχεται να καταρρίψει αυτή τη θεωρία περί πυροδότησης διαδοχικών απομακρυσμένων μεγάλων σεισμών, καταλήγοντας -όπως και άλλες σχετικές μελέτες στο παρελθόν- στο συμπέρασμα ότι τα καταστροφικά γεωλογικά συμβάντα είναι τυχαία και δεν είναι δυνατό να αλληλοεπηρεαστούν σε τόσο μεγάλες αποστάσεις.

Οι σεισμολόγοι Τομ Πάρσονς και Έρικ Γκάιστ της Αμερικανικής Γεωλογικής Υπηρεσίας, που έκαναν τη σχετική δημοσίευση στο περιοδικό της Αμερικανικής Σεισμολογικής Εταιρίας, μελέτησαν δύο ομάδες μεγάλων σεισμών: την πιο προσφατη που έλαβε χώρα μετά το 2004 και άλλη μία στη δεκαετία του ΄60, όταν πάλι είχαν τύχει να συμβούν πολλοί ισχυροί διαδοχικοί σεισμοί σε διάφορα σημεία του πλανήτη.

Για να δουν αν ήταν τυχαία ή όχι η συσσώρευση τόσων σεισμών στη δεκαετία του ΄60, καθώς και κατά τα τελευταία χρόνια, οι δύο γεωλόγοι κατέγραψαν τη χρονική απόσταση που έχει μεσολαβήσει ανάμεσα στους μεγαλύτερους σεισμούς (ισχύος άνω των 8,3 Ρίχτερ) κατά τα τελευταία 100 χρόνια και τη συνέκριναν με μία προσομοιωμένη χρονική σειρά τυχαίων σεισμών. Τελικά κατέληξαν στο συμπέρασμα ότι οι μεγάλοι σεισμοί λαμβάνουν χώρα με τυχαίο χρονισμό και δεν φαίνεται καθόλου να αλληλοσυσχετίζονται.

Και πώς γίνεται τόσοι πολλοί ισχυροί σεισμοί να είναι τυχαίοι, αφού κατά καιρούς συμπίπτουν χρονικά; «Ναι, φαίνεται παράξενο, όμως δεν είναι κάτι που δεν θα περίμενε κανείς από μία τυχαία διαδικασία, στην οποία το φαινόμενο της ομαδοποίησης (συγκέντρωσης) είναι απολύτως τυπικό. Αν π.χ. κανείς παίξει κορώνα-γράμματα πολλές φορές, το αποτέλεσμα δεν είναι μία ομαλή εναλλαγή ανάμεσα στις κορώνες και τα γράμματα, αλλά μπορούν να εμφανιστούν στη σειρά πολλές κορώνες ή πολλά γράμματα», δήλωσε ο Πάρσονς. Αυτό, όπως αναφέρουν, έχει και μία επικίνδυνη όψη: ότι ο κίνδυνος που απειλεί την ανθρωπότητα από μεγασεισμούς είναι στατιστικά ίδιος οποιαδήποτε στιγμή, αφού η πιθανότητα να συμβεί ένας επόμενος καταστροφικός σεισμός δεν εξαρτάται από το αν πρόσφατα συνέβη ένας εξίσου ισχυρός σεισμός σε κάποιο άλλο μέρος της Γης.

Από την άλλη, κατά τους Αμερικανούς γεωλόγους, η πιο αισιόδοξη όψη της μελέτης τους είναι ότι αφού οι μεγασεισμοί είναι τυχαίοι και ήδη έχουν γίνει αρκετοί από αυτούς κατά τα τελευταία χρόνια σε κοντινά χρονικά διαστήματα, είναι σχετικά μικρότερη η πιθανότητα να επαναληφθεί κάποια τέτοια παρόμοια συσσώρευση καταστροφών στο άμεσο μέλλον. Πάντως, προηγούμενες έρευνες έχουν δείξει ότι οι μεγάλοι σεισμοί όντως φαίνεται να έχουν κάποια επίπτωση σε μεγαλύτερες αποστάσεις, αλλά χωρίς να αποκτούν μεγάλη ισχύ. «Μετά από μεγάλους σεισμούς, βλέπουμε πολλούς μικρο-σεισμούς σε όλο τον πλανήτη, οι οποίοι όμως για κάποιο λόγο δεν φαίνεται να εξελίσσονται σε μέγα-σεισμούς», όπως είπε ο Πάρσονς.

Η διαπίστωση περί τυχαίου χαρακτήρα των σεισμών, εξάλλου, δυσκολεύει την πρόβλεψή τους, αφού μερικοί ερευνητές έλπιζαν ότι η τυχόν παγκόσμια «επικοινωνία» των μεγασεισμών θα διευκόλυνε την πρόβλεψη ενός επόμενου ανάλογου συμβάντος. Πάντως οι επιστήμονες διαφωνούν ακόμα, σε ποιό βαθμό είναι δυνατή η πρόβλεψη των μελλοντικών σεισμών. Μερικοί επιμένουν ότι το εν λόγω γεωλογικό φαινόμενο, τελικά, είναι χαοτικό και η πρόβλεψή του είναι αδύνατη, ενώ άλλοι δεν έχουν σταματήσει να ερευνούν νέους τρόπους, πιο αποτελεσματικής πρόβλεψης των σεισμών.

Πηγή: ΑΜΠΕ
Η ΚΑΘΗΜΕΡΙΝΗ, Τετάρτη 8 Αυγούστου 2012,
http://portal.kathimerini.gr/4dcgi/_w_articles_kathciv_1_06/08/2012_455634

Επικοινωνήσαμε με τον εκ των συγγραφέων Tom Parsons, ο οποίος είχε την καλωσύνη να μας στείλη το άρθρο τους, που δημοσιεύθηκε στο Bulletin of the Seismological Society of America, Vol. 102, No. 4, pp. 1583–1592, August 2012, doi: 10.1785/0120110282, και να επιτρέψη την επανδημοσίευσή του στα ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ.

Were Global M ≥8:3 Earthquake Time Intervals Random between 1900 and 2011?

Tom Parsons and Eric L. Geist

Abstract

The pattern of great earthquakes during the past ~100 yr raises questions whether large earthquake occur-rence is linked across global distances, or whether temporal clustering can be attributed to random chance. Great-earthquake frequency during the past decade in particular has engendered media speculation of heightened global hazard. We therefore examine interevent distributions of Earth's largest earthquakes at one-year resolution, and calculate how compatible they are with a random-in-time Poisson process.We show, using synthetic catalogs, that the probability of any specific global interevent distribution hap-pening is low, and that short-term clusters are the least repeatable features of a Poisson process. We examine the real catalog and find, just as expected from synthetic cata-logs, that the least probable M ≥8:3 earthquake intervals during the past 111 yr were the shortest (t < 1 yr) if a Poisson process is active (mean rate of 3.2%). When we study an M ≥8:3 catalog with locally triggered events re-moved, we find a higher mean rate of 9.5% for 0–1 yr in-tervals, comparable to the value (11.1%) obtained for simulated catalogs drawn from random-in-time exponential distributions. We emphasize short interevent times here because they are the most obvious and have led to specu-lation about physical links among global earthquakes. We also find that comparison of the whole 111-yr observed M ≥8:3 interevent distribution (including long quiescent peri-ods) to a Poisson process is not significantly different than the same comparison made with synthetic catalogs. We therefore find no evidence that global great-earthquake occurrence is not a random-in-time Poisson process.

Introduction

We are curious whether clusters of great earthquakes in the 1960s and 2000s that bounded an intervening period of quiescence (Fig. 1) point to a physical process (Bufe and Perkins, 2005; Pollitz et al., 1998), or whether these interevent times are consistent with a random-in-time Poisson process. A Poisson process is one in which events occur independently and with an exponential distribution of times between events. We therefore calculate the frequency that

observed earthquake intervals came from an exponential distribution of the form $p(T) = (1/\mu) \exp(-T/\mu)$ (where T is time, and μ is mean interevent time) because this function yields uniform probability (P) versus time for a given period (ΔT) as $P(T \leq \Delta T) = 1 - \exp(-\Delta T/\mu)$. Consistency with a Poisson process means that the global large-earthquake hazard is constant in time and, outside of local aftershock zones (Parsons and Velasco, 2011), not related to past events. Inconsistency at high confidence could be interpreted to imply a global seismic cycle, as Bufe and Perkins (2005) did.

The possibility that earthquakes communicate across global distances could revolutionize our concept of timedependent worldwide hazard, but past study has yielded differing answers (Bufe and Perkins, 2005; Geist and Parsons, 2011; Michael, 2011; Shearer and Stark, 2012). In this paper, we focus on finding out how often the observed frequency of interevent times, discretized into one-year bins, could have occurred randomly. We examine these features closely because short-term clusters of high global activity get noticed by seismologists, the public, and the press (e.g., Barcott, 2011; Winchester, 2011), with all parties concerned about the possible heightened worldwide earthquake hazard.

M ≥8:3 Earthquakes between 1900 and 2011

We extract M ≥8:3 events from the 1900–1999 Centennial catalog (Engdahl and Villaseñor, 2002; Fig. 2), augmented for the period 2000–2011 with the Advanced National Seismic System (ANSS) and Global Seismograph Network (GSN) catalog (Table 1). The M ≥8:3 level is well above the completeness threshold, and moment magnitudes have been calculated and compiled by Engdahl and Villaseñor (2002). Our lower magnitude of interest is arbitrarily chosen to some extent, but there are reasons why M ≥8:3 turns out to be a good number both for catalog completeness and for identifying triggered events. Magnitude completeness is a very serious issue when assessing interevent time distributions, as we do in this paper. Even one missing event could completely alter the conclusions, particularly when it comes to studying long periods of quiescence (as can be seen in Fig. 1).

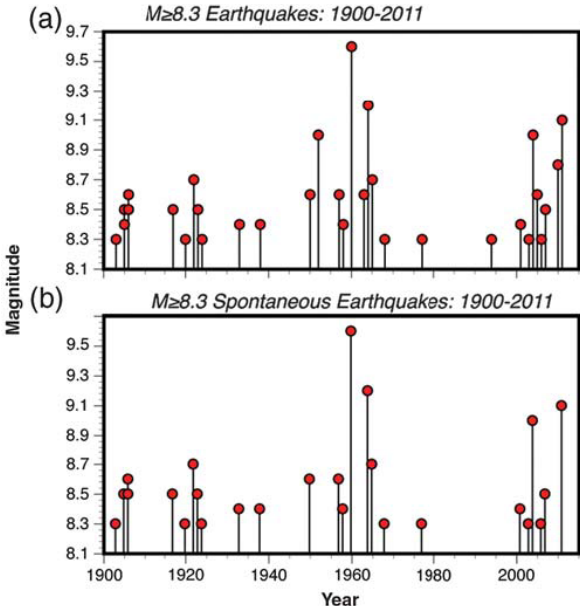

Figure 1. Graphical representation of the M ≥8:3 earthquake catalog we use in this study (Engdahl and Villaseñor, 2002) augmented for the period 2000–2011 with the ANSS catalog. All event sizes are given as moment magnitudes. Clusters of events interspersed with quiescent periods are evident. (a) All catalog events are shown. (b) A catalog with likely aftershocks/triggered earthquakes removed is shown.

An important component to this study is identifying likely triggered earthquakes that have occurred through identified physical processes. This becomes increasingly difficult to do with lower magnitude thresholds and requires the use of declustering algorithms, which bring their own sources of significant uncertainty. With the M ≥8:3 cutoff, we have the ability to assess each earthquake individually and can cite past studies where the interaction physics have been modeled. We identify likely nonspontaneous M ≥8:3 events (Fig. 2) as those that have been directly associated with stress-change models (Chery et al., 2001; Nalbant et al., 2005; Stein et al., 2010), or that fit empirical observations of aftershock characteristics in time and space (Parsons, 2002; Ruppert et al., 2007). Where there is specific information about a possible M ≥8:3 aftershock that is inconsistent with a known physical process, we do not remove it from the catalog, as in the case of the 2007 M ≥8:6 Sunda earthquake (Wiseman and Bürgmann, 2011).

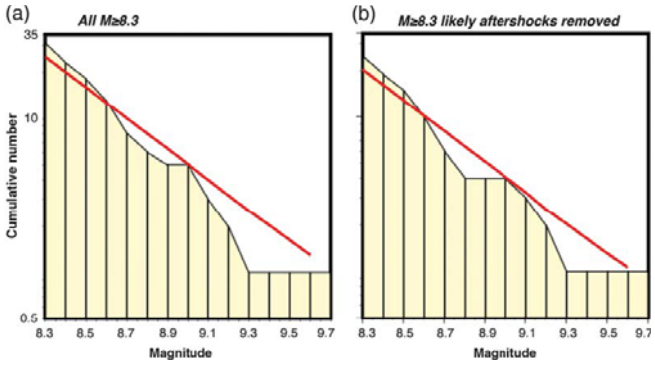

Figure 2. (a) The magnitude-frequency distribution of all catalog events (columns). (b) The magnitude-frequency distribution of a catalog with likely aftershocks/triggered earthquakes removed. The red lines are b-value = 1 slopes for reference.

Fit of the Raw Catalog to Time-Dependent and Time-Independent Distributions

Simple statistical analyses can be performed on the catalog to determine whether it is consistent with a timedependent process, a Poisson process, and/or with a clustertype model. In particular, the distribution of interevent times can be compared to a lognormal distribution, an exponential distribution in the case of a Poisson process, or a gamma distribution that better accounts for aftershocks and triggered events (Corral, 2004; Hainzl et al., 2006). We compare the empirical density function for M ≥8:3 interevent times with the best-fit lognormal, exponential, and gamma distributions using maximum likelihood estimation (Fig. 3).

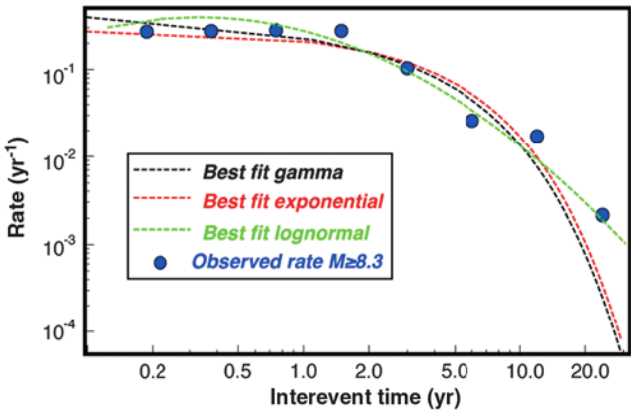

Figure 3. Density distribution of interevent times (years) for the M ≥8:3 earthquake catalog. The dots show the empirical density function using exponential binning (Corral, 2004). The red dashed line shows the best-fit (using maximum likelihood estimation) exponential distribution, the black dashed line shows the best-fit gamma distribution, and the green dashed line shows the best-fit lognormal distribution.

Because the distributions are similar, and because the lognormal and gamma distributions include an additional shape parameter, the Akaike information criterion (AIC) is lowest for the exponential distribution (138.6), increases to 140.2 for the gamma distribution, and is highest for the lognormal (141.6). The significance of the AIC difference between lognormal and the other distributions is difficult to judge, because they are not from the same family. However, if the AIC is used as a goodness-of-fit measure (e.g., Ogata, 1998), then the exponential distribution is the preferred statistical model for the interevent distribution of M ≥8:3 events.

A Kolmogoroff–Smirnoff (K–S) test on global large earthquake interevent times for different magnitude cutoffs was performed on a declustered catalog by Michael (2011), who found that the exponential distribution cannot be rejected for large magnitude cutoffs (M ≥7:5, 8.5, 9) at 95% confidence. We repeat these K–S calculations for the three distributions shown in Figure 3 and find that the null hypothesis of the data being distributed according to each of the three distributions cannot be rejected at the 5% significance level. Therefore the raw data are not sufficient to prove any of the common earthquake recurrence distribution families. This generalized approach shows that the overall interevent distribution can be fit in a number of ways but does not give us insight into how unusual specific features of greatearthquake clusters and gaps are relative to the possibility that they have happened by random chance. Further, we have not yet accounted for magnitude uncertainty.

Magnitude Uncertainty

Assembling post-1900 earthquake catalogs requires us to address uncertainties about earthquake size. Actual magnitudes might be higher or lower than the catalog values, and because a magnitude cutoff has to be applied in any analysis, interevent times will be affected. Magnitude is expressed on a logarithmic scale, meaning that a uniform plus or minus error estimate in magnitude units would systematically bias the implied moment (energy) upward. We instead convert reported catalog magnitudes to linear moment, apply Gaussian uncertainties centered on reported values, and then convert those distributions back to magnitudes (Fig. 4).

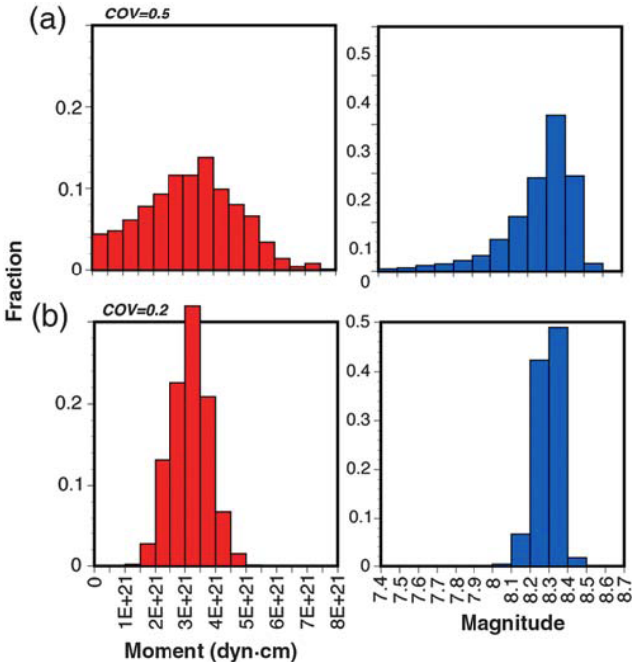

Figure 4. Magnitude uncertainty is addressed by applying a Gaussian distribution to the moment estimates (red columns) of each catalog earthquake. In these examples, the mean moment is derived from an M 8.3 earthquake. The resulting logarithmic magnitude uncertainty distributions are shown as blue columns. We apply in (a) a 0.5 COV to moment of pre 1950 events and in (b) a 0.2 COV to post 1950 earthquakes.

We use moment uncertainty distributions with coefficient of variation (COV, standard deviation divided by the mean) of 0.5 for earthquakes before 1950 and a COV of 0.2 for those after, which matches given magnitude uncertainty limits (Engdahl and Villaseñor, 2002) with logarithmic weighting. We draw 100 catalogs at random from possible magnitudes (Fig. 4) for cutoff thresholds between M ≥8:3 and M ≥8:7 and calculate interevent times for each draw, yielding a range of possible observed intervals for each one-year bin (the mean values from this exercise are shown in Fig. 5).

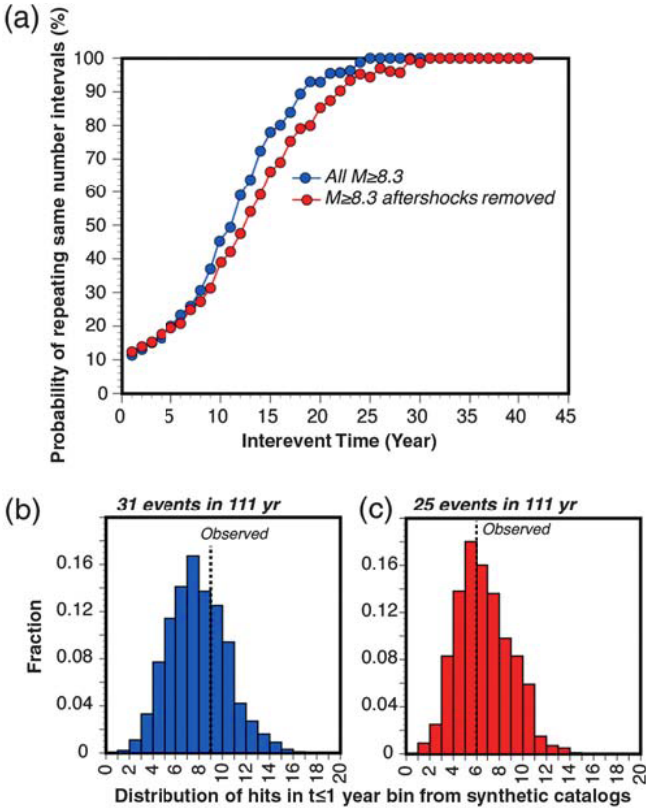

Figure 5. (a) The probability of the same number of intervals occurring in a 111 yr period if earthquakes occur randomly through a Poisson process as determined from 1000 synthetic catalogs drawn at random from exponential distributions. The blue curve shows values for allM ≥8:3 events (31 in 111 yr), and the red curve shows the same information but intended to simulate the catalog with likely triggered earthquakes removed (25 events in 111 yr). The 0–1-yr interevent bin has the lowest probability of repeating at 11%. (b) A histogram showing the distribution of the number of events (ranges from 1 to 15) happening at 0–1-yr intervals for 31 events in 111 yr from synthetic catalogs. (c) The same information as in (b) except for a simulation of the catalog with aftershocks removed.

Probability of a Given Number of Interevent Intervals in One-Year Bins Determined from Synthetic Catalogs

The global pattern of large earthquakes has long periods of quiescence interspersed with short-term clusters of events that are calculated to be unlikely outcomes from a Poisson process by Bufe and Perkins (2005). This is true, though any specific outcome is unlikely if earthquake occurrence is random. We show this by conducting a simple experiment; we create 1000 synthetic earthquake catalogs by drawing sets of 31 events at random from an exponential distribution of intervals (mean rate parameter found by dividing 31 events by 111 yr). We see no two interevent distributions out of 1000 that are exactly alike when the synthetic catalogs are discretized in one-year bins.

To get to the issue of specific observed features, we can narrow the focus to a particular attribute of the synthetic catalogs, for example the 0–1 yr interevent period, and count how many times a given number of intervals is seen in that bin (values from synthetic catalogs span a range from 1 to 15) (Fig. 5b, c). This just amounts to comparing each synthetic catalog of intervals to all the others. The average frequency that any number of intervals falls into the 0–1 yr bin is 11.1% of the 1000 synthetic catalogs, where any number refers to repeats of values from the entire 1-to-15 range. The percentage of synthetic catalogs that repeat the number of intervals in a given one-year bin can be thought of as the probability of a particular clustering behavior that might arise if 31 earthquakes occurred at random over a 111-yr period (or 25 in 111 yr if a catalog with aftershocks removed is considered). Generally, the probability of seeing a particular number of intervals increases with longer interevent times because most of them are zero in the synthetic catalogs (Fig. 5a). Further, the exponential distribution has the most weight at small values, therefore its histogram has more possible integer values in the short time bins, making them less likely to be repeated.

The results of this numerical experiment are useful because they provide a context to consider when we compare the observed record of M ≥8:3 earthquakes over the past 111 yr to synthetic catalogs. For example, if we think the number of great earthquakes that has happened closely spaced in time (say, less than one year apart) is anomalous, we might take note that any number of events that have happened less than one year apart is unusual under a Poisson process. If great earthquakes are independent of one another, we would expect any given 111-yr period to display shortterm (t ≤ 1 yr) earthquake clustering that has only about an 11% chance of occurring.

Matching Observed Features in the Global Interevent Distribution to Exponential (Random-in-Time) Distributions

The exercise shown in Figure 3, and those conducted by Michael (2011), imply that the observed record of great earthquakes is insufficiently persuasive to rule out representative functions of the interevent distribution families thought to underlie earthquake occurrence. However, we remain curious about how unusual specific features of the past 111 yr of M ≥8:3 earthquakes are, particularly short-term clusters like the period from 2000 to 2011. So, to address public concerns about apparent large earthquake clustering (e.g., Barcott, 2011; Winchester, 2011), we attempt to replicate these features—observation and nonobservation of interevent times at one-year resolution—of the global interevent distribution with synthetic catalogs generated through a Poisson process, while assessing the impact of magnitude uncertainty.

We focus on the exponential distribution because it can represent a null hypothesis of independent earthquake timing when event intervals are drawn from it at random (we test the observed catalog for independence in a later section).We calculate the rates that observed intervals within one-year bins match a Poisson process by comparing with 1000 interevent distributions from synthetic catalogs made randomly from exponential distributions (Fig. 6). The idea is that, because a 111-yr period is relatively short compared with recurrence intervals of great earthquakes, we can examine many synthetic catalogs to look for patterns that replicate observations and gain some insight as to how common observed features are, such as temporal earthquake clustering. This is similar to the general experiment described previously, but now we compare directly to observed values. Multiple synthetic catalogs give us a way to assess the impact of the small sampling.

Construction of Synthetic Catalogs and Method of Comparison with Observations

A group of 1000 synthetic catalogs is made for each of the 100 potentially observed catalogs. Each of the 100 catalogs is a potential observation because of magnitude uncertainty. This means that some events can drop under a given lower magnitude threshold because, in some of the 100 realizations, they can end up with too small of a magnitude to be included. Therefore each of the 100 catalogs is possibly the correct observed data, and each has an individual interevent distribution. For every lower magnitude threshold between M ≥8:3 and M ≥8:7, there are thus 100 realizations of the observed catalogs, and for each of those, we tally up how many of 1000 synthetic catalogs have the same number of intervals in one-year bins.We give the means of these results and the ranges across 95% of the calculated number of matches in Figure 6.

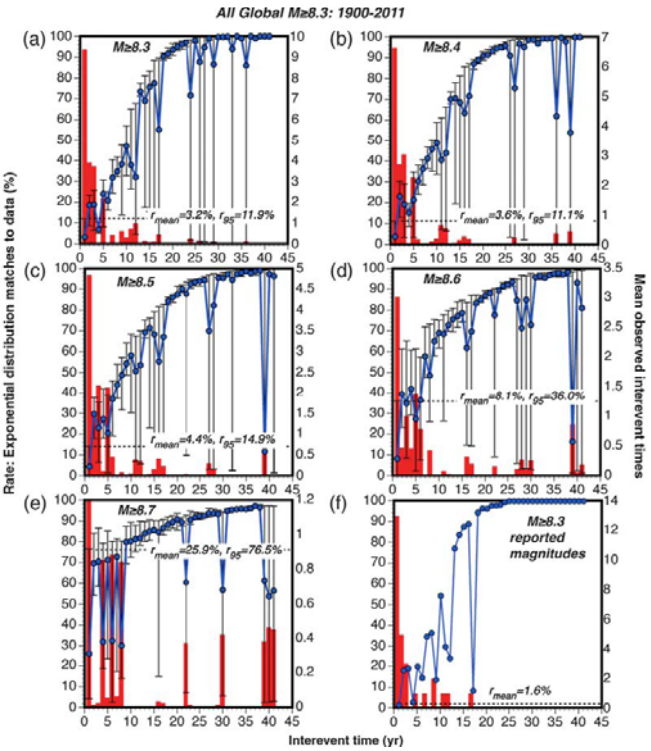

Figure 6. (a) The blue curves show calculated rates (in % of 1000 synthetic catalogs) that the number of time intervals observed between M ≥8:3 earthquakes is matched by a Poisson process (left vertical axis). The red columns show mean observed interevent distributions (right vertical axis). (b–e) The same calculations as in (a) but for higher magnitude cutoffs. The error bars give the effects of the small observed sample (found from 1000 simulations) and magnitude uncertainty (100 draws from distributions like those shown in Fig. 4). (f) The same analysis is performed assuming that reported magnitudes are exactly correct. As expected (Fig. 5), the lowest rates are found for the shortest intervals (<1 yr) in all cases (values are shown by the horizontal dashed lines).

Generation of synthetic catalogs using Monte Carlo sampling of exponential distributions accounts for the expected variability because of the small number (31) of global M ≥8:3 earthquakes (Fig. 2). We treat the period between 1900 and the first event of a given magnitude cutoff after 1900 as an additional interval, which is likely shorter than the actual duration. However, we want to include this interval because information can be conveyed by a long observed gap between 1900 and the first event above a given magnitude cutoff. There is no corresponding interval at the end of the catalog because of the 2011 M 9.0 Tohoku earthquake. Each distribution mean used to make synthetic catalogs is adjusted to equal the number of intervals for each of the 100 potentially observed catalogs (as described

previously) and can have different numbers of events because of magnitude variation. This process yields a total of 100,000 simulations for each cutoff magnitude studied (M ≥8:3 to M ≥8:7 in 0.1 magnitude units).

The error bars on Figure 6 combine the effects of sampling interevent times and magnitudes because each of 1000 draws is compared with one of 100 realizations of the possible event magnitudes. For all magnitude cutoffs we examine betweenM ≥8:3 andM ≥8:7, we note that the lowest match rate between observations and synthetic catalogs is for interevent times of <1 yr (Fig. 6), with mean values ranging from 3.2% for M ≥8:3 to 25.9% for M ≥8:7. Therefore, the feature that appears least likely when compared with a Poisson process is the occurrence of so many earthquakes (~9 on average) with short (t < 1 yr) interevent periods that are present in the global M ≥8:3 catalog (Fig. 6). However, as can be seen in Figure 5, the 0–1 yr interevent time bin has the smallest chance (~11%) of being repeated generally if a Poisson process is active.

We note the thresholds where 95% of the random draws from exponential distributions are found (error bars and r_{95} values given in Figure 6). We therefore take the high end of these ranges to be the points of maximum compatibility of a random-in-time model with the observations and the low end to be the minimum. Under these criteria, we interpret the shortest interevent times of M ≥8:3 earthquakes as having up to an 11.9% rate of matching a random process. This interpretation changes as a function of interevent time. Long quiescent periods in the global catalog (up to 36 yr for M ≥8:3) do not preclude a Poisson process in any of our calculations. For example, in the M ≥8:3 catalog, we note a broad range of match rates between 0% and 100% of the 1000 synthetic catalogs with the longest observed interevent time being 36 yr, with a mean over the calculations of 86.0% (Fig. 6). One could turn this argument around and point out that the low thresholds on probability that specific intervals came from an exponential distribution can be 0% (Fig. 6), meaning that the null hypothesis could be false.

Test of the Independence of Interevent Times

A Poisson process is defined as one in which independent events are separated by exponentially distributed timing. We are unable to rule out an exponential distribution underlying global M ≥8:3 earthquake interevent times, but that alone does not establish whether there is (or is not) temporal dependence among them. In a Poisson process, the amount of time since the last event contains no information about the amount of time until the next event. One test to determine if such dependence is present is an autocorrelation on sequential earthquake intervals. This process tests for functional dependence by identifying repeating or periodic patterns within the interevent distribution.

We conducted autocorrelations on the observed M ≥8:3 catalogs to see if there is any significant dependence but were unable to find any values that exceeded the 95% confidence bounds (Fig. 7). Confidence bounds were calculated using the formula derived by Bartlett (1946) for variance, where

$$\mathrm{var} = \frac{1}{n}\left[1 + 2\sum_{i=1}^{v-1}\rho^2(i)\right],$$

n is the number of intervals, and ρ(i) is autocorrelation values for given lags (v) (e.g., Brockwell and Davis, 2002). For comparison purposes, we sorted the observed interevent times from shortest to longest to create the appearance of a functional dependence between them and ran an autocorrelation test (Fig. 7d). In that case, we do note significant correlations over the first two lags, as would be expected.

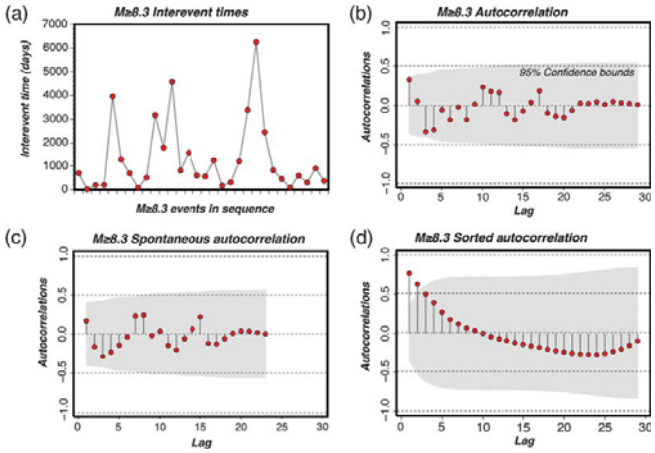

Figure 7. Autocorrelation test of observedM ≥8:3 interevent times. (a) Events in sequence are shown as a function of the number of days separating them. (b) Interevent times are autocorrelated; that is, the trace of (a) is compared with itself to see if there is any periodicity or dependence between interevent times. The lag gives the interevent time in sequence that is being compared. When (b) all events are studied, or (c) spontaneous events are studied, there is no significant (at 95% confidence) dependence among the observed intervals. When (d) intervals are artificially sorted from least to greatest, then dependence is evident in the autocorrelations. This is done to show the efficacy of the test.

Analysis with Local Aftershocks Removed

We want to assess whether global M ≥8:3 earthquake occurence is independent and random in time. A clear temporal dependence between mainshock earthquakes and aftershocks has been demonstrated (e.g., Omori, 1894; Ogata, 1998), and a number of physical models for this dependence have been identified. For example, there are stress-change explanations of short-term links among earthquakes, particularly those that are near in space (Yamashina, 1978; Das and Scholz, 1981; Stein and Lisowski, 1983; King et al., 1994; Freed, 2005) and possibly at global distances as well (Hill et al., 1993; Gomberg et al., 2004; Hill, 2008), though this has been difficult to establish for larger earthquakes (Parsons and Velasco, 2011). Therefore, if we want to make comparisons between observed catalogs and synthetic ones created assuming a Poisson process, then events with close temporal and spatial associations that are explicable by vetted physical models should be excluded.

We repeat the calculations made on the M ≥8:3 catalog shown in Figure 6 with a new catalog comprised of spontaneous earthquakes (a list of removed events is given in Table 2). The removal of likely aftershocks reduces the number of short intervals in the catalog. As a result, we calculate the shortest interevent times of M ≥8:3 earthquakes as having a mean matching rate of 9.5% to synthetic catalogs and a maximum rate of 21.8% (Fig. 8). This result implies that if global earthquakes are randomly distributed, short-term clustering in the 111-yr M ≥8:3 catalog of spontaneous earthquakes is comparable to the expected 11% repeat rate from synthetic catalogs (Fig. 5). This again points out that any specific outcome is unlikely, and that the past decade of apparently increased rates of great earthquakes is not necessarily anomalous. Matching rates from the Poisson model for short interevent times are higher for all tested magnitude thresholds when using the spontaneous catalog (Fig. 8) than when all events are included (Fig. 6).

Conclusions

We find, as did Michael (2011), that the interevent distribution of great earthquakes over the past 111 yr, when examined as a whole, cannot be excluded as having emerged

from a random-in-time Poisson process at 95% confidence. Neither can they be excluded as having come from distributions representing time dependence or cluster-type models (Fig. 3).

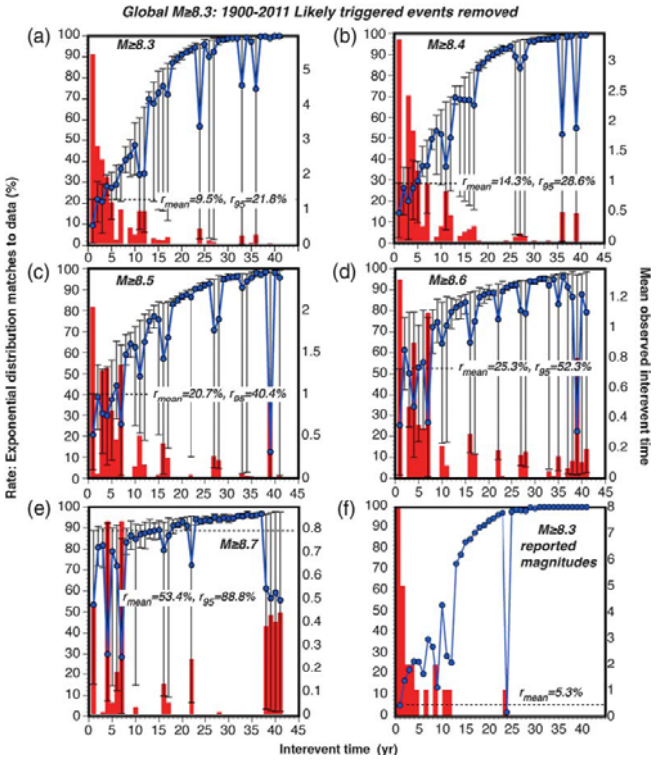

Figure 8. (a–f) The same information is presented as in Figure 6 except the input catalog has the likely triggered events identified in Figure 2 removed.

We study the specifics of the apparent clustering behaviour of the catalog that has captured scientific and public attention by breaking up the interevent distribution into one-year bins. This enables us to assess features like short-term clusters of events and intervening periods of quiescence.We find that the number of shortestM ≥8:3 earthquake intervals (<1 yr) over the past 111 yr is matched by a small number of synthetic catalogs, with mean values ranging from 3.2% for M ≥8:3 to 25.9% for M ≥8:7 (Fig. 6). When we study a catalog with likely triggered events removed, we find mean values ranging from 9.5% for M ≥8:3 to 53.4% for M ≥8:7 (Fig. 8).

Observed earthquake intervals seem increasingly compatible with a random-in-time distribution when higher magnitude cutoffs are imposed, or when longer interevent times are considered. However, the results of examining specific features of the interevent distribution should be interpreted in the context that if global great earthquakes are occurring at random then any specific number of events that happen in a short time is unlikely to be repeated in a similar way in an ~100-yr span. We conduct an experiment with the parameters of the observed catalog of M ≥8:3 events to find the probability of repeating a given number of intervals that fall into one-year bins and find that the lowest value is for 0–1-yr interevent times at 11.1% (Fig. 5). This is a natural feature of the exponential distribution, which has more weight at small times. There is thus a larger range of possible integer values in the small-time bins, and the rate of repeating any given value decreases. Thus, features in the observed catalog seem unusual at first glance but are in fact quite expected from a random-in-time Poisson process.

So, were global M ≥ 8.3 earthquake time intervals random between 1900 and 2011? Our results do not disprove a physical link that causes global earthquake clusters, but they show that the past 111-yr pattern of M ≥ 8.3 earthquakes does not require one. We find no evidence that the features of great-earthquake occurrence are inconsistent with a random-in-time, Poisson process.

Data and Resources

Earthquake catalogs used in this study to were drawn from the Centenial Catalog of Engdahl and Villaseñor, (2002) for the period 1900–1999 and augmented for the period 2000–2011 through the ANSS catalog search linked through the Northern California Earthquake Data Center (NCEDC) web site at http://www.ncedc.org/anss/catalogsearch.html (last accessed November 2011).

Table 1
Catalog of $M \geq 8.3$ Earthquakes Used in This Study

Date (dd/mm/yyyy)	Latitude	Longitude	Z (km)	M_w
11/08/1903	36.3600	22.9700	80.0	8.3
09/07/1905	49.0000	99.0000	0.0	8.5
23/07/1905	49.0000	98.0000	0.0	8.4
31/01/1906	1.0000	−81.5000	0.0	8.6
17/08/1906	−33.0000	−72.0000	0.0	8.5
26/06/1917	−15.5000	−173.0000	0.0	8.5
16/12/1920	36.6010	105.3170	25.0	8.3
11/11/1922	−28.5530	−70.7550	35.0	8.7
03/02/1923	53.8530	160.7610	35.0	8.5
26/06/1924	−56.4070	158.4890	15.0	8.3
02/03/1933	39.2240	144.6220	35.0	8.4
01/02/1938	−5.0500	131.6200	35.0	8.4
15/08/1950	28.5000	96.5000	0.0	8.6
04/11/1952	52.7500	159.5000	0.0	9.0
09/03/1957	51.5870	−175.4190	35.0	8.6
06/11/1958	44.3110	148.6500	35.0	8.4
22/05/1960	−38.2940	−73.0540	35.0	9.6
13/10/1963	44.7630	149.8010	26.0	8.6
28/03/1964	61.0190	−147.6260	6.3	9.2
04/02/1965	51.2100	178.4980	28.8	8.7
16/05/1968	40.9010	143.3460	26.0	8.3
19/08/1977	−11.1250	118.3800	20.9	8.3
04/10/1994	43.8320	147.3320	33.3	8.3
23/06/2001	−16.265	−73.641	33	8.4
25/09/2003	41.815	143.91	27	8.3
26/12/2004	3.295	95.982	30	9
28/03/2005	2.085	97.108	30	8.6
15/11/2006	46.592	153.266	10	8.3
12/09/2007	−4.438	101.367	34	8.5
27/02/2010	−36.122	−72.898	22.9	8.8
11/03/2011	38.297	142.373	29	9.1

The catalog is from Engdahl and Villaseñor (2002), augmented for the period 2000–2011 with the ANSS catalog. All event sizes are given as moment magnitudes.

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Table 2

Catalog of $M \geq 8.3$ Earthquakes with Likely Aftershocks/Triggered Earthquakes Removed

Region	Date (dd/mm/yyyy)	Latitude	Longitude	Range (km)	Depth (km)	M_w	Reference
Mongolia	**09/07/1905**	**49.0**	**99.0**		**0.0**	**8.5**	Chery *et al.* (2001)
	23/07/1905	49.0	98.0	111.2	0.0	8.4	
Kamchatka	**03/02/1923**	**53.853**	**160.761**		**35.0**	**8.5**	Ruppert *et al.* (2007)
	04/11/1952	52.75	159.50	248.6	0.0	9.0	
Kuriles	**06/11/1958**	**44.311**	**148.650**		**35.0**	**8.4**	Parsons (2002)
	13/10/1963	44.763	149.801	146.1	26.0	8.6	
	04/10/1994	43.832	147.332	164.2, 310.2	33.3	8.3	
Chile	**22/05/1960**	**−38.294**	**−73.054**		**35.0**	**9.6**	Stein *et al.* (2010)
	27/02/2010	−36.122	−72.898	303.7	22.9	8.8	
Sumatra	**26/12/2004**	**3.295**	**95.982**		**30.0**	**9.0**	Nalbant *et al.* (2005)
	28/03/2005	2.085	97.108	134.7	30.0	8.6	

The events in bold-face type are mainshocks, and others are treated as aftershocks.

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Menlo Park, California 94025

ΠΡΟΚΗΡΥΞΕΙΣ ΘΕΣΕΩΝ ΓΙΑ ΓΕΩΜΗΧΑΝΙΚΟΥΣ ΣΕ ΠΟΛΥΤΕΧΝΕΙΑ ΚΑΙ ΠΑΝΕΠΙΣΤΗΜΙΑ

Από τον καθηγητή του Griffith University στην πόλη Brisbane της Αυστραλίας Bala Balasubramaniam λάβαμε το ακόλουθο ηλεκτρονικό μήνυμα με προκήρυξη για θέση καθηγητή Γεωτεχνικής Μηχανικής

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The University is looking to make its first senior appointment in the field of Geotechnical Engineering and it is anticipated that the successful candidate will play a significant role in providing academic leadership and direction to the geotechnical academic group within the Civil Engineering Discipline. The appointee is also expected to provide high-level input into the planning and delivery of the School's teaching and research activities.

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- leadership in learning and teaching, curriculum development, and delivery of high quality undergraduate and postgraduate courses to students;
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ΠΡΟΚΗΡΥΞΕΙΣ ΒΡΑΒΕΙΩΝ ΓΙΑ ΓΕΩΜΗΧΑΝΙΚΟΥΣ

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All nominations will be reviewed by a Judging Committee of International Experts from Canada, India, Japan, Ireland, UK, and the United States. The award will be announced by December 31, 2012. Suitable arrangements will be made for awarding the Prize at an appropriate ceremony in the country of residence of the winner.

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NOTE: Since teaching excellence can be demonstrated many different ways, the nominator and referees are requested to clearly state the criteria they used to justify their nominee's teaching excellence.

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2. Nomination letter including a statement of 500 words outlining Significant Contributions towards Excellence in Teaching. (SEE NOTE ABOVE)
3. Two to Four more letters of recommendation (SEE NOTE ABOVE)
4. Chronology of education received
5. Chronology of jobs held
6. Area of specialization
7. List of refereed publications and grants related to teaching
8. One color digital photo (at least 300 dpi) with citation for listing
9. Any other relevant information.

Please make sure to put all the above information in a **single** PDF file of size less than 5MB.

For any other further information, please contact: Professor Shamsher Prakash (prakash@mst.edu).

ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ ΓΙΑ ΓΕΩΜΗΧΑΝΙΚΟΥΣ

GEOTECHNICAL AND STRUCTURAL INSTRUMENTATION

From: Kim Malcolm [mailto: Kim.Malcolm@itmsoil.com.au]
Sent: Monday, August 27, 2012 9:40 AM
To: Paris Xystris
Subject: Opportunity

Last communication we had was regarding geotech technician / engineer to work in Perth with my small company. I ended up employing a guy out of the UK. He has worked out quite well and is very busy.

So now I am looking for an additional person. I am looking for someone to be able manage the various projects that we have ongoing as well as be competent enough to install the range of products that itmsoil manufacture if required.

Do you know of anyone that may fit this description and also be willing to come to Perth? I will of course pay for and sponsor the visa (quite expensive), airfare and the first month accommodation whilst they get settled and find their feet. I would hope the pay would be equivalent or more to what they are/were earning in Greece.

The guys I have here are all in the late 20s or early 30s so I would like to keep that going if possible.

If you can help that would be great.

Cheers

Kim

Kim Malcolm
Managing Director
itmsoil Pty Ltd
209/396 Scarborough Beach Road
Osborne Park
Western Australia 6017
t: +61 (0) 8 9284 0244 m: 61 (0) 422188340
f: +61 (0) 8 92840233 w: www.itmsoil.com.au

New Australian centre targets geotechnical students

Growing demand for geotechnical engineers in Australia is the driving force behind the launch of an industry-supported geotechnical training ground at the University of Queensland (UQ) today.

UQ's new Geotechnical Engineering Centre will be run by the school of civil engineering and the venture is supported financially by geotechnical specialist Golder Associates and mining companies Rio Tinto, Anglo Gold Ashanti and BHP Billiton.

Each industry partner will contribute AUS$150,000 (£97,000), which will be matched by the university to deliver over AUS$6M (£3.9M) of funding over five years. The funding will support chairs in geomechanics and rock mechanics, lecturing positions in rock mechanics and hydrogeology, postdoctoral positions, undergraduate and postgraduate scholarships, as well as specialist geotechnical testing equipment.

Geotechnical Engineering Centre director professor David Williams said the Centre would produce much sought after civil and mining engineering graduates with a specialisation in geotechnical engineering. He said that the centre would meet the strong demand by the Australian construction and mining industries.

(NCE Editorial, 3 September, 2012, http://www.nce.co.uk/8635168.article)

ΠΡΟΣΕΧΕΙΣ ΕΚΔΗΛΩΣΕΙΣ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΣΤΗΝ ΕΛΛΑΔΑ

2ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΦΡΑΓΜΑΤΩΝ ΚΑΙ ΤΑΜΙΕΥΤΗΡΩΝ
Σχεδιασμός – Διαχείριση – Περιβάλλον
Αθήνα, 6 - 8 Νοεμβρίου 2013
www.eemf.gr

Η Ελληνική Επιτροπή Μεγάλων Φραγμάτων (ΕΕΜΦ) διοργανώνει το **2ο Πανελλήνιο Συνέδριο Φραγμάτων και Ταμιευτήρων στις 6, 7 & 8 Νοεμβρίου του 2013 στην Αθήνα.**

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

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

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

Σας καλούμε να συμμετάσχετε στο 2ο πανελλήνιο συνέδριο φραγμάτων και ταμιευτήρων και να αποστείλετε εργασίες σχετικές με το θεματολόγιο που παρουσιάζεται παρακάτω.

Θεματολόγιο

1. Φράγματα, Ταμιευτήρες και Περιβάλλον

- Φιλικές προς το περιβάλλον κατασκευές φραγμάτων και ταμιευτήρων
- Κοινωνικά αποδεκτός σχεδιασμός φραγμάτων και ταμιευτήρων
- Περιβαλλοντικοί όροι, επιπτώσεις και κοινωνικά οφέλη
- Περιορισμός υδρομορφολογικών αλλοιώσεων και αισθητική αποκατάσταση περιβάλλοντος
- Εμπλουτισμός – αποκατάσταση υπόγειων υδροφορέων, δημιουργία υγροβιότοπων αντιπλημμυρική προστασία κ.λπ.
- Διατήρηση και βελτίωση ποιότητας υδατικών πόρων
- Φερτές ύλες

2. Φράγματα και ολοκληρωμένη διαχείριση υδατικών πόρων

- Διαχείριση υδατικών πόρων σε επίπεδο λεκάνης απορροής
- Οι ταμιευτήρες ως έργα διαχείρισης υδατικών πόρων πολλαπλού σκοπού
- Τεχνικο-οικονομικά κριτήρια υλοποίησης νέων φραγμάτων
- Ο ρόλος των φραγμάτων στον ενεργειακό σχεδιασμό - Σύγχρονες τάσεις και τεχνολογικές εξελίξεις
- Ταμιευτήρες και υβριδικά συστήματα παραγωγής ενέργειας

3. Ασφάλεια φραγμάτων και ταμιευτήρων

- Κανονισμοί μελέτης, κατασκευής και λειτουργίας φραγμάτων
- Η πρόταση της ΕΕΜΦ για την σύνταξη εθνικού κανονισμού ασφάλειας φραγμάτων.
- Κίνδυνοι σχετιζόμενοι με προβλήματα οργάνωσης του κυρίου - διαχειριστή του έργου
- Απαιτήσεις παρακολούθησης συμπεριφοράς
- Αναλύσεις θραύσης φράγματος και επιπτώσεις
- Μακροχρόνια συμπεριφορά και κίνδυνοι οφειλόμενοι στη γήρανση των φραγμάτων
- Κίνδυνοι οφειλόμενοι σε αστοχίες Η/Μ εξοπλισμού
- Παρουσίαση πρόσφατων συμβάντων ή περιστατικών
- Φράγματα , ταμιευτήρες και δημόσια ασφάλεια
- Ασφαλής παροχέτευση εκτάκτων πλημμυρικών παροχών κατάντη – απαιτήσεις οριοθέτησης της κοίτης

4. Εξελίξεις στις μεθόδους σχεδιασμού & κατασκευής

- Υλικά κατασκευής Φραγμάτων, μέθοδοι κατασκευής, νέες τεχνικές
- Εκτίμηση, επιλογή και αναθεώρηση πλημμυρών σχεδιασμού
- Σχεδιασμός υπερχειλιστών – αναβάθμιση υπερχειλιστών
- Η επιρροή των Γεωλογικών συνθηκών στο σχεδιασμό.
- Εξελίξεις στο Γεωτεχνικό σχεδιασμό
- Εξελίξεις στον αντισεισμικό σχεδιασμό
- Εξελίξεις στον Η/Μ εξοπλισμό

5. Παρουσίαση έργων

Κρίσιμες ημερομηνίες για την αποστολή εργασιών:

- Υποβολή περιλήψεων: **15 Οκτωβρίου 2012**
- Αποδοχή περιλήψεων: **30 Νοεμβρίου 2012**
- Υποβολή πλήρους κειμένου: **30 Απριλίου 2013**
- Αποδοχή πλήρους κειμένου: **30 Ιουνίου 2013**

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

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

ΠΡΟΣΚΛΗΣΗ ΣΤΗΝ ΗΜΕΡΙΔΑ ΝΕΩΝ ΕΡΕΥΝΗΤΩΝ ΤΟΥ Ε.Τ.Α.Μ.
Θεσσαλονίκη, 7 Δεκεμβρίου 2012
www.etam.gr

Αξιότιμα Μέλη/ Φίλοι του ΕΤΑΜ,

Το Ελληνικό Τμήμα Αντισεισμικής Μηχανικής (Ε.Τ.Α.Μ.) διοργανώνει, υπό την αιγίδα του Τμήματος Πολιτικών Μηχανικών της Πολυτεχνικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, ημερίδα που απευθύνεται αποκλειστικά και μόνον σε νέους ερευνητές, με τίτλο:

Η ΑΝΤΙΣΕΙΣΜΙΚΗ ΜΗΧΑΝΙΚΗ ΜΕΣΑ ΑΠΟ ΤΗΝ ΕΠΙΣΤΗΜΟΝΙΚΗ ΜΑΤΙΑ ΝΕΩΝ ΕΡΕΥΝΗΤΩΝ ΚΑΙ ΜΗΧΑΝΙΚΩΝ

Σκοπός της ημερίδας είναι η ανάδειξη και η διάχυση του έργου της νέας γενιάς ερευνητών και μηχανικών (μελών ή μη του ΕΤΑΜ), η γνωριμία καθώς και η ανάπτυξη σχέσεων συνεργασίας μεταξύ τους. Η ημερίδα απευθύνεται σε σπουδαστές (μεταπτυχιακούς, υποψήφιους διδάκτορες), σε διδάκτορες (έως και 6 χρόνια μετά την απόκτηση του τίτλου), καθώς και σε ερευνητές ή επαγγελματίες μηχανικούς κάτω των 38 ετών.

Η ημερίδα θα πραγματοποιηθεί στην Θεσσαλονίκη την 7η Δεκεμβρίου 2012 στο Κέντρο Διάδοσης Ερευνητικών Αποτελεσμάτων (ΚΕ.Δ.Ε.Α) του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

Λεπτομέρειες για την ημερίδα παρατίθενται στην ιστοσελίδα του ΕΤΑΜ και στο τεύχος 45, Μάιος 2012 των «ΝΕΩΝ ΤΗΣ ΕΕΕΕΓΜ».

ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ
ΙΣΤΟΡΙΑΣ ΤΩΝ ΕΠΙΣΤΗΜΩΝ ΚΑΙ ΤΗΣ ΤΕΧΝΟΛΟΓΙΑΣ

ΠΡΟΣΚΛΗΣΗ ΕΚΔΗΛΩΣΗΣ ΕΝΔΙΑΦΕΡΟΝΤΟΣ

Η Εταιρεία Μελέτης και Διάδοσης της Ιστορίας των Επιστημών και της Τεχνολογίας (ΕΜΔΙΕΤ) και το Τμήμα Μεθοδολογίας, Ιστορίας και Θεωρίας της Επιστήμης (ΜΙΘΕ) του Πανεπιστημίου Αθηνών διοργανώνουν Πανελλήνιο Συνέδριο Ιστορίας των Επιστημών και της Τεχνολογίας στις 28, 29 και 30 Μαρτίου 2013 στην Αθήνα.

Μετά το πρώτο επιτυχημένο συνέδριο νέων ερευνητών το 2011 στην Αθήνα, η ΕΜΔΙΕΤ σε συνεργασία με το ΜΙΘΕ αποφάσισε να καθιερώσει τη διοργάνωση συνεδρίου κάθε δύο χρόνια, αποσκοπώντας στην καλλιέργεια συνθηκών που θα φέρουν σε επαφή μεταξύ τους Έλληνες ερευνητές από τον χώρο της ιστορίας των επιστημών και της τεχνολογίας, καθώς και συγγενών κλάδων, που εργάζονται στην Ελλάδα ή το εξωτερικό.

Η κεντρική θεματική του φετινού συνεδρίου είναι «Ευρώπη - Επιστήμη - Τεχνολογία».

Όσοι ενδιαφέρονται καλούνται να υποβάλουν σχετική πρόταση για ανακοίνωση. Προτάσεις που δεν εμπίπτουν στη θεματική αυτή μπορούν επίσης να υποβληθούν. Σημειώνεται ότι ενθαρρύνονται ιδιαίτερα οι προτάσεις για την οργάνωση συνεδριών· για όλες προβλέπεται η ύπαρξη σχολιαστή. Τέλος, προγραμματίζεται η δημοσίευση των ανακοινώσεων μετά από διαδικασία αξιολόγησης.

Οι ενδιαφερόμενοι μπορούν να υποβάλουν τις προτάσεις τους ηλεκτρονικά με τα επισυναπτόμενα δελτία μέχρι τις 30 Οκτωβρίου 2012 στη διεύθυνση info@emdiet.gr.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

Advances in Multiphysical Testing of Soils and Shales, ISSMGE Workshop, 3-5 September 2012, Lausanne, Switzerland, http://amtss.epfl.ch

Baltic Piling Days 2012, Tallinn, Estonia, 3-5th September 2012, www.balticpiling.com

The 3rd International Workshop on Modern Trends in Geomechanics (IW-MTG3)
4 - 5 September 2012, Nottingham, United Kingdom

The Nottingham Centre for Geomechanics (NCG) is pleased to host the 3rd International Workshop on Modern Trends in Geomechanics (IW- MTG3) from 4-5 September 2012. The previous two workshops in this series were successfully held in Vienna (2005) and Stanford (2010).

The format of IW-MTG3 will follow the established workshop tradition in which presentations are given by invited leading experts in the field of geomechanics. About 30 speakers will present at the two-day workshop. Research students are also encouraged to attend the workshop so that they can present their work within a poster session.

Contact person
Dr Alec Marshall
University of Nottingham, Department of Civil Engineering,
University Park,NG7 2RD,Nottingham,,UK
Phone: +44 (0)115 951 3908
Fax: +44 (0)115 951 3898
E-mail: EZ-geomechanics2012@exmail.nottingham.ac.uk

2nd International Conference on Transportation Geotechnics, 9 - 12 September 2012, Sapporo, Hokkaido, Japan, http://congress.coop.hokudai.ac.jp/tc3conference/index.html

International Congress Tunneling and Underground Infrastructure in Urban Areas, 10-11 September 2012, Baku, Azerbaijan, http://azta-asso.com

7th International Conference in Offshore Site Investigation and Geotechnics: Integrated Geotechnologies, Present and Future, 11-14 September 2012, London, United Kingdom, peter.allan@geomarine.co.uk; zenon@tamu.edu

CRETE2012 3rd International Conference on Hazardous and Industrial Waste Management September 12 - 14, 2012, Chania, Greece, www.hwm-conferences.tuc.gr

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

IS-Kanazawa 2012 The 9th International Conference on Testing and Design Methods for Deep Foundations 18-20 September 2012, Kanazawa, Japan, http://is-kanazawa2012.jp

1st Eastern European Tunnelling Conference, 18-21 September 2012, Budapest, Hungary, www.eetc2012budapest.com

ISC' 4 4th International Conference on Geotechnical and Geophysical Site Characterization, September 17-21, 2012, Porto de Galinhas, Pernambuco – Brazil, www.isc-4.com

1st Eastern European Tunneling Conference, September 18-21, 2012, Budapest, Hungary, www.eetc2012budapest.com

IS-Shanghai 2012- International Symposium on Coastal Engineering Geology, September 20-21, 2012, Shanghai, China, www.is-shanghai2012.org

The 4th International Conference on PROBLEMATIC SOILS, 21-23 September 2012, Wuhan, China, www.cipremier.com/page.php?487

The 4th Central Asian Geotechnical Symposium: Geo-Engineering for Construction and Conservation of Cultural Heritage and Historical Sites. Challenges and Solutions 21-23 September 2012 Samarkand, Uzbekistan http://conference.geotechnics.uz

15th World Conference on Earthquake Engineering, 24-28 September 2012, Lisbon, Portugal http://15wcee.org/

Geotechnics 2012 - Constructions, Technologies and Risk, 26-28 September 2012, Ostrava, Slovakia, www.ingeokring.nl/media/download_gallery/Prelimina.pdf

VOLSAM 2012 - Volcanism of the Southern Aegean in the frame of the broader Mediterranean area, 10-12 October 2012, Santorini island, Greece, http://volsam2012.conferences.gr

61. Geomechanics Colloquy "50 Years NATM", October 11th and 12th, 2012, Salzburg, Austria, salzburg@oegg.at

2nd International Symposium on Constitutive Modeling of Geomaterials: Advances and New Applications (IS-Model 2012), October 15 and 16, 2012 Beijing, China, www.csrme.com/ISMODEL/index.html

SAHC 2011, 8th International Conference on Structural Analysis of Historical Constructions, October 15 – 17, 2012, Wroclaw, Poland, www.sahc2012.org

7th Asian Rock Mechanics Symposium, 15-19 October 2012, Seoul, Korea, www.arms7.com

37th Annual Conference on Deep Foundations, October 16-19, 2012, Houston, TX, USA, www.dfi.org/conferencedetail.asp?id=193

10th International Congress on Advances in Civil Engineering, 17-19 October 2012, 17-19 October, Ankara, Turkey www.ace2012.metu.edu.tr

Montreal TAC 2012 - Tunnels and Underground Spaces: Sustainability and Innovations, 17 - 20 October 2012, Montreal, Canada, www.tac2012.ca

6th International Symposium on Roller Compacted Concrete (RCC) Dams October 23 to 25, 2012, Zaragoza, Spain, www.meetandforum.net/RCC2012

HYDRO 2012 Innovative Approaches to Global Challenges, 29 to 31 October 2012, Bilbao, Spain, www.hydropower-dams.com

International Conference on Ground Improvement and Ground Control: Transport Infrastructure Development and Natural Hazards Mitigation, 29 Oct - 2 Nov 2012, Wollongong, Australia www.icgiwollongong.com

Tangible Risks, Intangible Opportunities: Long-Term Risk Preparedness and Responses for Threats to Cultural Heritage – 2012 Theme: Reducing Risks to Cultural Heritage from Natural and Human-Caused Disasters, 31 October 2012, Beijing, China, pamela.jerome@icomos.org)

IV Panamerican Landslides Symposium, 31 October – 2 November 2012, Boyacá, Colombia, www.scg.org.co/web%20IVSPD/img/IV-SPD-BOLETIN-JULIO.pdf

6th Congress on Forensic Engineering, October 31 – November 3, 2012, San Francisco, USA http://content.asce.org/conferences/forensics2012/index.html

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

International Symposium on Earthquake-induced Landslides November 7-9, 2012, Kiryu, Japan http://geotech.ce.gunma-u.ac.jp/~isel/index.html

GEOMAT2012-KL, MALAYSIA Second International Conference on Geotechnique, Construction Materials and Environment, November 14-16, 2012, Kuala Lumpur, Malaysia, http://geomat2012.webs.com

32. Baugrundtagung with exhibition "Geotechnik", Mainz, Germany, 26 – 29 November 2012, www.baugrundtagung.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

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

2012 Forum on Urban Geoenvironment & Sustainable Development, 4-7 December 2012, Hong Kong, CHINA, www.civil.hku.hk/ugsd2012/en/

GA2012 - Geosynthetics Asia 2012 5th Asian Regional Conference on Geosynthetics, 13 - 16 December 2012, Bangkok, Thailand, www.set.ait.ac.th/acsig/GA2012

Forensic geotechnical engineering www.editorialmanager.com/feng

Fourth International Seminar on FORENSIC GEOTECHNICAL ENGINEERING, January, 10-12, 2013, Bengaluru, India, Prof. G L Sivakumar Babu, isfge2013@gmail.com

Geotechnical Special Publication, ASCE "Foundation Engineering in the Face of Uncertainty". Abstracts to Mohamad H. Hussein at: MHussein@pile.com.

Geotechnical Special Publication, ASCE "SOUND GEOTECHNICAL RESEARCH TO PRACTICE", http://web.engr.oregonstate.edu/~armin/index_files/HoltzGSP

Themed Issue on Geotechnical Challenges for Renewable Energy Developments, Geotechnical Engineering 2013, ben.ramster@icepublishing.com

Pam-Am UNSAT 2013 First Pan-American Conference on Unsaturated Soils, 19-22 February 2013, Cartagena de Indias, Colombia, panamunsat2013.uniandes.edu.co

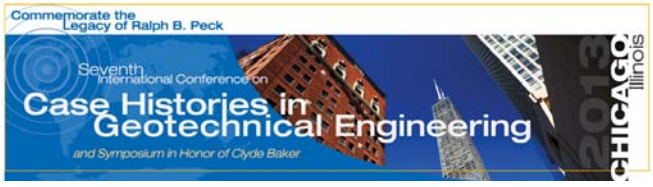
ICGE'13 3rd International Conference on Geotechnical Engineering New Developments in Analysis, Modeling, and Design, 21-23 February 2013, Hammamet, Tunisia www.icge13.com

TU-SEOUL 2013 International Symposium on Tunnelling and Underground Space Construction for Sustainable Development, March 18-20, 2013, Seoul, Korea www.tu-seoul2013.org

International Conference on Installation Effects in Geotechnical Engineering, 24-27 March 2013, Rotterdam, The Netherlands, http://geo-install.co.uk

EURO:TUN 2013 Computational Methods in Tunneling and Subsurface Engineering, 17-19 April 2013, Bochum, Germany, www.eurotun2013.rub.de

12th International Conference Underground Construction Prague 2013, 22-24 April 2013, Prague, Czech Republic, www.ita-aites.cz/en/conference_underg_constr/conference-uc-2013



Conference to Commemorate the Legacy of Ralph B. Peck, 7th International Conference on Case Histories in Geotechnical Engineering & Soil Dynamics and Symposium in Honor of Clyde Baker, Chicago, USA, 29 April – 4 May, 2013, http://7icchge.mst.edu

IGS-Incheon 2013 - 5th International Symposium on Geotechnical Engineering, Disaster Prevention and Reduction, and Environmentally Sustainable Development, May 15-17 May 2013, Incheon, South Korea, www.geochina-cces.cn/download/2013_5th_Dsiaster_prevention_Bulletin_1.pdf

HF2013 Effective and Sustainable Hydraulic Fracturing - an ISRM Specialized Conference, 20-22 May 2013, Brisbane, Queensland, Australia, http://www.csiro.au/events/HF2013

Experimental Micromechanics for Geomaterials Joint workshop of the ISSMGE TC101-TC105, 23 - 24 May 2013, Hong Kong, owlam@hku.hk

18th SouthEast Asian Geotechnical & Inaugural AGSSEA Conference, 29 – 31 May 2013, Singapore, www.18seagc.com

Second International Symposium on Geotechnical Engineering for the Preservation of Monuments and Historic Sites
30 -31 May 2013, Napoli, Italy
www.tc301-napoli.org

The conservation of monuments and historic sites is one of the most challenging problems facing modern civilization. It involves a number of factors belonging to different fields (cultural, humanistic, social, technical, economical, administrative), intertwining in inextricable patterns. In particular, the requirements of safety and use appear (and often actually are) in conflict with the respect of the integrity of the monuments. In almost all countries of the world the conservation is looked after by an official trained in Art History or Archaeology. He has generally the control of any action to be undertaken, and imposes constraints and limitations that sometimes appear unreasonable to the engineer. The engineer, in turn, tends to achieve safety by means of solutions which appear unacceptable to the official in charge of conservation, sometimes mechanically applying procedures and regulations conceived for new structures. It is evident that some equilibrium has to be found between the safe fruition of a monument and the respect of its integrity. The former task belongs to the know-how of any well trained and experienced engineer, while the latter one is more difficult, being the same concept of integrity rather elusive.

The difficulty of the problem is increased by the lack of a general theory, universally accepted and guiding the behaviour of the actors involved as the Mechanics does with the structural engineer. The possibility of finding in practice an acceptable equilibrium is linked to the development of a shared culture. The International Society of Soil Mechanics and Geotechnical Engineering contributed to this development by an ad hoc Committee (TC 19 – Conservation of Monuments and Historic Sites), that has been promoted over 25 years ago by French and Italian engineers (Jean Kerisel, Arrigo Croce). A number of international and regional symposia have been organised, always with large audience and lively discussions. A Lecture dedicated to Jean Kerisel will be given for the first time at the next International Conference on Soil Mechanics and Geotechnical Engineering to be held in 2013 in Paris. In this framework, the Technical Committee (now TC301) is organising the 2nd International Symposium on Geotechnical Engineering for the Preservation of Monuments and Historic Sites, which will be held in Napoli on May 2013. Its aim is that of comparing experiences, presenting important achievements and new ideas, establishing fruitful links.

The contributions to the Conference should focus on the following main themes:

1. Geotechnical aspects of historic sites, monuments and cities;
2. Past design criteria and traditional construction methods;
3. Techniques to preserve ancient sites and constructions;
4. Rehabilitation of heritage;
5. Role of geotechnical engineering in preservation of cultural and historical integrity.

Scientific secretariat

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info@tc301-napoli.org

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Emilio Bilotta (phone: +39 081 76 83469; email: emilio.bilotta@unina.it)

WTC 2013 ITA-AITES World Tunnel Congress and 39th General Assembly "Underground – the way to the future", Geneva, Switzerland, May 31 to June 7, 2013. www.wtc2013.ch

First International Conference on Rock Dynamics and Applications (RocDyn-1), 6-8 June 2013, Lausanne, Switzerland, www.rocdyn.org

Strait Crossing Norway 2013 : Extreme Crossings and New Technologies, 16-19 June 2013, Bergen, Norway www.sc2013.no

SINOROCK 2013
Rock Characterization, Modelling and Engineering Design Methods
an ISRM Specialized Conference
18-20 June 2013, Shanghai, China

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E-mail:	xtfeng@whrsm.ac.cn

STREMAH 2013 13th International Conference on Studies, Repairs and Maintenance of Heritage Architecture, 25 – 27 June 2013, New Forest, UK, carlos@wessex.ac.uk

TC215 ISSMGE - International Symposium on Coupled Phenomena in Environmental Geotechnics (CPEG) - "From theoretical and experimental research to practical applications", 1 - 3 July 2013, Torino, Italy, www.tc215-cpeg-torino.org

The 6th International Symposium on Rock Stress, 20-22 August 2013, Sendai, Japan, http://www2.kankyo.tohoku.ac.jp/rs2013

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

13th International Conference of the Geological Society of Greece, September 5-8 2013, Chania, Greece, www.ege13.gr

Géotechnique Symposium in Print on Bio- and Chemo-Mechanical Processes in Geotechnical Engineering, www.elabs10.com/content/2010001471/SIP%202013.pdf

EUROCK 2013 ISRM European Regional Symposium "Rock Mechanics for Resources, Energy and Environment", 21-26 September 2013, Wroclaw, Poland www.eurock2013.pwr.wroc.pl

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

International Symposium on Design and Practice of Geosynthetic-Reinforced Soil Structures, 14-16 October, 2013, Bologna, Italy, www.civil.columbia.edu/bologna2013

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

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

EUROCK 2014
ISRM European Regional Symposium
Rock Engineering and Rock Mechanics:
Structures in and on Rock Masses
26-28 May 2014, Vigo, Spain

Contact Person: Prof. Leandro Alejano
ETSI MINAS - University of Vigo
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E-mail: alejano@uvigo.es

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

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

IAEG XII CONGRESS Torino 2014 Engineering Geology for Society and Territory, IAEG 50th Anniversary, September 15-18, 2014, Torino, Italy, www.iaeg2014.com

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

ARMS 8 - 8th ISRM Rock Mechanics Symposium, 15-17 October 2014, Sapporo, Japan www.rocknet-japan.org/ARMS8/index.htm

13th ISRM International Congress on Rock Mechanics
Innovations in Applied and Theoretical Rock Mechanics
10 – 13 May 2015, Montreal, Canada

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

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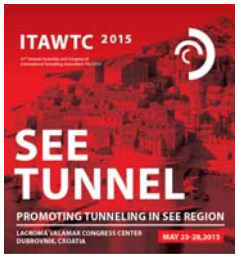
E-mail: ferri.hassani@cGill.ca



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

Contact
ITA Croatia - Croatian Association for Tunnels and Underground Structures
Davorin KOLIC, Society President
Trnjanska 140
HR-10 000 Zagreb
Croatia
info@itacroatia.eu

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

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

The British Geotechnical Association (BGA) is pleased to announce that it will be hosting the 16th European Conference on Soil Mechanics and Geotechnical Engineering at the Edinburgh International Conference Centre from 13th to 17th September 2015. The conference was awarded by a meeting of the European Member Societies on 13th September 2011 at the 15th European Conference on Soil Mechanics and Geotechnical Engineering in Athens, Greece.

You can view the BGA bid document at the following link: http://files.marketingedinburgh.org/bid/ECSMGEELECTRONICBID.pdf

The conference website will be updated regularly as arrangements for the conference progress. Please bookmark it and visit regularly.

We look forward to welcoming you all in Edinburgh, one of Europe's truly great cities, in September 2015.

Dr Mike Winter
Chair of the Organising Committee
mwinter@trl.co.uk

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Shaking the Levees of the Sacramento Delta

Federal officials are in Stockton this week to discuss the seismic safety of the Sacramento-Delta levee system. In the meantime, we show you an unsual experiment that tests the safety of the levees.

In the middle of a cow pasture on Sherman Island near Antioch, a group of engineering students in bright blue polo shirts fussed over a strange looking contraption. The device garnering all the attention was perched atop a mound of dirt and mud.

As the clanging of wrenches and scurrying of blue shirts subsided, a gentle whir emanated from the great gizmo, which began spinning smoothly like the blades of a bread mixer. Faster and faster, the pile of dirt began to tremble, shaking the ground of the surrounding field.

"It feels a little bit like we're on a waterbed," said Scott Brandenberg, a UCLA assistant engineering professor.

The conflation of mud and machine represented the most recent test of the underlying soil of the Delta's levee system. The spinning device, called an Eccentric Mass Shaker, simulated the pulsing of a large earthquake on the team's homemade model of the Delta's levees.

The aim of the experiment wasn't to see how long it would take the machine to pummel a mound of soil into dust. Rather, it was aimed at understanding the soil itself.

"The goal of the test is to measure the seismic response of the peat soil that underlies a lot of the levees here in the delta," said Brandenberg.

The team staged a similar test of the peat soil back in August. But that soil was dry, and the researchers wanted to see how the same soil would react with water, which naturally sits below the surface of the fields on Sherman Island. This time around, the team dug a moat around the levee model, and filled it with water.

"It's a unique material," Brandenberg said of the soil. "It's very soft and compressible and we don't know a lot about how it might behave if there is an earthquake."

State engineers say there is no record of a serious seismic disturbance in the Delta, although they say the 1906 quake left its mark on train embankments in the area. Still, they believe the levee system, which sits below sea level, could lay vulnerable to seismic activity. Specifically, the fear is a regional failure of the levees could have wide-ranging impacts to the Delta's statewide water deliveries.

"If we have multiple-island flooding you bring a lot of saltwater from the bay into the Delta," said David Mraz, an engineer with California's Dept. of Water and Resources. "You have to shut down the water supply system."

The UCLA team planned to take its soil samples back to Southern California where they'd be studied and cataloged over the next six months. The team said it would share its data with other researchers.

"With that information we can do some numerical models." said Brandenberg. "And analyze what the stresses are inside the embankment."

The ground shaking grabbed the attention of a herd of cows who sauntered over to investigate the unusual scene. It also attracted several locals, including Chris Gulick who was raised on Sherman Island and is the second generation to operate nearby Eddo's Harbor and RV Park.

"What you're protecting isn't just farmland and a few cattle," said Gulick, watching the team of blue shirts. "There's so many resources out here nobody thinks about."

Gulick said he was happy to see the testing, but not because he thought it would reveal vulnerabilities in the regions network of levees, some built 150 years ago.

"I'm hoping it dispels the myth that the levees in the Delta are fragile and on the edge of failure," Gulick said.

As it turned out, the earthquake inducing machine peteredout long before the levee. Engineers continued to add weights to the machines arms until the ground buckled in waves, and several people complained of upset stomachs. Still, the mound of dirt assembled by the team held out, until the engineers decided their machine had had enough.

As the shaking faded, the wind whipped the grass into a frenzy and the bovine observers lost interest and lumbered away – hoping it would be the last shaking they'd experience for a good long spell.

(Joe Rosato Jr. / KNTV-TV (San Francisco), Aug 16, 2012, http://www.nbcbayarea.com/news/local/Shaking-the-Levees-of-the-Sacramento-Delta-166344716.html)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Research reveals soil carbon capture potential

Urban soils have the potential to remove carbon dioxide from the atmosphere, according to new research published in this month's edition of Science of the total environment.

The work by New castle and Oxford universities, backed by the Engineering and Physical Sciences Research Council and the Natural Environment Research Council, suggests that 38,000t of carbon dioxide has been captured by the 10ha Science Central redevelopment in Newcastle and the site could remove a further 27,000t.

Newcastle University lead researcher on the project David Manning said: "Urban soils tend to be rich in waste materials such as concrete or metal slag that contain calcium and magnesium. These minerals capture and store atmospheric carbon through the processes of weathering to form carbonates which are chemically stable and a permanent store of soil carbon."

The site was previously used as a colliery, as well as being home Scottish and Newcastle Breweries, and 30,000t of near-surface coal deposits will be removed from the site before the area is backfilled with demolition material from buildings on the site. Researchers at the universities have said that the carbon released as a result of the coal extraction will be cancelled out by the carbon absorbed by the soil at the site.

Manning explained that the site is covered by approximately 1M.t of demolition material spread in a 0.2m to 6m thick. The material on site originally had an overall carbon capture potential of 65,000t and geochemical analysis suggests that within three years of demolition approximately 60% of this potential has been exploited

Manning said that data from this research provides further evidence of the importance of secondary carbonate mineral formation, and added: "It suggests that engineered soils could be used for carbon capture and storage with the addition and management of suitable Ca/Mg-rich materials."

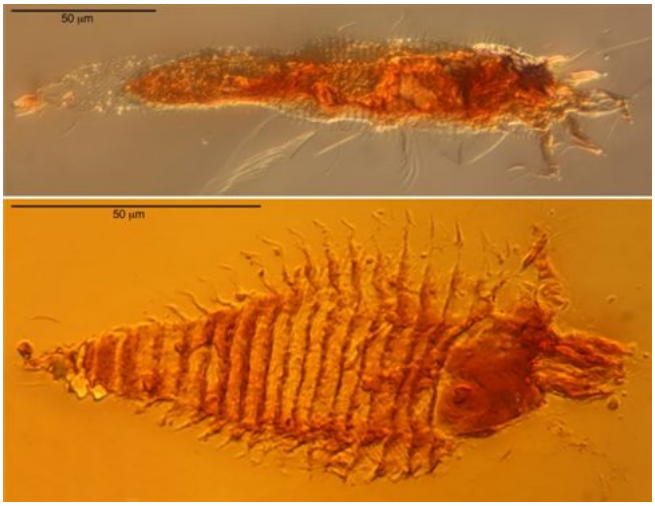
(New Civil Engineer, 16 August, 2012,
http://www.nce.co.uk/8634524.article)

Νεκρή φύση σε ρετσίνι

Μέσα σε κεχριμπάρι από τις Άλπεις, το αρχαιότερο διατηρημένο έντομο

Πριν από περίπου 230 εκατομμύρια χρόνια, όταν όλη η ξηρά της Γης ήταν ακόμα ενωμένη σε μια ήπειρο, μια μύγα και δύο ακάρεα είχαν την ατυχία να παγιδευτούν σε ρετσίνι από προϊστορικά κωνοφόρα. Το τέλος τους όμως δεν ήταν άδοξο, αφού τώρα αναγνωρίστηκαν ως τα αρχαιότερα δείγματα στην ομάδα των αρθροπόδων -η οποία περιλαμβάνει τα έντομα, τα αραχνίδια και τα καρκινοειδή.

Τα πρώτα αρθρόποδα εμφανίστηκαν πριν από περίπου 400 εκατομμύρια χρόνια και πολλά μέλη της ομάδας είναι γνωστά από απολιθώματα πολύ παλαιότερα από τα νέα δείγματα. Όμως τα απολιθώματα δεν περιέχουν τους πραγματικούς ιστούς του ζώου, είναι συμπιεσμένα από το βάρος των πετρωμάτων και συχνά δεν διατηρούν όλα τα μορφολογικά χαρακτηριστικά.



Τα δύο προϊστορικά ακάρεα είχαν τέσσερα πόδια αντί για οκτώ όπως οι σημερινοί συγγενείς τους

Αντίθετα, τα τρία αρθρόποδα που βρέθηκαν παγιδευμένα σε κεχριμπάρι από τις Άλπεις παραμένουν αναλλοίωτα από τις αρχές της Τριασσικής περιόδου.

«Στην Τριασσική περίοδο υπήρξε μια δραματική αλλαγή της πανίδας και της χλωρίδας, αφού ήταν μια μεταβατική περίοδος μετά μια από τις μεγαλύτερες μαζικές εξαφανίσεις ειδών, στα τέλη της Πέρμιας περιόδου» σχολιάζει ο Ντέιβιντ Γκριμάλντι, επικεφαλής των ερευνητών στο Αμερικανικό Μουσείο Φυσικής Ιστορίας.

«Είναι σημαντικό να μελετήσουμε αυτή την περίοδο προκειμένου να μάθουμε πώς εξελίχθηκε η ζωή» επισημαίνει.

Η ανακάλυψή του δημοσιεύεται στην αμερικανική επιθεώρηση PNAS.

Οι ερευνητές εξέτασαν συνολικά 70.000 σταγόνες απολιθωμένου ρετσινιού από την περιοχή των Άλπεων στη βορειοανατολική Ιταλία, η οποία θεωρείται η κυριότερη πηγή κεχριμπαριού της Τριασσικής περιόδου σε παγκόσμιο επίπεδο.

Ήταν μια κοπιαστική δουλειά, καθώς τα πλάσματα που αναζητούσαν ήταν μικροσκοπικά. Το πρώτο από τα τρία αρθρόποδα ήταν μια μύγα μήκους ενός περίπου χιλιοστού. Ορισμένα τμήματά της έλειπαν, εμποδίζοντας το χαρακτηρισμό του είδους, σίγουρα όμως πρόκειται για το αρχαιότερο διατηρημένο έντομο που έχει βρεθεί ως σήμερα.

Είναι πράγματι ένα παράξενο έντομο, καθώς έφερε οκτώ πόδια αντί για έξι, όπως όλα τα σημερινά έντομα.

Ασυνήθιστα ήταν και τα δύο άλλα πλάσματα, δύο μικροσκοπικά ακάρεα, τα οποία κατατάσσονται στην ομάδα των αραχνίδιων.

Σε αντίθεση όμως με τις αράχνες, τους σκορπιούς και τα σημερινά ακάρεα, που έχουν οκτώ πόδια, τα δύο ακάρεα της Τριασσικής είχαν μόνο δύο ζεύγη ποδιών.

Τα στοματικά εξαρτήματα των παγιδευμένων ακάρεων δείχνουν ότι επρόκειτο για φυτοφάγα είδη. Σήμερα, σχεδόν όλα τα φυτοφάγα ακάρεα τρέφονται με ανθοφόρα φυτά της ομάδας των αγγειόσπερμα.

Πριν από 250 εκατομμύρια χρόνια, όμως, τα αγγειόσπερμα φυτά δεν είχαν ακόμα εμφανιστεί. Όπως φαίνεται τα παγιδευμένα ακάρεα τρέφονταν με τα κωνοφόρα (γυμνόσπερμα) που κυριαρχούσαν τότε στον πλανήτη.

Για κακή τους τύχη, τα κωνοφόρα παράγουν ρετσίνι, με το οποίο μπορούν ενίοτε να εκδικούνται τα ακάρεα.

Και η εκδίκησή τους κρατά για πάντα.

(Newsroom ΔΟΛ, 28 Αυγ. 2012, http://news.in.gr/science-technology/article/?aid=1231210732)

Ακόμα δεν τα είδαμε και άρχισαν τα όργανα...

"Σώσε τη Γαύδο – Σώσε τη Μεσόγειο"

Κάτοικοι της Γαύδου συλλέγουν υπογραφές για την απαγόρευση εξόρυξης πετρελαίου και φυσικού αερίου από την περιοχή

Συλλογή υπογραφών πραγματοποιούν κάτοικοι της Γαύδου, μέσω του διαδικτύου και της ιστοσελίδας www.change.org, με σκοπό την αποτροπή της έναρξης γεωτρήσεων και την απαγόρευση εξόρυξης πετρελαίου και φυσικού αερίου από την περιοχή.

Η καμπάνια με την ονομασία «Σώστε τη Γαύδο / Σώστε τη Μεσόγειο» ξεκίνησε στις 21 Αυγούστου και αποστέλλεται στον Επίτροπο της Ε.Ε. για τον Ανθρώπινα Δικαιώματα Nils Muiznieks.

Πιο συγκεκριμένα, στους λόγους έναρξης αυτής της καμπάνιας συλλογής υπογραφών, οι κάτοικοι αναφέρουν την σεισμικότητα της περιοχής και τους κινδύνους από ένα πιθανό ατύχημα. Θεωρούν ότι, η μορφή της Θάλασσας της Μεσογείου (κλειστή, σχεδόν σα λίμνη) μετατρέπει κάθε ατύχημα σε οποιαδήποτε περιοχή σε περιβαλλοντική καταστροφή για όλη την περιοχή, ενώ πιστεύουν ότι η παραγωγή φυσικού αερίου και πετρελαίου στη Μεσόγειου δε θα σώσει την οικονομική κατάσταση της Ευρώπης.

Οι υπογραφές που έχουν συλλεχθεί έως αυτή τη στιγμή δεν ξεπερνούν τις μερικές δεκάδες.

Ακολουθεί ολόκληρο το κείμενο όπως υπογράφεται από τους χρήστες στο:http://www.change.org/petitions/save-gavdos-save-mediterranean?utm_campaign=friend_inviter_modal&utm_medium=facebook&utm_source=share_petition&utm_term=26119225

Η ελληνική κυβέρνηση εξετάζει το θέμα της παραγωγής φυσικού αερίου και πετρελαίου στην περιοχή της Κρήτης και πιο συγκεκριμένα ανάμεσα στην Κρήτη και τη Γαύδο, το νοτιότερο νησί της Ευρώπης.

Αντιλαμβανόμαστε ότι η λήψη μιας τέτοιας απόφασης από την κυβέρνηση της Ελλάδας και τις ευρωπαϊκές εταιρείες ενέργειας, στηρίζεται από ανάλογα επιχειρήματα. Εμείς, οι κάτοικοι της Γαύδου, τα θεωρούμε λανθασμένα και, ως εκ τουτου, δεν είμαστε διατεθειμένοι να επιτρέψουμε την καταστροφή του τρόπου της ζωής μας.

Είναι άκρως ανησυχητικό κι επικίνδυνο να ξεκινήσουν γεωτρήσεις σε ζώνη σεισμικής δραστηριότητας. Υπό αυτές τις συνθήκες, δεν υπάρχουν εγγυήσεις για την ασφάλεια των εργασιών. Ας θυμηθούμε τη Φουκοσίμα, όπου το πυρηνικό εργοστάσιο κατασκευάστηκε, παρόλο που ήταν ήδη γνωστή η περιοδικότητα της σεισμικής δραστηριότητας στην περιοχή. Επομένως, η καταστροφή του εργοστασίου είχε συνυπολογιστεί στο σχέδιο κατασκευής και λειτουργίας του.

Η λεκάνη της Θάλασσας της Μεσογείου, η οποία σε αντίθεση με τον Κόλπο του Μεξικού, μοιάζει με λίμνη, θα μετατρέψει οποιοδήποτε τοπικό ατύχημα σε περιβαλλοντική καταστροφή στην κλίμακα ολόκληρης της Μεσογείου.

Η Γαύδος είναι η τελευταία γωνιά καταπράσινου παράδεισου στην Ευρώπη. Εδώ, η φύση δεν έχει αλλάξει ανεπανόρθωτα υπό την επίδραση της παγκόσμιας βιομηχανίας. Στο νησί μας έρχονται να ξεκουραστούν άνθρωποι από όλη την Ευρώπη, και το να μετατραπεί ένα τέτοιο μέρος σε βιομηχανική ζώνη, για λόγους αμφίβολων οικονομικών συμφερόντων, αποτελεί μη-ανθρωπιστική πράξη.

Δεν πιστεύουμε ότι η παραγωγή φυσικού αερίου και πετρελαίου στη Μεσόγειο θα σώσει την οικονομική κατάσταση της Ευρώπης, όσο κερδοφόρα κι αν αυτή αναμένεται. Είναι αδύνατο να αναστηλωθεί η ευρωπαϊκή οικονομία με μοναδικό δεκανίκι το φυσικό αέριο. Πιστεύουμε ότι η οικονομία οφείλει να υπηρετεί τους ανθρώπους κι δεν θα θυσιάσουμε τη ζωή μας για τις ανάγκες της.

Γνωστοποιούμε τη γνώμη μας για το θέμα αυτό πριν από την έναρξη ερευνών για τους υπόγειους πόρους στην περιοχή μας, ώστε όταν προκύψουν προβλήματα, καμία κυβερνήση και κανείς εμπλεκόμενος δε θα είναι σε θέση να καταφύγει σε δικαιολογίες του τύπου "εμείς δε γνωρίζαμε τίποτα γι' αυτό."

Είναι επείγουσα ανάγκη:

1ον Να απαγορευθεί η εξόρυξη πετρελαίου και φυσικού αερίου από τη Μεσόγειο Θάλασσα.

2ον Η Γαύδος και η Κρήτη να αναγνωριστούν και να προστατευτούν ως θησαυροί της Ευρωπαϊκής Περιβαλλοντικής Κληρονομιάς.

3ον Όποια εργασία με περιβαλλοντικές συνέπειες λαμβάνει χώρα στη Γαύδο και την Κρήτη να γίνεται με την πρότερη συναίνεση των κατοίκωντους δια δημοψηφίσματος.

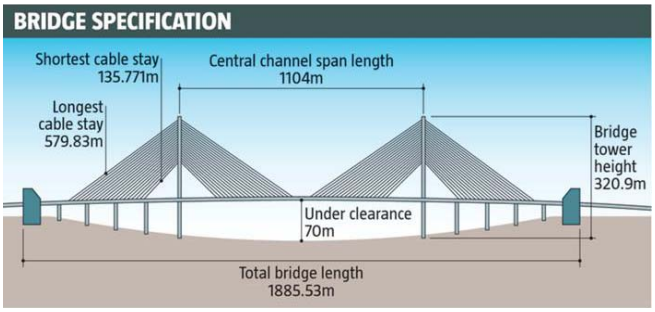
(Αγώνας της Κρήτης, Τετάρτη 22 Αυγούστου 2012)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Bridges: Russian Masterpiece

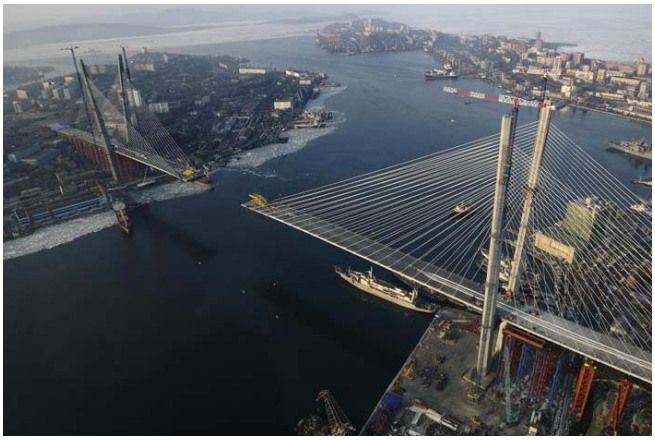
Last month Russian Prime Minister Dmitry Medvedev declared the new world-record cable stayed Russky Island bridge a "beautiful, unique" structure as he opened it to traffic. Mark Hansford was in Vladivostok before him to speak to those who have made it happen.

Big bridges have been used by governments as a show of economic might for centuries, from London's Tower Bridge, to Sydney's Harbour Bridge and San Francisco's Golden Gate Bridge. That tradition is showing little sign of abating, with two of the world's most dominant superpowers battling it out to have the world's longest of the most modern type of big crossing - the cable stayed bridge. And it is the Russians who have edged ahead following the inauguration in Vladivostok last month of the 1,872m long Russky Island bridge.



With a central span of 1,104m it is only slightly longer than that of China's Sutong Bridge which has a central span of 1,088m, but it is enough to take the record. And it is the record, and the statement of power that goes with it, that Russia wants to make in the old Soviet port of Vladivostok as it gears up to host a major economic summit next month.

Federal and state governments have been pumping RB-204bn (£7.2bn) into the city's roads and railways as it prepares to host the Asia Pacific Economic Cooperation (Apec) summit. The Russky Island bridge is the biggest single investment, although perhaps more impressive is the city's Golden Horn bridge with its 737m central span (see end of article).



But it is the Russky Island Bridge of which the Russian government is most proud. It connects the continent with the small Siberian Island of Russky, where the Apec summit will take place in a vast convention centre and hotel complex built for the job and as a future home to the Far Eastern Federal University. Heads of government from across the Asia-Pacific region will therefore cross the bridge, getting a first-hand demonstration of Russian engineering prowess.

Speaking at the inauguration last month, Prime Minister Dmitry Medvedev warmly congratulated the Russian bridge builders and spoke of how "really very proud" he was of being with them and to be among the first people to travel over "this beautiful, unique structure".

"This is the opening of a magnificent-looking cable stayed bridge that has been built by the teamwork of excellent professionals," he said.

French specialist

But it's not all down to Russians. For, while Russian legislation demanded a Russian contractor - USK Most got the contract - and a Russian designer - Mostovik - the key component in any cable stayed bridge - the cable stays themselves - were designed and installed by French specialist Freyssinet.

Indeed, when NCE visited in June, ahead of the inauguration, Russian transport vice-minister Oleg Belozerov was keen to highlight the eagerness of the Russian government to bring in international expertise. "The president [Vladimir Putin] himself was keen for the excellent experience of international firms," he said. "We are keen for consortiums to be made up with foreign experience, and projects for the Apec conference were a good place to show that."

Vladivostok's mayor Igor Puchkarev was more glowing still. "We are very excited about the appearance of new bridges in our town and it is due to Freyssinet that we have them," he said. Freyssinet also supplied the cables and provided technical support for the Golden Horn bridge.

Freyssinet's world-renowned expertise in long-span cable stayed bridges was unquestionably vital for Russky Island. While only a modest increase in length on Sutong bridge, it is being built in a much more testing environment. Siberian winters are, after all, world-renowned as being particularly harsh and the bridge will have to withstand a marine environment with temperatures as low as -40°C and design wind speeds of 36m/s. By comparison the design wind speed on the 856m span Pont de Normandie was just 15m/s. Freyssinet's knowledge was therefore seen as key and it carried out design, production and installation of the cable stays and damping system. It also carried out an expert appraisal on behalf of the Russian Ministry of Construction to validate the superstructure design, and brought in world-renowned bridge designer Michel Virlogeux to advise Mostovik on its deck design.Virlogeux's input was to ensure that the deck had a cross-section in the shape of an in-

verted aerofoil to give it negative lift and better stability under wind loading. He also advised on optimising the dimensions of the towers. But he is modest about his contribution. "This one is a very classical design," he says. "But I like it."

The design is indeed a classical cable stayed bridge. It is completely symmetrical, with a central orthotropic steel box girder, 28m wide and 3.2m high. It has two 321m tall standard A-shaped reinforced concrete towers and features 168 parallel-strand cable stays with dampers placed on each one. The towers were built with self-climbing formwork and piles 2m in diameter were driven as deep as 77m below ground to support them.

Construction began in 2007 and the truly momentous moment - the moment Russky Island bridge became the world's longest cable stayed bridge with a 1,104m span - happened in April when USK Most hoisted the final 12m long deck section 76m from a barge to its final position and welded it into place.

Yet even before that, records had been broken by Freyssinet's cable team. Long span cable stayed bridges need long cable stays, and the ones on Russky are the longest and heaviest ever; up to 580m long and 65t in weight.

And herein lies the challenge. To keep wind loads down - wind effects on the cables themselves contribute about 55% of wind loadings on long span bridges - Freyssninet has used its patented compact cable stays which can contain around 20% more strands in their sheaths than conventional sheaths of the same diameter. This means the same vertical load can be carried by fewer cables, which in turn reduces the wind loadings.

Reduced wind loads

In fact, wind loads on the structure are reduced by a hefty 25% to 30% as a result. This translates into a massive knock on saving of 35% to 40% on the cost of materials for the pylons and deck.

The longest set of cables was installed earlier this year, but for Freyssinet the build-up started in July 2011 with the positioning of the first pair of 136m long, 4t cables at a height of 186m. From that date operations proceeded with the installation of eight planes of 21 cable stays culminating in March with the installation of the last - and longest - and heaviest - pair of stay cables at a height of 317m. These weighed in at a massive 65t each.

Each cable is made up of between 13 and 79 strands of 15.7mm diameter, with each strand comprising seven galvanised steel wires individually covered with a thin film of petroleum wax and encased in a high density polyethylene (HDPE) sheath.

The number of strands in each cable increases as the hanging angle increases - every degree from the vertical decreases the efficiency of the load transfer so the number of strands must be increased to compensate. The longest cables are by definition those that hang the furthest from the vertical and so need the most strands - 79 at Russky.

"The ultracompact stay cables of the bridge to the Russky Island are second to none in the world in terms of both the length and design," says USK Most director Aleksey Baranov.

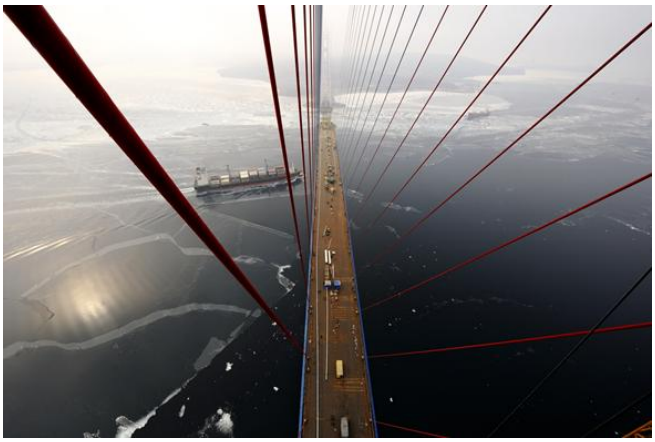
At its peak Freyssinet had 45 people working on site, with around 300 Russian workers trained by Freyssinet working under the guidance of USK Most to provide the support needed to install the cables.

Shared culture

From Freyssinet's point of view it has worked a treat. "The co-operation between us and the Russians was very simple because we share the same technical culture," says Freyssinet chief executive Jerome Stubler. "Working with Russians is easier than with many other countries," he adds.

Since March Freyssinet's effort has been focused on installing the dampers, used on all long span cable stayed bridges to provide aerodynamic stability. This has been taken to new levels of technical innovation on Russky.

Initially the dampers in use will be Freyssinet's patented but now standard systems - installed where the cables meet the deck. On shorter cables Freyssinet's Internal Radial Dampers are used. These are located inside the anchorage tubes and provide a smooth outer shape. On the longer cables these aren't up to the job, and Freyssinet's Pendular External Dampers are needed. They use piston dampers with a pendular lever system which can move around a rod hinged on fixed support.



They are bulkier looking, and could soon become a thing of the past as Freyssinet has agreed with client the City of Vladivostok to retrofit its newest damper system to the bridge once the hullabaloo of the Apec summit has passed. This will be the first use of its new damping cross tie. It has spent £600,000 developing the patented system and Stubler for one is eager to try it out.

"We got the patent one year ago but we agreed with the client six months ago that we will not install it for opening," he says.

"But it complies with the specification and if we had installed it here we may not have installed normal dampers."

Cross ties - often called aiguilles - are nothing new, Freyssinet installed them on the Normandie bridge in France. But aiguilles run across the cable array continuously and are unpopular with bridge architects.

Freyssinet's system differs in that the cross ties run from just one cable to the next and so are less visually intrusive. It works differently too.

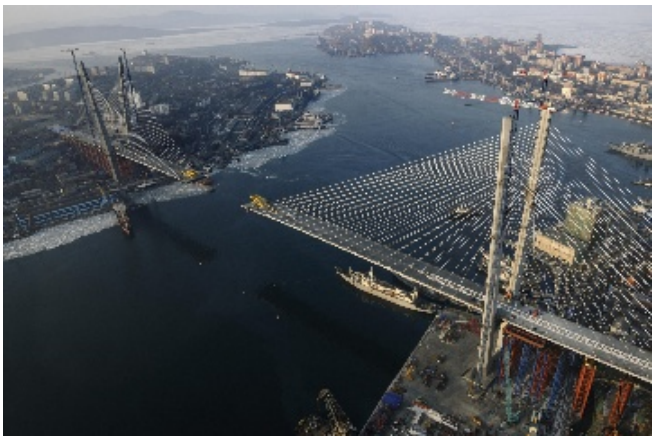
The general concept is the same - by effectively strapping pairs of cables together at their mid point, the structure becomes much more robust and resistant to wind loads.

Meanwhile Russian bigwigs from Vladivostok to Moscow are chomping at the bit to sample the Russky Island bridge experience for themselves.

"We are anticipating that president Putin is to come here in September when we host the summit," says mayor Puchkarev.

"But I can reveal a secret - he wants to walk or drive over the bridge himself as soon as possible."

Golden Horn Bridge



While Russky Island is thrust into the international spotlight by virtue of its record-breaking central span and its role in Vladivostok's hosting of the Apec summit, its neighbour the Golden Horn bridge is the one that is being celebrated locally.

The locals are proud of their city, which they see as the San Francisco of the east - and it's easy to see why - it's hilly, it's coastal, it spends eight months of the year shrouded in fog, and for Russia its rather laid-back. All that's been missing, apart from the thriving vineyards, is the signature bridge. And to the locals, the Golden Horn - not Russky - is the bridge claiming that crown.

"The Golden Horn bridge is the one we have been waiting most for," says Vladivostok mayor Igor Puchkarev. "In fact, we have been waiting over 100 years."

This view is partly borne out by its beauty but also out of practicality as it unites one of the city's most densely populated yet under-developed suburbs with the centre and, it is hoped, will act as a catalyst for regeneration of the area.

"Until now it would take up to three hours to reach the city centre because of the traffic. Now this has journey been eliminated - now it will take only 10 minutes to walk to, and driving it will take even less. It is a very meaningful bridge for us," says Puchkarev.

And in any other city it would be winning huge plaudits. With a main span of 737m and a total length of 2,389m it will be the ninth-longest cable stayed structure in the world by span when it opens this autumn.

It is also another triumph of Franco-Russian collaboration, with Freyssinet supplying and installing the 192 cable stays, providing technical assistance to contractor TMK and training personnel.

It also makes the area a hotbed of cable stay construction. "There is just 5km between the bridges. It means it is probably the biggest concentration of cable stays in the world," says Freyssinet construction manager Damien Delbos.

Construction started in 2008 with Freyssinet starting to install cables in June 2011. Again, Freyssinet's compact sheath was used to reduce the impact of wind. Its work was done in April.

(Mark Hansford / New Civil Engineer, 9 August 2012, http://www.nce.co.uk/features/structures/bridges-russian-masterpiece/8634173.article?blocktitle=Top-features&contentID=1079)

Is There a Limit to How Tall Buildings Can Get?

The race is always on. Within the span of just two years, the world's tallest building was built three times in New York City – the 282.5-meter Bank of Manhattan in 1930, the 319-meter Chrysler Building in a few months after, and then 11 months later the 381-meter Empire State Building in 1931. The era of architectural horse-racing and ego-boosting has only intensified in the decades since. In 2003, the 509-meter Taipei 101 unseated the 452-meter Petronas

Towers in Kuala Lumpur after a seven-year reign as the world's tallest. In 2010, the Burj Khalifa in Dubai far surpassed Taipei 101, climbing up to 828 meters. Bold builders in China want to go 10 meters higher later this year with a 220-story pre-fab tower that can be constructed in a baffling 90 days. And then, in 2018, the Kingdom Tower in Jeddah, Saudi Arabia (below, right) will go significantly farther, with a proposed height of at least 1,000 meters.

The Burj Khalifa stands tall in Dubai's skyline - *Reuters.* Rendering of Freedom

Will this race ever stop? Not in the foreseeable future, at least. But there has to be some sort of end point, some highest possible height that a building can reach. There will eventually be a world's tallest building that is unbeatably the tallest, because there has to be an upper limit. Right?

Ask a building professional or skyscraper expert and they'll tell you there are many limitations that stop towers from rising ever-higher. Materials, physical human comfort, elevator technology and, most importantly, money all play a role in determining how tall a building can or can't go.

But surely there must be some physical limitations that would prevent a building from going up too high. We couldn't, for example, build a building that reached the moon because, in scientific terms, moon hit building and building go boom. But could there be a building with a penthouse in space, beyond earth's atmosphere? Or a 100-mile tall building? Or even a 1-mile building?

The Council on Tall Buildings and Urban Habitat, a group interested in and focused on the phenomenon of skyscrapers, recently asked a group of leading skyscraper architects and designers about some of the limitations of tall buildings. They wondered, "What do you think is the single biggest limiting factor that would prevent humanity creating a mile-high tower or higher?" The responses are compiled in this video, and tend to focus on the pragmatic technicalities of dealing with funding and the real estate market or the lack of natural light in wide-based buildings.

"The predominant problem is in the elevator and transportation system," says Adrian Smith, the architect behind the current tallest building in the world and the one that will soon outrank it, the kilometer-tall Kingdom Tower in Jeddah.

But in terms of structural limitations, the ultimate expert is likely William Baker. He's the top structural engineer at Skidmore, Owings and Merrill and he worked with Smith on the Burj Khalifa, designing the system that allowed it to rise so high. That system, known as the buttressed core, is a kind of three-winged spear that allows stability, viably usable space (as in not buried deeply and darkly inside a massively wide building) and limited loss of space for structural elements.

The illustration in the next page from SOM shows how the buttressed core of the Burj Khalifa compares to the traditional structure of the Willis Tower. (This image is an adaptation of a graphic that originally appeared in this article on Baker and the buttressed core from the December 2007 issue of *Wired*.)

Baker says the buttressed core design could be used to build structures even taller than the Burj Khalifa. "We could go twice that or more," he says.

And though he calls skyscraper design "a fairly serious undertaking," he also thinks that it's totally feasible to build much taller than even the Kingdom Tower.

"We could easily do a kilometer. We could easily do a mile," he says. "We could do at least a mile and probably quite a bit more."

The buttressed core would probably have to be modified to go much higher than a mile. But Baker says that other systems could be designed. In fact, he's working on some of them now.

One idea for a new system would be buildings with hollowed bases. Think of the Eiffel Tower, says Tim Johnson. He's chairman at the Council on Tall Buildings and Urban Habitat and a partner at the architecture firm NBBJ, and he says any really, really tall building would have to be like a supersized version of the Parisian icon, otherwise the lower floors required to support the gradually narrowing structure would be way too big to even fill up.

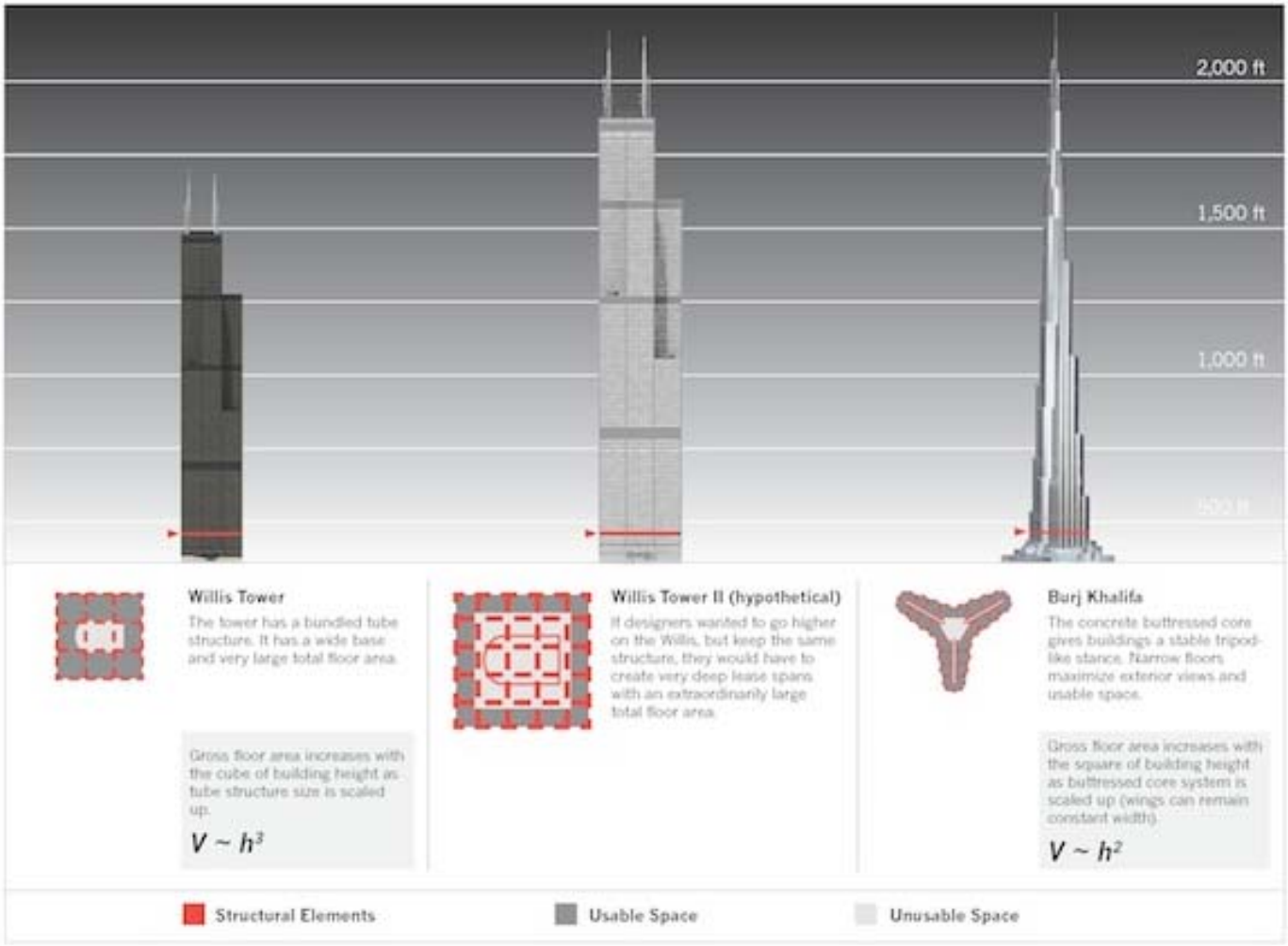
For a Middle East-based client he's not allowed to identify, Johnson worked on a project back in the late 2000s designing a building that would have been a mile-and-a-half tall, with 500 stories. Somewhat of a theoretical practice, the design team identified between 8 and 10 inventions that would have had to take place to build a building that tall. Not innovations, Johnson says, but inventions, as in completely new technologies and materials. "One of the client's requirements was to push human ingenuity," he says. Consider them pushed.

With those inventions and the hollow, Eiffel Tower-like base, Johnson says the design could have worked. The project was canned as a result of the crash of the real estate market in the late 2000s (and probably at least a little good old-fashioned pragmatism). But if things were to change, that building could be built, he says.

"We proved that it is physically and even programmatically possible to build a building a mile-and-a-half tall. If somebody would have said 'Do it two miles,' we probably could have done that, too," Johnson says. "A lot of it comes down to money. Who's going to have that kind of capital?"

As far as the structure is concerned, others think it's possible, too. My colleague John Metcalfe recently pointed out a 1990s-era concept for a two-and-a-half-mile volcano-looking supertower in Tokyo called the X-Seed 4000 that has a similar Eiffel Towerishness to it.

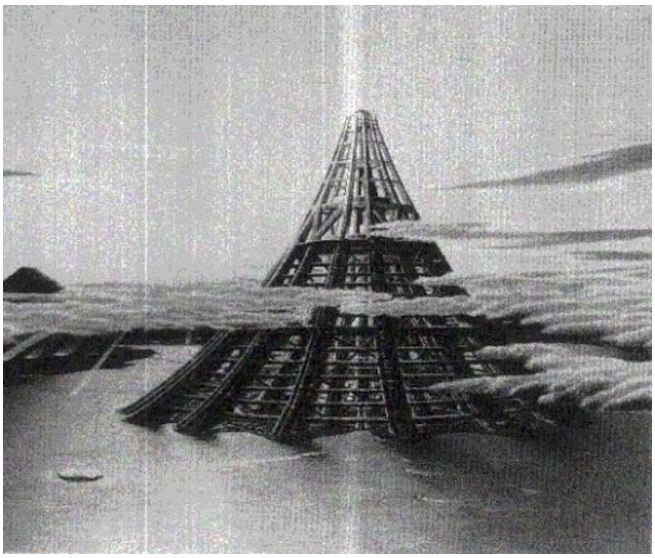
As Metcalfe notes, this 4,000-meter "skypenetrator" was never built for a variety of reasons, but the most obvious is that "real estate in Tokyo isn't exactly cheap. The base of this abnormally swole tower would eat up blocks and blocks if it was to be stable." In fact the base of this structure, according to conceptual drawings, would have spread for miles and miles, almost like the base of Mount Fuji, itself about 225 meters smaller than the X-Seed 4000.



A building taller than a mountain seems preposterous. But according to Baker, it's entirely possible.

"You could conceivably go higher than the highest mountain, as long as you kept spreading a wider and wider base," Baker says.

Theoretically, then, a building could be built at least as tall as 8,849 meters, one meter taller than Mount Everest. The base of that mountain, according to these theoretical calculations, is about 4,100 square kilometers – a huge footprint for a building, even one with a hollow core. But given structural systems like the buttressed core, the base probably wouldn't need to be nearly as large as that of a mountain.



And this theoretical tallest building could probably go even taller than 8,849 meters, Baker says, because buildings are far lighter than solid mountains. The Burj Khalifa, he estimates, is about 15 percent structure and 85 percent air. Based on some quick math, if a building is only 15 percent as heavy as a solid object, it could be 6.6667 times taller and weigh the same as that solid object. A building could, hypothetically, climb to nearly 59,000 meters without outweighing Mount Everest or crushing the very earth below. Right?

"I'd have to come up with a considered opinion on that," says Baker.

How about an unconsidered opinion?

"I'm afraid I'm going to have to chicken out on you and not give you a number," Baker laughs. "This is the kind of thing I'd want to do with a student."

"If you get some funding for a grad student for a semester, I'll give you a number," Baker says.

So we still don't really know what the tallest building ever would be. In the meantime, Everest-plus-one is essentially the highest. But like the ever-moving crown for the tallest building in the world, even this estimate could rise with a little investigation. Any grad students out there got a semester to spare?

Note: As a number of readers have pointed out, this article neglects to mention the concept of the space elevator –a 100,000-kilometer shaft anchored on the earth that rises out beyond our atmosphere where a counterweight would hold it in place, enabling earth-based vehicles to relatively efficiently climb up into space. Admittedly, that would be a

tall structure, probably the tallest. But for the purposes of this article, I chose to focus on buildings in the common perception of the word. My sincere apologies to any space elevator enthusiasts out there who feel left out. Excelsior! -N.B.

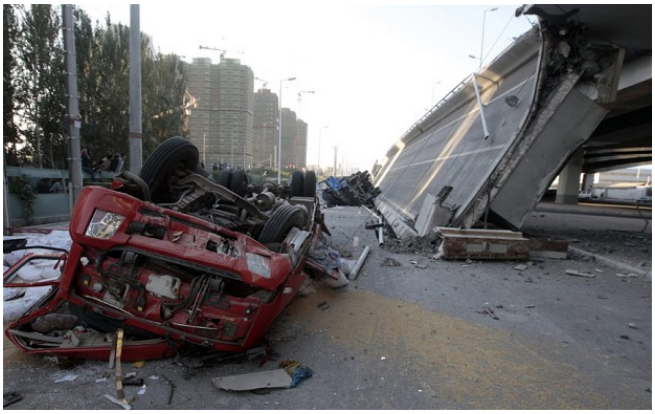
(Nate Berg / The Atlantic Cities, 16 August 2012, http://www.theatlanticcities.com/design/2012/08/there-limit-how-tall-buildings-can-get/2963/)

Three killed as suspension bridge collapses in China

Three people were killed and five injured when an eight-lane suspension bridge in northeast China collapsed early on Friday, only nine months after it opened, state media said.

The bridge, part of an airport expressway in Harbin city, only opened last November after two years of construction that cost 1.9 billion yuan ($300 million), China News Service reported.

A 320-foot section broke off when four heavy trucks drove onto the bridge, plunging them to the ground and crushing them, said a CCTV news reporter at the scene. The bridge was designed to handle up to 9,800 vehicles per hour.



Two people were killed on the spot, a third died later, and five remain in hospital for treatment, the report said, adding that authorities were investigating the cause of the accident.

A collapsed section of the Yangmingtan Bridge's ramp, in the city of Harbin, dropped 100 feet to the ground on Friday, killing three people and injuring five.

The official Xinhua news agency said at least six major bridges had collapsed across the country since July last year, and that shoddy construction and overloading were to blame.

China has rapidly expanded its road and rail infrastructure over the past decade as its economy has boomed, but critics say that safety has sometimes been overlooked in the rush to develop.

At least 40 people were killed when two high-speed trains collided near the eastern city of Wenzhou in July last year, and another train collision in the northeastern province of Heilongjiang on Thursday left at least 24 people injured.

Authorities in Harbin were not immediately available for comment on Friday's accident, which came after two people died last week when a road in the same city caved in, leaving a hole 10 meters wide and 10 meters deep.

(The Telegraph, 24 Aug 2012 http://world.einnews.com/article/111687311?promo=800&utm_source=MailingList&utm_medium=email&utm_campaign=Breaking+News%3A+world122-friday)

Collapse of New Bridge Underscores Worries about China Infrastructure

HONG KONG - One of the longest bridges in northern China collapsed on Friday, just nine months after it opened, setting off a storm of criticism from Chinese Internet users and underscoring questions about the quality of construction in the country's rapid expansion of its infrastructure.

A nearly 330-foot-long section of a ramp of the eight-lane Yangmingtan Bridge in the city of Harbin dropped 100 feet to the ground. Four trucks plummeted with it, resulting in three deaths and five injuries.

The 9.6-mile bridge is one of three built over the Songhua River in that area in the past four years. China's economic stimulus program in 2009 and 2010 helped the country avoid most of the effects of the global economic downturn, but involved incurring heavy debt to pay for the rapid con-

struction of new bridges, highways and high-speed raillines all over the country.

Questions about the materials used during the construction and whether the projects were properly engineered have been the subject of national debate ever since a high-speed train plowed into the back of a stopped train on the same track on July 23 last year in the eastern city of Wenzhou. The crash killed 40 people and injured 191; a subsequent investigation blamed in particular flaws in the design of the signaling equipment.

Photographs on Chinese Web sites on Friday appeared to show that the collapsed section of the Yangmingtan Bridge's ramp had fallen on land, not in the river.

According to the official Xinhua news agency, the Yangmingtan Bridge was the sixth major bridge in China to collapse since July 2011. Chinese officials have tended to blame overloaded trucks for the collapses, and did so again on Friday.

Many in China have attributed the recent spate of bridge collapses to corruption, and online reaction to the latest collapse was scathing.

"Corrupt officials who do not die just continue to cause disaster after disaster," said one post on Friday on Sina Weibo, a Chinese microblogging service similar to Twitter.

Another Internet user expressed hope "that the government will put heavy emphasis on this and investigate to find out the real truth, and give both the dead and the living some justice!" A third user was more laconic, remarking, "Tofu engineering work leads to a tofu bridge."

Chinese news media reported that the bridge had cost 1.88 billion renminbi, or almost $300 million.

Hilda Wang contributed reporting.

Keith Bradsher / New York Times, August 24, 2012, http://www.nytimes.com/2012/08/25/world/asia/collapse-of-new-bridge-underscores-chinas-infrastructure-concerns.html?_r=1)

Chinese Blame Failing Bridges on Corruption

Eight bridges have collapsed around China since 2011. Here, government investigators examine a recently built entrance ramp that collapsed last week in the northeastern city of Harbin, killing three people. Local residents believe government corruption and substandard materials are to blame.

When the Yangmingtan bridge opened in the northeastern Chinese city of Harbin in November, local officials hailed it as a grand achievement.

The bridge stretched more than nine miles and cost nearly $300 million. Construction was supposed to take three years, but workers finished in half that time.

"A lot of comrades didn't go home for more than a year, never took a holiday, never took off a weekend," Yang Qingwei, the party secretary of a bridge construction company, proudly told Heilongjiang provincial TV.

But early one morning last week, an entrance ramp to the bridge collapsed. Four trucks on the ramp tumbled to the roadway below. Three people died and five were injured.

The government initially blamed the trucks, saying they were overloaded. But infrastructure fails so often in China, most people assume the real culprit is government corruption.

A Series of Bridge Collapses

Since 2011, eight bridges have collapsed around the country, according to China's state-run media. The cases include one in April 2011, when a cable snapped on a suspension bridge in Western China's Xinjiang region, sending a chunk of roadway plunging onto a riverbank.

Two months later, a bridge in southern China's Fujian province collapsed, leaving one dead and 22 injured.

And in March this year, a bridge under construction in Central China's Hubei province snapped in half.

The collapse in Harbin sparked more than 2 million posts on Sina Weibo, China's most popular Twitter-like site. The reaction of Zeo Niu, a college junior studying in Harbin, was typical.

"Corruption. It is the first thing that pops into our mind," said Niu, 20. "We don't have to think about it, because it's so common."'

Niu's uncle runs a construction company in central China. She says using substandard material while charging for high-quality goods is routine.

"This analogy is made by my uncle," she said. "If the central government wants a steel bar, it should be 10 centimeters. When it comes to the province, it will be 8 centimeters, and when it comes to the city, it will be 5. This is very, very common. This is not news."

Rapid Growth, Shoddy Construction

In fact, corruption and failing infrastructure have been a problem in China since the 1990s, when market reforms set the country's economy on a rocketlike trajectory. The government went on a sustained building boom that provided unprecedented opportunities for graft.

Zhu Lijia, a professor at the Chinese Academy of Governance in Beijing, said bid rigging is the norm and there are no checks or balances on the procurement process.

"The situation is going in a bad direction," said Zhu in a phone interview from Beijing. "We do have relevant laws regarding the bidding process, but there is a lack of enforcement. The bidding process is only a show."

Chinese have a phrase for these failing infrastructure projects: doufazha, which means "bean curd dregs."

The most infamous case occurred in 2008, when a massive earthquake struck Sichuan province. In one poorly built school alone, 700 children were crushed to death.

"These were charity projects, and officials dared to skimp on the job and use low-quality materials," said Zhu. "This was much worse than Harbin. Up until now, we haven't seen any officials punished."

The Yangmingtan bridge collapse has generated a variety of reactions in Harbin.

Many people refused to discuss it this week with a foreign reporter for fear that they would get in trouble with the local government or bring discredit to their country.

Part of a Deeper Problem

Others saw the collapse as a symptom of deeper problems with China's one-party system. A man surnamed Zhang, who designs furniture, said infrastructure continues to collapse because there is no way to police the government.

"China's civil society is not strong enough," Zhang said over Pepsis at a local KFC. "It's too fragmented and too weak and can't force the party to make changes."

Others in Harbin see collapsing projects as a fact of life in a rapidly developing country with no rule of law.

"Probably as the system improves, these problems may be solved," said a chemistry doctoral student who gave just his surname, Sun, not sounding terribly convinced himself.

Sun, 30, was hanging out on a bench at the Harbin Institute of Technology in a blue T-shirt, camouflage cargo pants and Crocs. Asked how society solves a problem like this, Sun was at a loss.

"We want to participate, but we aren't the government," he said. "We are just common people. We can give the government ideas. We can discuss this hot topic in private and online. That's all we can do."

Zeo Niu, the college student, is angry about the infrastructure failures. But she says what really upsets her is that so many projects collapse, people just become overwhelmed.

"I will never remember those victims' names in this accident, and people won't remember it," Niu said. "It will be buried by another accident."

(Frank Langfitt / National Public Radio, August 29, 2012, http://www.npr.org/2012/08/29/160231137/chinese-blame-failed-infrastructure-on-corruption)

The 15 College Majors with the Highest Pay

College has never been more expensive, so what should someone study so the student has a better chance at a high salary once graduation comes?

Here's a hint -- head to your nearest medical school or engineering college if you want an awesome starting salary.

According to College Majors Handbook with Real Career Paths and Payoffs, which uses data from the Census Bureau statistics, U.S. Department of Labor studies and a 2011 survey of 170,000 college grads by the National Science Foundation, students who studied engineering and medicine command the highest median pay.

1. Pre-med $100,000
2. Computer systems engineering $85,000
3. Pharmacy $84,000
4. Chemical engineering $80,000
5. Electrical and electronics engineering $75,000
6. Mechanical engineering $75,000
7. Aerospace and aeronautical engineering $74,000
8. Computer science $73,000
9. Industrial engineering $73,000
10. Physics and astronomy $72,200
11. **Civil engineering $70,000**
12. Electrical and electronics engineering technology $65,000
13. Economics $63,300
14. Financial management $63,000
15. Mechanical engineering technology $63,000

(Tyler Kingkade / The Huffington Post, August 24, 2012)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.geoengineer.org

Κυκλοφόρησε το Τεύχος #91 του **Newsletter του Geoengineer.org** (Αύγουστος 2012) με πολλές χρήσιμες πληροφορί-ες για όλα τα θέματα της γεωτεχνικής μηχανικής. Υπενθυμί-ζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (http://www.geoengineer.org/geonews90.htm).

Geosynthetics International

www.thomastelford.com/journals

Κυκλοφόρησε το τεύχος αρ. 4 του 19ου τόμου (Αυγούστου 2012) του περιοδικού **Geosynthetics International** με τα παρακάτω περιεχόμενα:

*Absorption and discharge capacity tests on natural prefabricated vertical drains B.S. Asha, J.N. Mandal pages 263 - 271
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00013]

*Behaviour of reinforced structures under simulated toe scouring C.-C. Huang, Y.-S. Chen, pages 272 - 283
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00014]

*Stability analyses of reinforced walls subjected to simulated toe scouring C.-C. Huang, Y.-S. Chen, pages 284 – 291,
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00015]

*Model tests on geosynthetic-reinforced stone columns: a comparative study K. Ali, J.T. Shahu, K.G. Sharma, pages 292 – 305,
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00016]

*Model tests for anchored geosynthetic slope systems under dry and seepage conditions R.-H. Chen, P.-C. Chi, K.-Y. Fon, 306 – 318,
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00017]

*On measuring the hydraulic transmissivity of the geotextile cover of geosynthetic clay liners H.M. Abuel-Naga, A. Bouazza, E. Lalot, 319 – 323,
[http://www.icevirtuallibrary.com/content/article/10.1680/gein.12.00018].

Πρόσβαση μέσω της ιστοσελίδας
http://www.icevirtuallibrary.com/content/issue/gein/19/4.

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