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Αρ. 54 – ΦΕΒΡΟΥΑΡΙΟΣ 2013

Κάτοικος της Florida χάθηκε σε…τρύπα που άνοιξε στο υπνοδωμάτιό του

Ένας κάτοικος του Brandon, στα προάστια της Tampa, Florida, USA φέρεται ότι έχασε την ζωή του όταν ξαφνικά μια τεράστια τρύπα άνοιξε εκεί όπου βρισκόταν το υπνοδωμάτιό του και τον ρούφηξε, παρασύροντάς τον στο βάθος της γης κατά τη διάρκεια της νύχτας της Πέμπτης 28 Φεβρουαρίου προς Παρασκευή 01 Μαρτίου.

Οι αρχές, οι οποίες εκλήθησαν στον τόπο του δυστυχήματος, βρήκαν όταν μπήκαν μέσα στο σπίτι μια τρύπα διαμέτρου 6m -η οποία δεν είναι εντελώς ορατή από το εξωτερικό μέρος του σπιτιού- και δεν μπόρεσαν να έρθουν σε επαφή με το θύμα.

Το φαινόμενο σχηματισμού sinkholes στην περιοχή της Φλώριδας είναι συνηθισμένο, όπως φαίνεται και στην παρακάτω φωτογραφία από την sinkhole που εμφανίστηκε στις 3 Μαΐου 2012 στο Windmere.

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ΑΡΘΡΑ

Dam Safety: Ontario Ministry Develops Dam Management Plan

David G. Judge, Hugh John Cook and Allan Chow

Balancing the responsibilities of dam ownership with the requirements of dam management can be a challenging task. The Ontario Ministry of Natural Resources' multi-functional dam asset management plan allows efficient and effective management of a large fleet of dams for the best environmental, economic and recreational outcomes.

Dam infrastructure in the Canadian province of Ontario serves a variety of purposes related to: protection of public resources to enhance ecological sustainability, management of water to enhance economic opportunities, and protection of life and property against floods and dam failures. The Ontario Ministry of Natural Resources (MNR) owns more than 400 dams and is responsible for maintaining these dams for the well-being of provincial residents, to provide economic benefits, and to protect the environment. Most of the dams were constructed between 1956 and 1970 and are 40 to 55 years old. Nine of the dams impound water for hydropower operations.

The core business objectives supported by MNR dams are protection of: life and property from floods and erosion; ecosystem health, including fishery management and preservation of fish and wildlife habitat; and wetlands, especially those deemed "provincially significant." The provincially significant wetland designation is established by MNR biologists and specially trained and approved private sector biologists using a complex scoring system that evaluates the size of the wetland, the biota within that wetland and the rarity/importance of the biota. MNR's dams also provide barriers to lamprey and other invasive fish species; reservoirs for hydro power production; and recreation, boating, and navigation opportunities. Among these core business objectives, protection of life and property and the provision of measures for public safety are regarded as the most important.

The government of Ontario has created a Ministry of Infrastructure and requires that all provincial infrastructures be professionally managed using asset management plans. As a result, MNR commissioned the development of a formal dam asset management plan (DAMP) to enable them to manage their dams on a lifecycle basis to minimize total costs while still achieving the required service levels at a reasonable level of risk to the environment and public. Previously the dam assets were managed using an informal system that dealt with specific problems as they were identified. DAMP, developed by consultant Hatch Ltd. with MNR staff, provides access to comprehensive information about the assets, including a risk assessment, so that the dams can be efficiently and effectively managed.

DAMP was developed to allocate funds necessary for the sustainable lifecycle management of dams, as well as to ensure that dam safety, economic and environmental aspects are well-handled. The DAMP model was configured into a proprietary database called the Total Capital Planning Solution or TCPS®. TCPS goes beyond conventional engineering-based condition assessments by overlaying an organization's business objectives/strategies against many identified technical options, thus providing a scalable and sustainable approach to strategic asset management.

The DAMP model includes application of a Risk Based Profiling System (RBPS) based on work originally done by the U.S. Bureau of Reclamation. RBPS was originally developed to address dam safety issues, and it is used within the DAMP model to ensure high-risk structures are identified and deficiencies are resolved through prioritized allocation of limited funds. As funds are allocated in the planning model, the risk profile is adjusted to show the direct benefit.

Background on MNR's dam safety program

Dams have been built and maintained by the province to meet the business goals previously mentioned: protection of the life and health of Ontario citizens, ensuring healthy aquatic ecosystems that safeguard human health and quality of life and support the natural environment. Initially, many of the dams were developed by private interests for economic activity related to forestry, mining and hydropower. Most of the dams that were originally developed for hydro purposes have remained within this business sector and are not presently owned by MNR. Dams that were originally developed for forestry have, in many cases, been handed over to MNR for ongoing ownership and management. A smaller number of dams were developed for flood management and environmental purposes. MNR dams are typically small (less than 10 meters tall) and consist of a variety of structure types, including concrete, earthfill and rockfill, steel sheet pile, and timber crib dams.

DAMP provides updated information about the assets themselves, as well as a better understanding of the risks associated with the existence and operation of the dams and of their importance in supporting MNR's ecologic and economic objectives. In this way, DAMP helps MNR staff make a strong case for predictable and stable funding needed to support responsible ownership, operation and maintenance of its dams.

MNR is in a unique position as both an owner and regulator of dams. MNR owns and manages dam assets but also oversees itself to ensure that these dams comply with all applicable dam safety standards. In fact, MNR is in a position where it needs to lead by example and demonstrate to other dam owners in the province that it is in full, responsible compliance with the law.

MNR has completed Dam Safety Assessments (DSAs) for 200 of its dams over the past 15 years. The DSAs look at the design and construction of each dam, its present condition, and the risks and consequences associated with possible failure of each dam. This information is central to RBPS. MNR determined that these dams were of significant enough importance and value to warrant formal, detailed study. The rest of its dams are small and do not contribute significantly to MNR's core business goals. As well, they are not deemed to present any significant risk to humans or the environment should they fail.

Funding sources

In the early 2000s, the government of Ontario committed to invest C$8 million (US$8.15 million) annually in dam infrastructure management, but recently the funding level has been reduced by half because of other provincial requirements for funding. As a result, there is a significant backlog of deferred capital expenditures needed to upgrade the MNR aging dam infrastructure. With the available funding, each of MNR's regional Engineering Offices has undertaken work on dams that fall into three main categories, as discussed below.

Major capital projects

Major capital projects are large construction projects on individual dams, usually costing more than C$100,000, intended to address serious structural and/or hydraulic de-

ficiencies. This category of work includes reconstruction or replacement of dams but also includes works that extend the structure's life or reduce operational costs, as well as decommissioning of dams that don't serve a useful function.

In any one year, major capital projects are performed on a discretionary basis because dams deteriorate relatively slowly. For this reason, decisions to defer such projects have been typical in the past five years. Over time, however, deferring critical capital projects represents an ongoing public safety risk, as the likelihood of these dams failing continues to increase and the consequences of failure can be large.

If the level of risk is high, options are available to manage the risk without undertaking major capital projects. Options include conducting a risk assessment to confirm and quantify the risks and ensure they are below the unacceptable level, modifying dam operations, lowering the normal water level to reduce pressure on the structure, and developing and documenting emergency preparedness plans.

Dam safety support

Annual maintenance is vital to the safety of the dams. Routine inspections of dams by operators and engineers, as well as full-scale dam safety reviews, are conducted annually, every five years, and every 10 years. MNR also conducts regular safety training for all those involved with the operation of the dams and periodically replaces employee safety equipment.

In addition, minor maintenance is annually required to address worker and public safety around dams. Stoplogs, booms, railings, stairs, warning signs and safety lines are inspected, upgraded and repaired as needed. Maintenance of automated control systems, water level and flow data loggers, and records management - including the dam database and provincial dam information portal - ensure proper operation and process documentation at each dam.

Dam operation costs

The costs in this category are primarily associated with the resources and activities needed to regulate water levels. MNR typically allocates C$800,000 (US$815,744) annually to cover dam operating costs. The funding in this category is non-discretionary as it is required to meet the water level demands for recreational use communicated by the public and dam safety requirements during extreme floods.

For capital plan development, C$1.8 million (US$1.83 million) - C$1 million (US$1.02 million) for dam safety support, plus C$800,000 (US$815,744) for dam operations - is required every year as non-discretionary funding. In addition, major capital funding is required on an annual basis to ensure the long-term safety and utility of MNR's dams. The extent of the major capital funding required was evaluated using the DAMP tool.

MNR dam management

For DSAs, the primary criterion for selecting the structures to be assessed was a risk profile of the dams in terms of the consequences of accidental dam failure due to unforeseen floods or earthquakes or due to inadequate original design or ongoing maintenance. As part of the DSA preparation process, all of these factors were evaluated to determine the features and conditions of the present infrastructure (at the time of the individual DSAs) that were acceptable and unacceptable to MNR in terms of regulatory compliance with applicable dam safety standards.

Whenever unacceptable dam characteristics have been identified, MNR has dealt with them to the extent that available funding permitted such work to be completed. Nevertheless, unacceptable features have remained in some cases, either because sufficient funding was not available or because a subjective evaluation determined that the immediate risks to the public, the environment and the economy were acceptable.

In 2007, MNR determined this subjective evaluation of risk was not adequate and embarked on a program to develop a more consistent and objective approach to dam safety risk assessment. In 2008 and 2009, as a first step in this program, MNR developed an RBPS to help determine the risk profiles of the dams. RBPS evaluates risk to people (both dam operators and the general public), the environment and other infrastructure of economic and cultural importance, including downstream roads, bridges, residential housing, hospitals, schools and historic buildings.

In the initial development and related study performed in 2008 to 2009 by Hatch Ltd. in conjunction with MNR, RBPS was applied to 43 dams identified by MNR as warranting an early evaluation. In the present study, the RBPS methodology has been applied to the remaining 133 dams for which there are sufficient data to do an evaluation. The results of the RBPS analyses form the basis for a significant portion of the funding needed for MNR to remain in compliance with its own regulatory requirements.

Establishing DAMP

In response to a request from the Ontario Ministry of Infrastructure in 2010, MNR embarked on a process of developing a formal DAMP for its dams. DAMP is a tool MNR can use for comprehensive, all-inclusive, consistent and logical management of its dam assets. Initially, the goal was to develop a DAMP for the next 30 years; however, the DAMP that has been developed as part of the present contract is a living document/plan that will be continually updated using TCPS, a sophisticated data management tool developed by Altus Capital Planning (now VFA Canada Corporation) for the purpose of managing any type of asset.

DAMP was developed by combining TCPS with a second tool designed by Hatch to factor MNR's core objectives into the decision-making process. This tool, known as the KPI module, calculates key performance indicators (KPIs) that reflect the relative value of each dam in supporting MNR's three main objectives discussed previously.

Data collection/compilation

Development of the asset management plan required solid supporting data to assess priorities for funding allocation.

The primary goal of the project was to develop the process for evaluating and prioritizing spending requirements, not to focus on data collection. Therefore, reasonable efforts were made to obtain as much data as possible from existing sources, with the expectation that refinements and data additions would be made over time.

Data were collected from MNR's Microsoft Access database, RBPS, dam safety assessments, and questionnaires directed to MNR staff in the regional and district office throughout the province. These MNR staff members were identified as having directly relevant experience with the dam structures. All of the data was then combined and analyzed as a whole.

Key performance indicators

For each of MNR's provincial objectives, a key indicator was selected to reflect the relative importance of each dam in meeting the objective. These indicators are described below.

Public safety

Public safety was addressed using the RBPS that was developed based on extensive previous work by the Reclamation. The Reclamation methodology was adapted and modified to suit MNR dams, which cover a much smaller range of types and sizes. RBPS uses extensive, dam-specific data as input, such as age and condition, materials and type of construction, spill capacity, foundation and stability data, hydrologic characteristics and more.

This information is useful in determining safety rankings and the worst case loading condition that would trigger dam failure and the most severe consequences that would result, as well as an index to determine the risk and severity of failure.

MNR has used results from application of RBPS to assess each dam in terms of classical probability versus consequence plots so that MNR could determine which of its dams were of greatest concern and which warranted funding to protect provincial interests. The total failure index (TFI) was chosen as the key parameter of interest for evaluation purposes. TFI is built up using physical characteristics and assessments of the dam. These data include age, composition, type of construction, foundation material, overall condition and stability (see Figure 1).

FIGURE 1 Total Failure vs. Economic & Ecologic Ranking

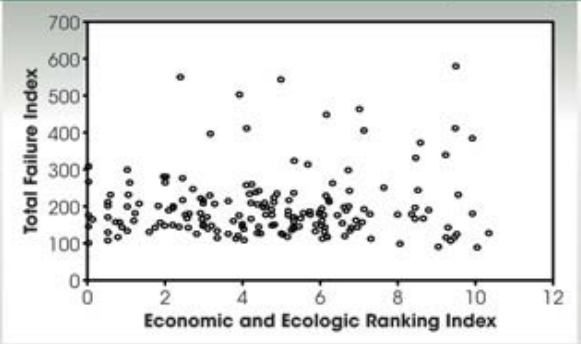

Figure 2 shows that there are important dams with a TFI that is too high for dam safety purposes. These dams require attention. The combined index can be used both to identify the dams having the most value, as well as those having the least value.

The design of the TFI calculation is such that the total range is 0 to 1,000. Many dams with TFI values of 25 or less are very small structures that have not been deemed important enough to warrant having dam safety assessments completed. A project is under way to evaluate these structures in more detail.

However, TFI does not tell the whole story by itself, because it gives a sense only of the likelihood that a dam will fail, with no indication of the magnitude of the potential consequences. To fill this gap, the hazard potential classification (HPC) of the dam was also included, as shown in Figure 2).

Economic benefits

To reflect the value of each dam in supporting provincial economic interests, an economic ranking index was developed. It is calculated by assigning a ranking score to various parameters based on the responses to a series of questions about the number and value of houses, hotels, and other living spaces on the reservoir; the importance of the reservoir in terms of hydro, navigation, commercial operations, and recreational activities; and accessibility by road or boat.

FIGURE 2 Total Failure vs. Hazard Potential Classification

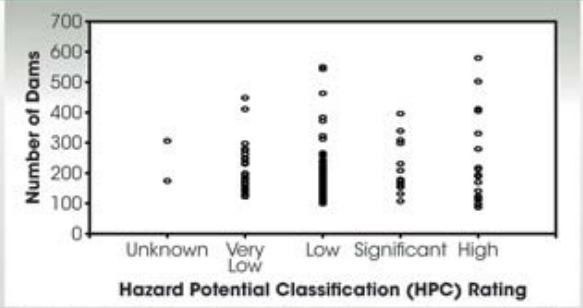

Figure 1 reveals the dams of greatest interest from a safety perspective. These dams appear closest to the top of the plot, particularly on the right side in the HIGH HPC category, showing that there are a few MNR dams in Ontario that require attention.

Environmental/ecological value

To reflect the value of each dam in supporting provincial environmental interests, an ecologic ranking index was developed. This index is calculated by assigning a ranking score to various parameters based on responses to a series of questions about the effect of dams on fish species and populations, wildlife, and wetlands.

The ecologic parameters are then given appropriate weightings and added up to produce a single ecologic index. The design of the ecologic ranking index calculation is such that the theoretical maximum value for any dam is 10. Unlike the other two KPIs, however, the minimum value is less than 0 because the present existence of a dam might well have an overall negative environmental/ecologic impact.

Unlike economic interests - to which a dam might, at worst, make no beneficial contribution (and is assigned a score of 0) - it is possible that a dam might actually have a detrimental effect on some ecologic parameters. In such cases, a value in the range from -10 to 10 may be assigned.

To easily assess the overall value of a dam in terms of supporting provincial objectives, the economic and ecologic ranking indices have been added together to create a single index, designated briefly as E+E. Figure 1 shows the TFI versus E+E. This plot clearly shows there are important dams with a TFI that is too high for dam safety purposes. These dams require attention. The combined index can be used both to identify the dams having the greatest value, as well as those having the least value. The first group consists of dams to which MNR should allocate funding is shown in Table 1.

TCPS software platform

The TCPS software platform was used to compile and store the large amount of physical data concerning the more than 400 MNR dams. This data includes details concerning dam height, type, generating capacity, age, condition, spillway capacity, design and construction, and more.

TCPS efficiently and effectively manages the large amount of data so that it can be used for further asset management/funding assessments. TCPS elegantly addresses four different "worlds" of capital expenditure: asset renewal, asset functionality, regulatory compliance of assets and strategic use of assets.

TCPS essentially addresses questions that are directly important for asset sustainability, such as the conditions of the assets, corrective actions needed, and costs of the improvements.

However, because of the specialized nature of the MNR dam assets, it was also necessary to address MNR's KPIs as previously discussed.

Table 1: Top-Ranked Dams by Economic Ranking Index

Rank	Dam Name	District	Region	HPC	RI_{econ}
1	Bala (North) Dam	Parry Sound	Southern	Low	7.0
2	Mary Lake (Port Sydney) Dam	Parry Sound	Southern	High	6.8
3	Magnetawan Main Dam and Lock	Parry Sound	Southern	High	6.8
4	Crane Lake Dam	Parry Sound	Southern	Very Low	6.6
5	Bala (South) Dam	Parry Sound	Southern	Low	6.5
6	Galeairy Lake Dam	Bancroft	Southern	High	6.4
7	Magnetawan Centre Dam	Parry Sound	Southern	High	6.0
8	Cache Lake Dam	Algonquin	Southern	Very Low	5.8
9	Magnetawan East Dam	Parry Sound	Southern	High	5.8
10	Weslemkoon Lake Dam	Bancroft	Southern	Low	5.6
11	Port Carling Dam	Parry Sound	Southern	Low	5.5
12	Hollow Lake (Kawagama) Dam	Parry Sound	Southern	Low	5.3
13	Burditt Lake Dam	Fort Frances	Northwest	Low	5.3
14	Snowshoe Rapids Dam	Red Lake	Northwest	Significant	5.2
15	Tea Lake Dam	Algonquin	Southern	Low	5.1
16	Agimak Lake Dam	Dryden	Northwest	Significant	5.1
17	Johnnie Lake Dam	Sudbury	Northeast	Low	5.0
18	Forest Lake Dam	Dryden	Northwest	Low	4.7
19	Lyndhurst Dam	Kemptville	Southern	Low	4.7
20	Talon Lake Dam	North Bay	Northeast	Low	4.6
21	Clayton Lake Dam	Kemptville	Southern	Low	4.5
22	Harris Lake Dam (Spillway No. 3)	Parry Sound	Southern	Low	4.5
23	Harris Lake Dam (Earth Plug)	Parry Sound	Southern	Low	4.5
24	American Trail (Harris Lake) Dam	Parry Sound	Southern	Low	4.5
25	Harris Lake Dam (Spillway No. 2)	Parry Sound	Southern	Low	4.5

Development of DAMP

The MNR DAMP is undergoing study and assessment within the overall context of budget plans for the Ontario government. The plan has not yet been approved, and it seems likely changes will be required because of ongoing fiscal austerity measures being implemented in the province. The provincial government has been prorogued until February 2013, so approval and further implementation of DAMP are on hold. For this reason, specific details of the plan, including project names and funding scenarios, are not disclosed. Nevertheless, the process that was used can be described.

Six key funding areas were addressed: ongoing normal annual maintenance; ongoing annual dam safety support; information management; major capital spending for new dams and replacement of severely deteriorated dams; major capital spending for major maintenance/rehabilitation of existing dams; and dam removal/decommissioning/divestment for dams that do not contribute significantly to MNR's three core business goals.

At the present time, there is a large backlog of work that needs to be done with respect to dam replacements and major rehabilitation. This major rehab work generally includes structural measures such as concrete repair and anchoring and spillway capacity increases. As well, there are many dams that do not meet MNR's core business goals and that should be removed, decommissioned or divested. This is being assessed in more detail using the information contained within the DAMP.

Turning data into dollars

Following assessment of all of the funding requirements, it was possible to develop a proposed schedule of recapitalization funding that would adequately address MNR's three core business goals. Figure 1 (see page 32) shows an ongoing capital backlog where available funding is not adequate to properly look after the asset base. Unfortunately, this is not an unusual situation.

An asset management plan has been developed that outlines the funding requirements for adequately managing the province's dam assets. This plan is being evaluated by the Ontario Ministry of Infrastructure in conjunction with similar plans for other provincial assets such as hospitals, roads and bridges. It remains to be seen if the allocated funds will adequately address the outstanding asset management requirements.

DAMP has resulted in the efficient, effective and safe management of MNR's dam assets, and it will continue to evolve and change based on ongoing condition assessments and inevitably shifting government budget allocations. As the program is fine-tuned, MNR believes it will provide continual support to the decision-making processes faced by the government and dam owners and operators, as well as offering a model for other governments and organizations to replicate.

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(HYDRO-REVIEW, Volume 31, Issue 8, 1st December 2012, http://www.hydroworld.com/articles/hr/print/volume-31/issue-08/articles/dam-safety-ontario-ministry-develops-dam-management-plan.html)

Blast perception and monitoring

Monitoring, and thus quantifying, the effects of blasting during hard-rock tunnel excavation can be important for several reasons. As demonstrated by the accompanying article describing work undertaken in China, predetermination of likely blasting effects based on factors such as rock conditions, dimensions and blasting procedure, can also be of great value in planning drill-and-blast excavation so as to avoid damage to surrounding ground and adjacent structures. The reasons for devising blasting procedures and monitoring may include:

- Contractual limits on vibration article velocity and acceleration at pre-determined locations, prompted by generally increased environmental concerns;
- Determining most cost-effective drilling procedures and use of blasting agents;
- Minimising blast vibration on adjacent structures that might otherwise be damaged, increasing project costs and delays;
- Demonstrating actual vibration levels to local authorities, residents and business owners that might otherwise perceive vibration and 'shock' to be larger and have concerns about improbable damage.

In addition to any 'third' party' concerns, any delay, stoppage or excessive restriction to blasting would be generally intolerable for limited face underground tunnelling. The public may mistake blast vibrations for natural seismic activity, and vice versa, but they are of different frequencies from different source locations. Vibration monitoring can also detect the differences and sources. The extraction of large volumes of underground rock, especially in mining, could trigger seismic events as the pressures and stresses on the remaining rock changes. Faulting can accentuate this.

Vibration monitoring is based on measuring units of peak particle velocity (PPV) and acceleration at the selected location, perhaps near a structure that may be causing concern. This allows a comparison with known threshold levels above which damage to structures is known to occur. Of course this is also dependent on the existing security of the structure causing concern. As shown in the accompanying article, monitoring values can be simulated by appropriate software to predict the threshold of possible 'third party' damage and to design appropriate blasting procedures before any actually takes place.

Blast monitoring includes recording field data using a specialised digital seismograph and geophone and recording events, such as blasting times and charge, that may be relevant to the vibration readings.

Extended permanent blast monitoring has been is use at Australia's Kalgoorlie Super Pit since 1998 to check on vibration generated by the Mount Charlotte underground mine. The system includes eight monitors that generate data used to manage and minimise possible impacts, including redesign of the blasting to produce the lowest vibrations. Special explosives and detonators have also been manufactured for this purpose.

In 'civil' tunnelling perhaps the greatest need for blast vibration monitoring is in urban situations underlain by hard rock; a situation that is common in regions such as Scandinavia and Asian cities such as Hong Kong and Singapore particularly for complex or cavernous excavations. The alternatives of roadheaders and hard-rock TBMs may be discounted due to, respectively, excessively hard rock or planned drives of relatively short length.

In addition to protection of adjacent structures and the public from the effects of tunnel blasting, it is often necessary to protect existing tunnels, whether from blasting, impact ground consolidation or most frequently, piling. In Singapore Instantel dealer Absolute Instruments supplied 42 Instantel DIN geophone instruments with 21 Minimate Plus 8-channel monitors to the Woodsville Interchange Upgrade Project to check on construction vibrations reaching the underlying existing metro tunnels as well as nearby residents. Instantel, a division of Xmark, has been a part of the Stanley Black & Decker group since 2008. It manufactures vibration instrumentation and software under the series names Minimate and Blastmate.

One of several projects in Sweden involving Orica Group's Nitro Consult's blast vibration is the Stockholm City Line (Citybanan). Nitro Consult has also been involved with ground investigations, noise monitoring, structure-borne sound and risk analysis. The project requires about 1.5 million m3 of rock to be excavated sensitively by drill and blast. Two of the tunnels are underwater and the rest of the excavations, including two 260 x 220 x 220m underground stations, are beneath city structures.

A recent Nitro Consult introduction, used on the Citybanan, is the NCVIB web-based system to make the results of vibration measurements more useable. It presents the results of vibration and airborne shockwave measurements together with other useful parameters such as temperature, noise, stresses and groundwater levels.

The blaster can receive up-to-the-minute information from the last round blasted and can therefore quickly adjust the drilling and charging parameters for the next blast. Warnings of exceeding vibration limits can be built in.

(Maurice Jones / Tunnels & Tunnelling International, 15 January 2013, http://www.tunnelsonline.info/features/blast-perception-and-monitoring)

Blast vibration influence on existing tunnels

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Southwest Jiantong University, China

The work on vibration monitoring was between a diversion tunnel for Bai Shui Jiang third class power station in Yan Jin county of Yun Nan province, and the Shiu Ba Yan Tunnel underpass of Nei Kun Railway. The LS-DYNA explicit dynamic numerical simulation and in situ blast vibration monitoring were used over a short study distance to monitor vibration influence on the existing tunnel by blasting in the diversion tunnel.

Scope

- The work (see conclusions at end of article) has shown:
- The relationship between tunnel diameter, vibration velocity and acceleration;
- The relationship between the distance and relative position of the blasting face relative to the existing tunnel and vibration velocity and acceleration;
- The relationship between the amount of explosives, and the vibration parameters;
- The influence of rock condition on vibration parameters;
- A formula relating the above influence parameters;
- The value of on-site blasting vibration monitoring, with the importance of manoeuvrability;
- Countermeasures to reduce blasting vibration influence.

For adjacent tunnel construction by drill and blast, as a new tunnel reaches an existing tunnel, the influence on the existing tunnel should be mitigated or eliminated to insure personnel safety and tunnel security. The engineering quality and schedule of the new tunnel should also be insured. In the work presented the blasting influence on adjacent existing buildings and tunnel in a short clear distance are studied. However, the study of dynamical influence of up-down crossover tunnels is comparatively less. Based on the practical situation of diversion tunnel for Bai Shui Jiang power station and the underpass of the Shou Ba Yan rail tunnel, by using the LS-DYNA method for explicit dynamic numerical simulation and in situ blast vibration monitoring, the vibration influence on the existing tunnel by blasting was studied.

The diversion tunnel has a plane angle of 82 deg with the railway lines in the underpass tunnel. The clear distance of two tunnels is 13.06m. The rail tunnel section measures 6.55m height and clear width 4.9m. The Grade III lining is 400mm thick and made of C20 concrete. An invert (grate) layer is 200mm thick. The diversion tunnel crosses strata of limestone, marlstone, sandstone, etc and has a circular section of 7.0m i.d., 8.1m o.d. The lining is also of C20 concrete, 500mm thick.

Finite element model

To simplify the finite element model for convenience of study all simultaneous initiation dosage was condensed into one cut-hole with the diameter of the cut-hole calculated by actual dosage. In the model the front and back boundaries are all 42m away from the existing tunnel, and the upper boundary is 33.6m away from the existing tunnel. The left and right boundaries are all 34m away from the underpass tunnel, and the lower boundary is 38m away. All the six boundaries are nonreflecting.

The rock, explosives, air and lining are all simulated by SOLID164. The whole model has 131,136 elements and 138,572 nodes in total. Explosives, air, rock and concrete lining use the ALE algorithm, which shares nodes. To simplify it is assumed that the parameters of the plug material are the same as media material.

Materials parameters

According to the design data and related literature, rock parameters, explosives, air and lining are as shown in tables one, two and three.

Table 1. Basic parameters of rock's mechanical properties

Grade	Elastic ratio / Gpa	Poisson rato	Bulk density (γ/g.cm^3)	Yield strength (σ_0/MPa)	Tangent module (E_{Tan}/ GPa)	Compression strength (σ_C/Mpa	Tensile strength (σ_{ST}/ MPa)	Plastic Induration (E_p/ GPa)
III	25.74	0.24	2.66	24.52	10.38	49.04	2.04	8.70

Source: Southwest Jiantong University

Table 2. Concrete damage constitutive parameters

Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value
P_0/(g.cm3)	2.30	C	0.007	P_{crush}/GPa	0.016	K_1/GPa	85.0
E/GPa	42.0	N	0.61	P_{crush}	0.001	K_2/GPa	-171.0

Source: Southwest Jiantong University

Table 3. Parameters used in the four cases for values in figures 4(a) and 4(b). In all cases tunnel diameter equal at 8m, clear distance between is 8m, and rock type III.

Case no.	Excavation blast advance (footage - m	Detonation/initiation mode
1	4	Full face
24	2	Full face
25	1	Full face
26	1	Partial face/subsection

Source: Southwest Jiantong University

The tunnel wall rock media is simulated by a plastic follow-up model [Dong, Y-X et al, 2006] with the parameters in Table One.

The concrete for preliminary and secondary lining concrete is simulated by the JHC material (Zhong & Wang, 2006) as in Table Two.

The tunnel case in the project utilised high-power emulsion explosive RJ2#, with the parameters as follows:

ρ / g.cm^{-3} = 1.05
D / m.s^{-1} = 4600
P_c / GPa = 32.4
A / GPa = 214.4
B / GPa = 0.182
R_1 = 4.2
R_2 = 0.9
Ω = 0.15
E_0 / GPa = 4.192

Air is included by the void material model with the density of 0.0012g/cm^3. The other six parameters have default values, and the equation of state adopts linear polynomial.

A total of 31 operating cases were calculated. In the basic operating case the tunnel wall rock is grade III; the two tunnels are circular in section; the diameter of the existing and new tunnels are both D=8m; the clear distance between at the up-down crossover is H=D=8m; the blast initiation is full face initiation, and chainage 4m. Using changed values for the new-build tunnel diameter, the clear distance between the two tunnels, chainage, blast initiation mode and tunnel wall rock grade, the 31 operating modes were developed.

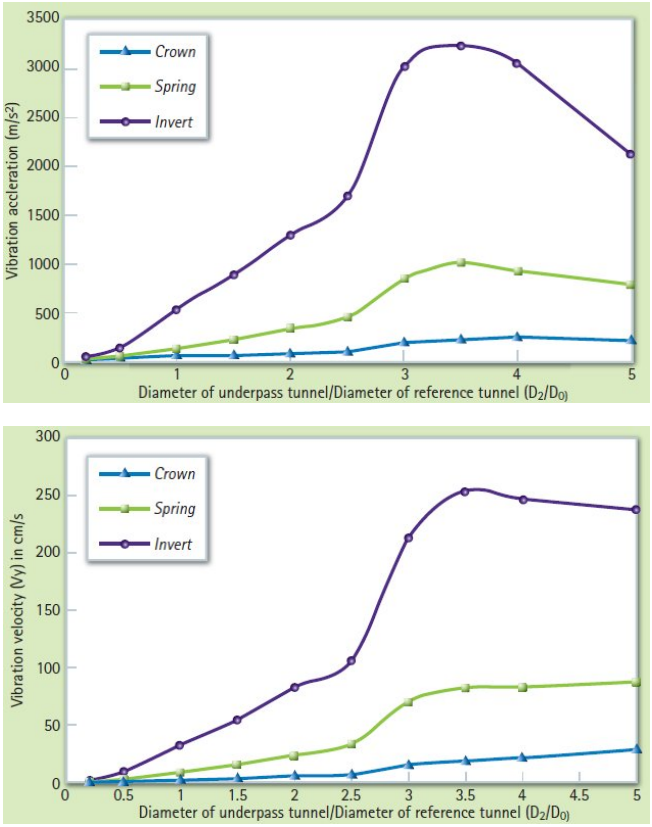

Figure 1, relationships between vibration velocity and acceleration with new tunnel diameter

The maximum influence on the existing tunnel by blast vibration from the underpass new-build underpass tunnel occurs on the crossover section of two tunnels, so nodes and elements were selected on the crown, spring and arch invert of this crossover section and reviewed.

Analysis of simulation

In cases 1-10 the cases were divided according to changes in the diameter of the new-build tunnel. The relationship between maximum vibration velocity/acceleration and diameter is shown in Figure 1.

The graphs show that the maximum vibration velocity and acceleration on arch invert are all bigger than the other two monitoring points, while the minimum response is on crown.

When the diameter of the underpass new tunnel is less than 2.5D (D reference diameter = 8m), the vibration velocity and acceleration increase as the diameter of new tunnel diameter increases, and is basically in a linear relationship. When the diameter of new tunnel is 2.53.5D, the vibration velocity and acceleration rapidly increase. When the diameter of new tunnel is bigger than 3.5D, the vibration velocity and acceleration tend to decrease.

Cases one and 1123 are divided according to the clear vertical distance between the two tunnels. The relationships between maximum vibration velocity /acceleration and clear distance is in Figure 2.

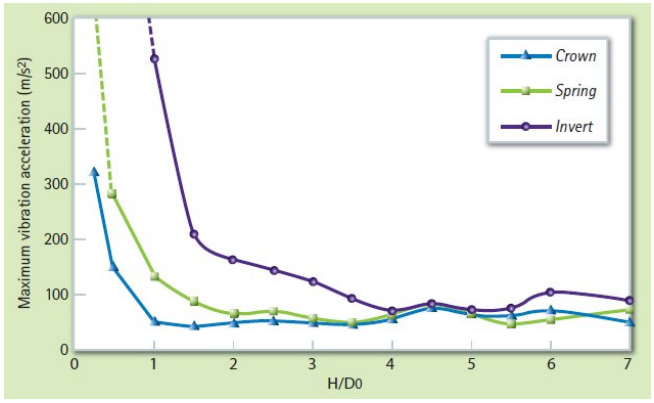

Figure 2a, Relationship between separation distance and max vibration velocity

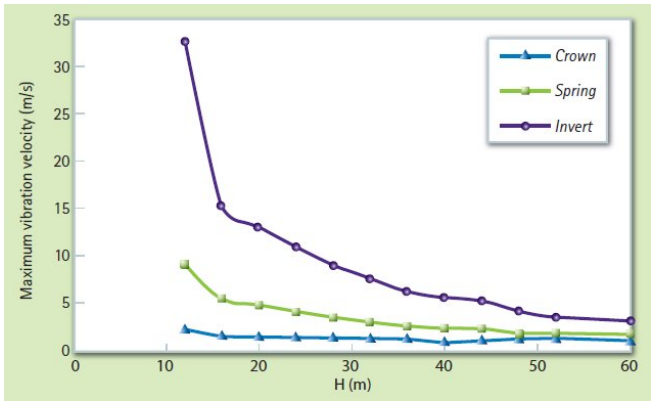

Figure 2b, Relationship between tunnel separation/diameter ratio (H/D0) and maximum vibration acceleration

When the clear distance increases the vibration velocity and acceleration decrease. Vibration influence on arch invert is the most and on crown is the least.

By linear interpolation it was found that when the clear distance of two tunnels is 5.65D for a 4cm/s vibration velocity (control criterion), in grade III wall rock. When the new tunnel diameter is more than 5.65D, the single blast advance ('footage') is 4m and full-face blast initiation is used, the new tunnel will not influence the existing tunnel.

In cases one and 2426 the model variations were according excavation blast advance ('footage') and initiation mode. The relationships between maximum vibration velocity/acceleration on arch invert from the new underpass tunnel excavation face are shown in Figure 3.

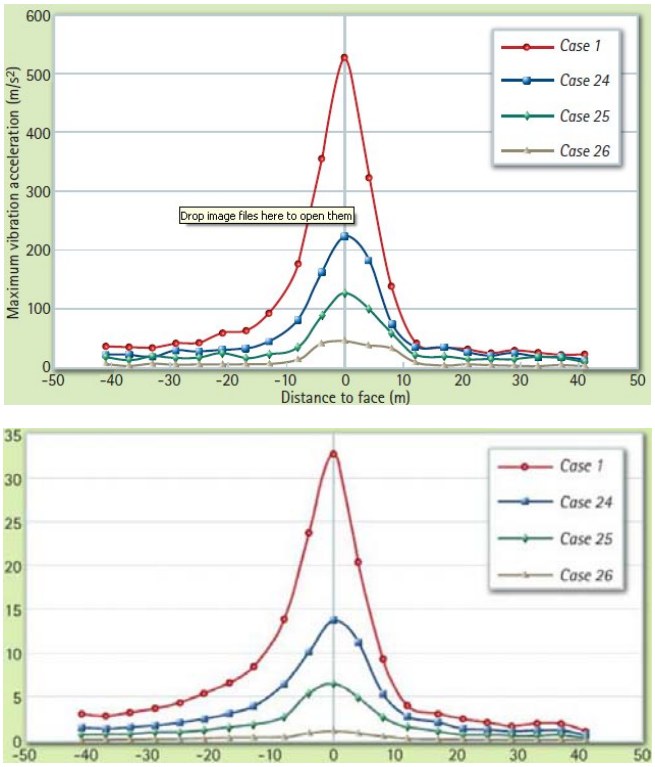

Figure 3, Relationship between maximum vibration acceleration at tunnel invert and distance to face for the four cases in Table Three

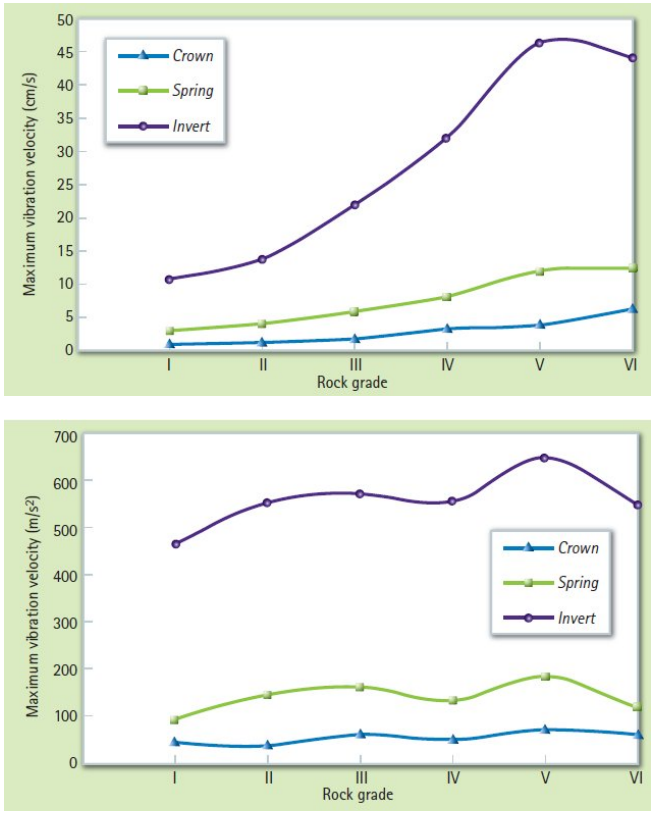

Figure 4, Relationships between vibration velocity and vibration acceleration and the rock grade

When the blast advance ('footage') decreases or the full face initiation is changed into partial face initiation, the vibration velocity and acceleration decrease. This is because of the reduced explosive dose. The arch invert is most influenced by vibration velocity and acceleration and the arch crown is least influenced. When the blasting agent dose is the same, the farther from reviewed point, the lower is the vibration velocity and acceleration at this point. The vibration response is less with the distance from the excavation face to the existing tunnel (0 on Figure 3 graphs) because the medium to diffuse vibration wave before/after excavation changes.

Cases 2731 are divided according to rock grade. The relationship between maximum vibration velocity/acceleration and rock grade is shown in Figure 4.

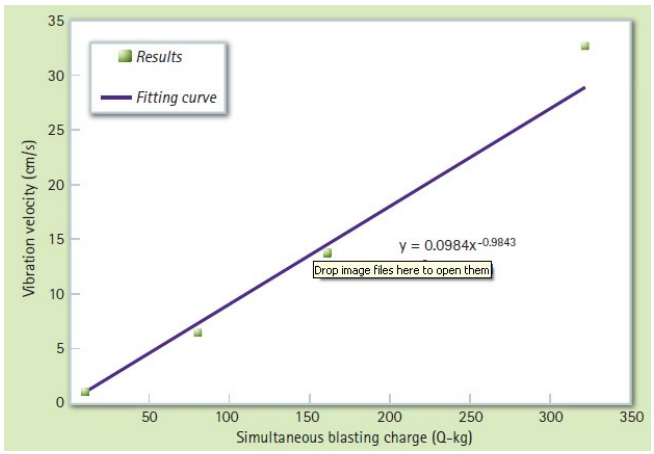

Figure 5, Relationship between vibration velocity and distance between monitoring point and blast source

The relational expression is:

$$\text{Formula (1): } v = 894.75 \frac{1}{Q^{1.383}}$$

Influence of simultaneous blasting charge: The change of blasthole length (footage) and blast initiation mode is actually the change of simultaneous blasting charge (Q). The fit curve for relation between blasting vibration velocity at the arch invert and simultaneous blast charge is as Figure 6.

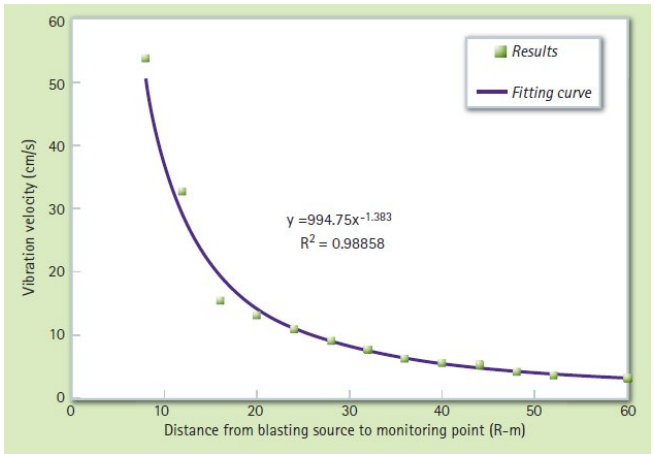

Figure 6, Relationship between vibration velocity and simultaneous blasting charge

The relational expression is:

$$\text{Formula (2): } v = 0.0984 Q^{0.9843}$$

Influence by rock grade: The fitting curve for the relationship between blasting vibration velocity (V) at the arch invert and rock grade (IIV) is as shown in Figure 7.

The relational expression is:

Formula (3): v=10.821N + 4883

where N is a positive integer for rock classes I-VI (Qiu, W, 2003 and also Bi, J & Zhong, J, 2004).

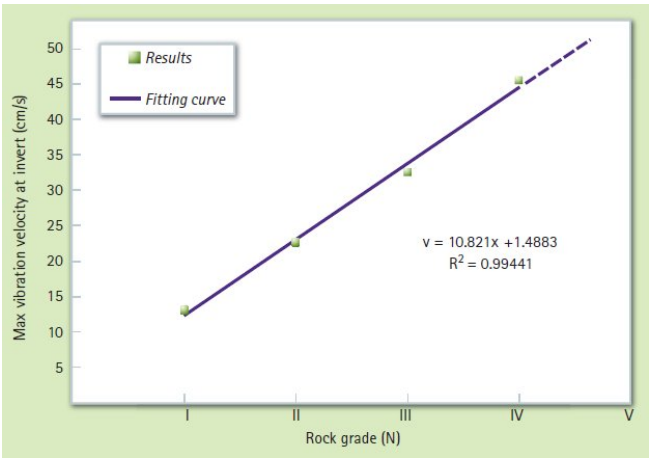

Figure 7, Relationship between blast vibration velocity at arch invert and rock grade

Deducing formula

In the reference operating mode; in formula (1), R takes 12m and in formula (2) Q is 321.70kg. The vibration velocity calculated by the two formulae should be equal, so the average value 28.85cm/s of the two results by the two formulae is taken. The compensation factor of vibration velocity by distance R), and simultaneous blasting charge Q are:

$$\alpha_R = 31.104 \times \frac{1}{R^{1.383}}$$

and

$$\alpha_Q = 0.034 Q^{0.9843}$$

So the formula of blasting vibration velocity considering compensation factors of R and Q of tunnel construction is:

Formula (4):

$$v = 28 \times 5 \times \alpha_R \times \alpha_Q = 3.042$$

$$\frac{Q^{0.943}}{R^{1.383}} = \alpha \times \frac{Q^{0.943}}{R^{1.383}}$$

NB - is the compensation factor in consideration of the rock grade. It is 3.042 when the rock grade is III. The formula considering the rock grade influence is:

$$\text{Formula (5):} \quad \alpha = 0.9695N + 0.1334$$

Where N is the positive integer for rock glass (Qiu, W, 2003 & Bi, J & Zhong, J, 2004, refs 8 &2)

The total explosive charge is calculated according to excavation face area, unit charge and hole length (footage).

Assuming excavation diameter is D, footage is L, the clear distance is H, unit dose is q, when the new-build tunnel is blasting just under existing tunnel, it should be:

$$R = H + \frac{D}{2} \qquad Q = \frac{\pi}{4} \times D_2 \times L \times q$$

Taking R and Q into Formula (4):

Formula (6):

$$v = \alpha \frac{\left(\frac{\pi}{4} \times D^2 \times L \times q\right)^{0.9843}}{\left(H + \frac{D}{2}\right)^{1.383}}$$

In engineering applications the maximum vibration velocity on the existing tunnel as influenced by the new-build tunnel excavation blasting is calculated according to factors in project practice, as well as to judge the rationality of blasting parameters. From vibration velocity control criterion, the charge blasthole length (footage) and the clear distance between the tunnels, which have no influence, can be calculated.

A: 'Footage': When the vibration velocity control criterion ([V]) is confirmed, transform Formula 6, and the 'footage' formula is given as follows:

Formula (7):

$$H = \left(\frac{\alpha}{[V]} \times \left(\frac{\pi}{4} \times D^2 \times L \times q\right)^{0.9843}\right)^{\frac{1}{1.383}} - \frac{D}{2}$$

B: Clear distance between two tunnels: When the vibration velocity control criterion ([V]) and blasthole charge length (footage) are confirmed, transform Formula 6 and the clear distance when no influence occurred between two tunnels is given as follows:

Formula (8):

$$H = \left(\frac{\alpha}{[V]} \times \left(\frac{\pi}{4} \times D^2 \times L \times q\right)^{0.9843}\right)^{\frac{1}{1.383}} - \frac{D}{2}$$

Validation

To validate the numerical modelling with formulae results, substitute upward parameters of the various calculation for operating mode into Formula 6, and take the result to compare with the numerical simulation result as in Table 4.

The ratios between the numerical simulation results and formulation results are mostly from 90 to 120 per cent, which demonstrates that the two results are comparable.

In practice, Formula 6 can be used to accurately calculate the blasting vibration velocity in similar projects. Comparing monitoring vibration velocity with calculation result in the project case, the distinction is little, demonstrating the applicability of the deduced formula.

Countermeasures

In conclusion, the influence of blasting vibration on an existing tunnel decreases when the new-build tunnel diameter and blast advance (footage) decreases, when initiation mode changes (full face into subsection blasting) and when the clear distance between the two tunnels increases. In consideration of these factors, the possible countermeasures are as follows:

Damping technique:

- The best option is to try to increase the clear distance between the two up-and-down crossover tunnels;

- Minimise the excavation advance (footage) of the new-build tunnel within reason;

- Minimise the total blasting charge; that is to adopt subsection excavation, so subsection blasting;

- Adopt interference damping blasting technique [Gong L, Qiu W & Cao Y, 2006, and the China Blasting Safety Regulations 2003].

- Adopt mesothyrid (central) burn cut, notch cutting or small-section TBM partial excavation, and so on.

Principle to choose countermeasure: Conventional methods of reducing blast excavation advance (footage) and using subsection blasting have priority.

When these methods cannot meet needs, methods of interference damping blasting technique, excavating an antivibration ditch, circumferential damping holes and notch cutting are adopted.

Blasting test: In stretches with no blasting vibration influence the principal blasting parameters can be tested.

Based on blasting vibration monitoring results, blasting parameters are adjusted.

Conclusions

1. For full-face excavation and D0<2.5D, vibration velocity and acceleration at the existing tunnel induced by underpass tunnel blast construction increases as D0 increases and in a near-linear relationship. For 2.5D<D0<3.5D vibration velocity and acceleration increases rapidly. For D0>3.5D, vibration velocity and acceleration does not increase, but decrease as D0 increases.

2. Vibration velocity and acceleration decrease as the distance between the two tunnel increases. For the same distance, the influence of blasting vibration before the excavation face reaches existing tunnel is bigger than the influence after the excavation face passes by. For the same blasting parameters, the influence of blasting vibration decreases as distance between the tunnels increases. Vibration influence increases as the explosive charge increases. Vibration velocity increases and acceleration decreases as the surrounding rock becomes worse.

3. The blasting vibration velocity formula has been deduced, considering parameters of excavation diameter, blast excavation advance (footage), the clear distance of two up-and-down crossover tunnel and blast charge. Compared with on-site blasting vibration monitoring, the formula applicability and numerical simulation correction have been proved accurate.

4. The countermeasures of subsection excavation, subsection blasting and interference damping blasting technique to reduce the influence of vibration are given together with the principles of choice. The significance and manoeuvrability of a blasting test and vibration monitoring are also then indicated.

Acknowledgements

This article is an abridged version of the paper "Vibration influence on existing tunnel by blasting construction of underpass diversion tunnel and countermeasures' by the authors and presented at the World Tunnel Congress. Helsinki and published in the WTC 2011 Proceedings. We are grateful to The International Tunnelling Association, Finnish Association of Civil Engineers and Finnish Tunnelling Association for permission to publish here.

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ΠΡΟΚΥΡΗΞΕΙΣ ΒΡΑΒΕΙΩΝ ΓΙΑ ΓΕΩΜΗΧΑΝΙΚΟΥΣ

For any further information, please contact: Sally Prakash, Honorary Secretary or Shamsher Prakash, 1707 Jackson Circle, Rolla, MO-65401, USA, Email: prakash@mst.edu

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Shamsher Prakash Foundation solicits nomination (no application) for the 2013 Shamsher Prakash Research Award for young engineers, scientists and researchers (40 years or younger, Date of Birth 03-31-72 or later) from all over the world. Nominations are invited so as to reach the Honorary Secretary on or before **March 31, 2013**.

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1. Name of the Candidate with complete postal address and telephone, fax number, E-mail, date of birth, age on **March 31, 2013**,
2. Letter of Nomination including a statement of 500 words of the Significant Contributions and/or international impact and future potential
3. Two to Four or more letters of recommendation
4. Chronology of education
5. Chronology of jobs held
6. Area of specialization
7. Complete list of refereed publication in journals only (please attach not more than three (3) significant recent publications).
8. One 5" x 7" color digital photo with citation for listing, if winner
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Please make sure to put all the above information in a **single PDF file only not to exceed 5MB size**

EUROSEISTEST

The Web Portal of the EUROSEISTEST Database

The EUROSEISTEST in a nutshell

EUROSEISTEST is a multidisciplinary European experimental site (e.g. Pitilakis et al., 2011) for integrated studies in earthquake engineering, engineering seismology, seismology, geotechnical engineering and soil dynamics. It is the longest running (for 20 years) basin-instrumentation project worldwide, and is located in the Mygdonia valley (epicentral area of the 1978, M6.4 earthquake), about 30km to the NE of the city of Thessaloniki in northern Greece (Figure 1). It consists of a 3D accelerograph array (Figure 2) and an instrumented single-degree-of-freedom structure (EuroProteas; Figure 3), the latter to be used in studies of soil foundation – structure interaction studies.

Figure 1 – Location (triangle) of the EUROSEISTEST experimental site.

The initial development of EUROSEISTEST was mainly funded by the European Commission - Directorate General for Research and Development under the framework of consecutive EU research projects (EuroseisTest, 1993-1995; EuroseisMod, 1996-1999; Euroseisrisk, 2002-2005). In years after 2005, the maintenance and improvement of the array, as well as the construction of the EuroProteas structure, have been funded through resources of the Research Unit of Soil Dynamics and Geotechnical Earthquake Engineering (SDGEE, http://sdgee.civil.auth.gr) of the Aristotle University of Thessaloniki, as well as by several other European Union (e.g. SERIES, NERA) and international projects. The establishment and operation of the experimental site have been the responsibility of SDGEE with the contribution of the Institute of Engineering Seismology and Earthquake Engineering of the Earthquake Planning and Protection Organization of Greece (ITSAK-EPPO, http://www.itsak.gr), among other partners.

EUROSEISTEST is unique in its kind on the global scale, both because of its long lifetime and the very good knowledge of the underlying earth structure in three dimensions (Figure 4). This is the reason why it has been repeatedly selected as the optimum site to be used for the validation/verification of strong ground motion simulation codes in the frame of large research projects and has been the subject of more than 200 research articles (the reader is referred to http://euroseisdb.civil.auth.gr/uploads/file_attachment/file/9/Euroseistest_ref-erences.pdf for a full list of relative publications).

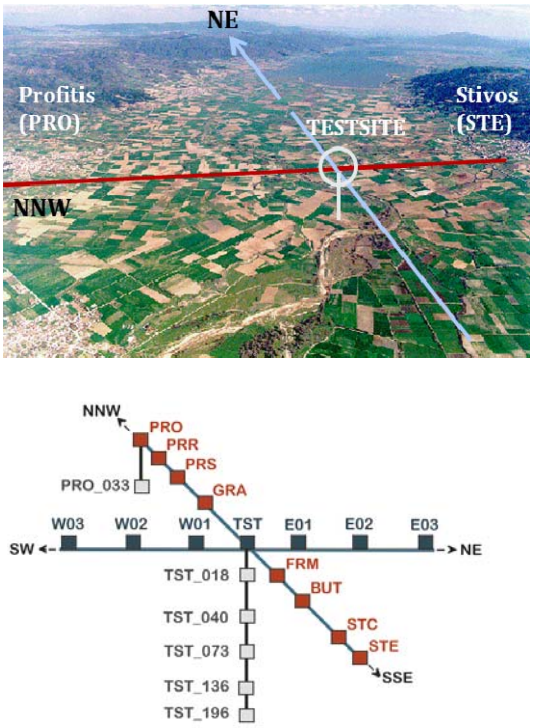

Figure 2 – The permanent accelerometric network of EUROSEISTEST. Left: Air photograph of the central part of the Mygdonia graben. The directions of the two branches of the surface array are noted as thick lines. The centre of the network (Test site) is the location of TST station and the deepest downhole array that reaches the underlying bedrock at circa 200m depth. Right: the current configuration of the EUROSEISTEST network with station codes.

Figure 3 – EuroProteas, facility specially designed for SFSI studies.

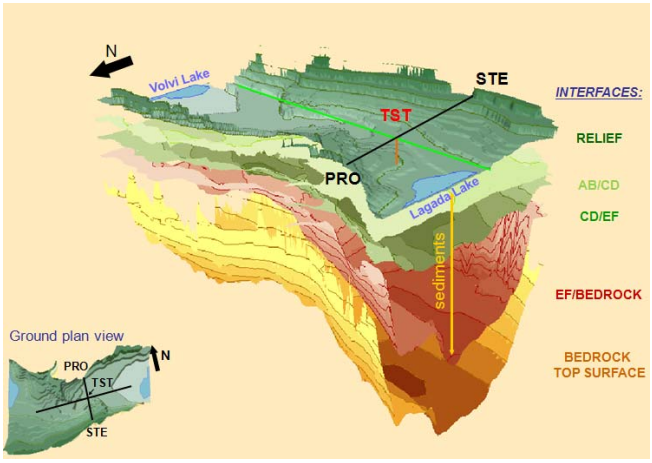

Figure 4 – 3D model of the Mygdonia basin geological structure (Manakou et al., 2010)

The Web Portal of the EUROSEISTEST Database

During its 20-years-long life, the permanent accelerograph network of EUROSEISTEST has recorded more than 190 events of local magnitude, M_L in the range 1.5-6.6 and at epicentral distances from 1 to 500 km. These events have provided circa 1000 three-component acceleration records, which along with stations and earthquakes metadata constitute a significant dataset, useful in different kinds of ground motion and site effects studies. These data and metadata were recently organized in a well-structured and easily extendable database, which is accessible through the internet at the web address http://euroseisdb.civil.auth.gr (Figure 5).

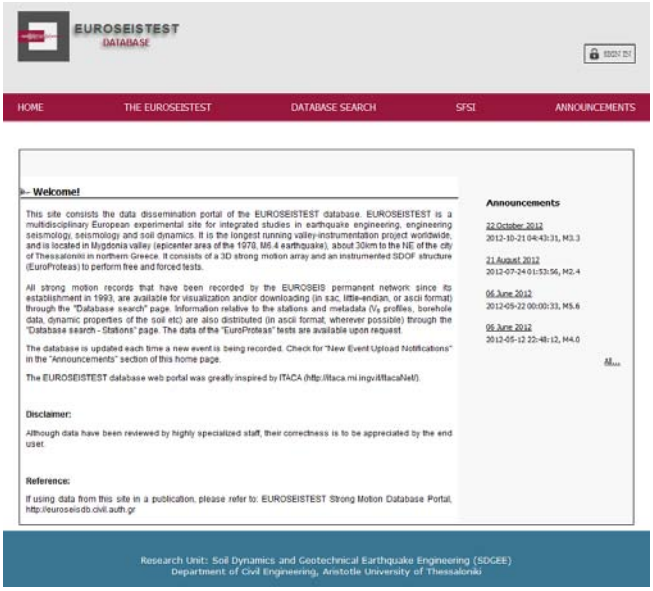

Figure 5 – The home page of the EUROSEISTEST web portal (http://euroseisdb.civil.auth.gr).

Among general information on the EUROSEISTEST history and so far scientific accomplishments, the visitor of the web portal can find all acceleration recordings (e.g. Figure 6) and pertinent seismological metadata. Furthermore, there exists a wealth of geotechnical, geophysical and site response results at the sites of the permanent recording stations of EUROSEISTEST. All data and meta-data are easily downloadable for further use.

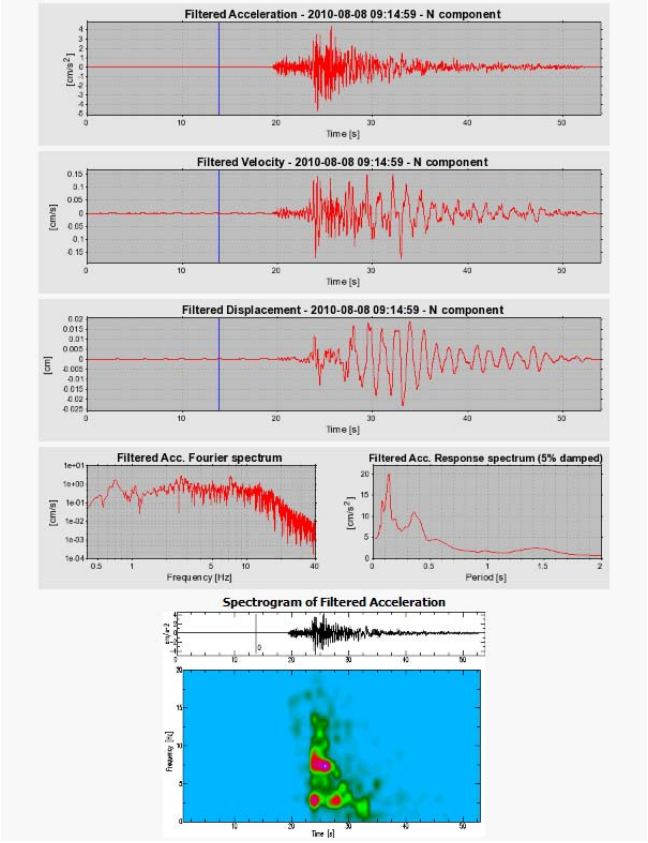

Figure 6 – Part of data plots available for a recorded component of acceleration. From top to bottom: acceleration, velocity and displacement time histories, Acceleration amplitude Fourier and response (5% damped) spectra and spectrogram of the acceleration time history.

Acknowledgments

The EUROSEISTEST database structure and web portal designing were greatly inspired by ITACA (Working group ITACA, 2010; Luzi et al., 2008), the Italian Accelerometric database. The EUROSEISTEST database could not have been accomplished without the fieldwork and lab support of many people, both from the Research Unit of Soil Dynamics and Geotechnical Earthquake Engineering of the Aristotle University of Thessaloniki, the Institute of Engineering Seismology and Earthquake Engineering and several other European and International Institutes who provided valuable support during the development of the test site at its early stage. Special thanks are due to our technicians A. Marinos and N. Adam. We also thank Stavrina Kykalou for her professional advice on the improvement of the graphical designing of our web portal. We are indebted to the developers of all the software pieces used in the frame of the present work, who chose to freely share their creations with the public and/or the scientific community.

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Διαδικτυακή πύλη διάχυσης των δεδομένων του ερευνητικού πεδίου EUROSEISTEST: http://euroseisdb.civil.auth.gr

Το ερευνητικό πεδίο δοκιμών EUROSEISTEST, το οποίο έχει αναπτύξει και λειτουργεί συνεχώς από το 1993 η ερευνητική μονάδα Εδαφοδυναμικής και Γεωτεχνικής Σεισμικής Μηχανικής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, σε συνεργασία με το ΙΤΣΑΚ-ΟΑΣΠ και διαφορα ερευνητικά ινστιτούτα από την Ευρώπη, είναι μία από τις σημαντικότερες μεγάλες εργαστηριακές υποδομές σε παγκόσμιο επίπεδο για τη μελέτη της ισχυρής εδαφικής κίνησης και άλλων συναφών θεμάτων, όπως είναι η επιρροή των τοπικών εδαφικών συνθηκών, η διάδοση των σεισμικών κυμάτων σε σύνθετες γεωλογικές δομές, ακόμη και θέματα δυναμικής αλληλεπίδρασης εδάφους - θεμελίωσης κατασκευής.

Το σύνολο των καταγραφών και λοιπών δεδομένων του EUROSEISTEST, μαζί με υψηλής ποιότητας μετα-δεδομένα (meta-data) για τους σεισμούς που έχουν καταγραφεί μέχρι σήμερα και τον γεωτεχνικό χαρακτηρισμό των θέσεων των σταθμών του δικτύου είναι πλέον διαθέσιμα μέσω του διαδικτύου στη διεύθυνση: http://euroseisdb.civil.auth.gr

Παράλληλα, λειτουργεί και σχετική λίστα ηλεκτρονικής αλληλογραφίας (εγγραφή στη διεύθυνση https://lists.auth.gr/sympa/subscribe/euroseisdb) για ενημέρωση των χρηστών της βάσης σχετικά με την ανάρτηση νέων δεδομένων και άλλα ερευνητικά νέα του EUROSEISTEST.

ΓΕΩΔΙΑΔΡΟΜΕΣ ΣΤΗΝ ΕΛΛΑΔΑ

Εξερευνήστε το τοπίο, τα πετρώματα και τη φύση έξη περιοχών της Ελλάδας. Γνωρίστε τη γεωλογία, την ιστορία και τον πολιτισμό τους.

Η σειρά «Γεωδιαδρομές στην Ελλάδα» είναι πιλοτική έκδοση του Ινστιτούτου Γεωλογικών και Μεταλλευτικών Ερευνών (ΙΓΜΕ) με τη χρηματοδότηση του Γ΄ ΚΠΣ (2000-2006) Επιχειρησιακό Πρόγραμμα Ανταγωνιστικότητα, Δράση 7.3.1/ Πράξη 7.3.1.3 ΙΙ, συγχρηματοδοτούμενο απο την Ευρωπαϊκη Ενωση (ΕΤΠΑ), για το έργο: **«Ανάδειξη γεωτόπων-γεωπάρκων, συμβολή στην αειφόρο ανάπτυξη»** και το υποέργο: «Δημιουργία υλικού προβολής, διάδοσης, ευαισθητοποίησης για τους γεώτοπους και τα γεωπάρκα», ενώ η αποτύπωση των γεωδιαδρομών έγινε στο πλαίσιο του υποέργου «Μελέτες-σχεδιασμός γεωδιαδρομών για δυνητικά γεωπάρκα» του ίδιου έργου, κατά το 2008.

Οι γεωδιαδρομές, που περιγράφονται στις καρτέλες, είναι σχεδιασμένες έτσι ώστε να επιτρέπουν να γνωρίσουμε μερικά στιγμιότυπα της γεωλογικής και της άρρηκτα δεμένης μαζί της πολιτιστικής ιστορίας του τόπου. Στις πρώτες εισαγωγικές καρτέλες παρουσιάζεται συνοπτικά η φυσική (βιοτική), συμπεριλαμβανομένης της γεωλογικής (αβιοτικής) και η πολιτιστική κληρονομιά της περιοχής, ενώ οι υπόλοιπες καρτέλλες παρουσιάζουν τις γεωδιαδρομές. Από τις διαδρομές, άλλες είναι σχεδιασμένες για αυτοκίνητο και άλλες για περπάτημα. Κάθε καρτέλα αφορά συνήθως μία διαδρομή και οι παράγραφοι με κεφαλαία γράμματα (Α, Β...) δίνουν οδηγίες σχετικά με το πώς θα κινηθείτε για να προσεγγίσετε τη θέση, ενώ οι παράγραφοι με αριθμούς (1, 2...) δίνουν ερμηνευτικές πληροφορίες κυρίως για το γεωλογικό ενδιαφέρον μιας θέσης (γεώτοπος). Τα ίδια γράμματα και οι αριθμοί στους χάρτες των καρτελλών αντιστοιχούν στις οδηγίες και στις ερμηνευτικές πληροφορίες. Οι χάρτες των καρτελών είναι ενδεικτικοί, με αδρές πληροφορίες. Ο τοπογραφικός χάρτης 1: 50.000 είναι απαραίτητο εργαλείο στην εξόρμησή σας, ακόμη καλύτερα και ο αντίστοιχος γεωλογικός χάρτης (εκδόσεις ΙΓΜΕ).

Οι γεωδιαδρομές είναι είτε μονοθεματικές είτε πολυθεματικές. Οι σχεδιασμένες στο χάρτη έγχρωμες γεωδιαδρομές (ένα χρώμα για κάθε διαδρομή) δεν είναι, προς το παρόν τουλάχιστον, πλήρως σηματοδοτημένες στο ύπαιθρο. Οι γεωδιαδρομές θα σηματοδοτηθούν με επιτόπου ενδείξεις (πινακίδες με το λογότυπο και με το ίδιο χρώμα της γεωδιαδρομής στις καρτέλες, μικρές καθοδηγητικές αρχικά με έναν αριθμό και την ονομασία της γεωδιαδρομής και του γεωτόπου, και μεγαλύτερες ερμηνευτικές πινακίδες στη συνέχεια) που αφορούν τα σημεία ενδιαφέροντος τα οποία περιγράφονται σ' αυτές τις καρτέλες, ήδη έχουν κατασκευαστεί σχετικές πινακίδες. Γι' αυτό να παρατηρείτε προσεκτικά το χώρο που διατρέχετε, ώστε να αντιληφθείτε τη σηματοδότηση. Προτού ξεκινήσετε, βεβαιωθείτε ότι έχετε διαβάσει το σύνολο του σχολιασμού που αφορά την εξόρμησή σας και περιέχεται στις καρτέλες.

Οι διαδρομές είναι όλες σχετικά εύκολες. Χρειαζόσαστε ένα αυτοκίνητο σε καλή κατάσταση, κατάλληλο ντύσιμο, κάποιο εξοπλισμό (π.χ. φακό, μπαστούνι...), νερό, τροφή και καλή παρέα. Για την καλύτερη περιήγηση της κάθε περιοχής σχεδιάστηκε ένας αριθμός γεωδιαδρομών, που καλύπτουν ολόκληρη την περιοχή με τα πιο σημαντικά αξιοθέατα.

ΧΡΗΣΙΜΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

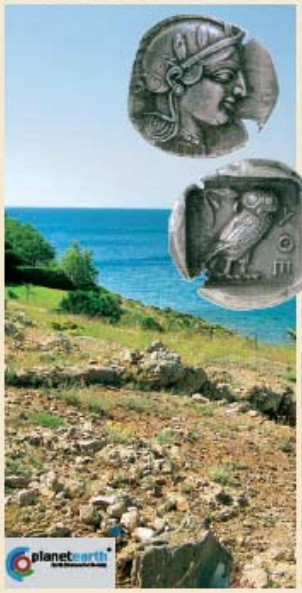
Σ' αυτή την πρώτη πιλοτική αποτύπωση γεωδιαδρομών, έγινε προσπάθεια ώστε αυτές να ακολουθούν κανονικούς δρόμους ή έτοιμα μονοπάτια σχετικά σηματοδοτημένα. Σε κάποιες περιπτώσεις οι γεώτοποι, κομβικά σημεία των γεωδιαδρομών, πιθανόν να βρίσκονται σε ιδιωτικούς, αρχαιολογικούς και γενικά χώρους με καθεστώς προστασίας. Οι γεωδιαδρομείς πρέπει να συμπεριφέρονται όπως αρμόζει σε κάθε περίπτωση, σεβόμενοι τα δικαιώματα των ιδιοκτητών ή τους κανόνες των χώρων, προσπαθώντας να τους διατηρήσουν στην καλύτερη δυνατή κατάσταση.

ISBN 978-960-87453-8-4 Μαρώνεια
ISBN 978-960-87453-7-7 Νότια Θάσος
ISBN 978-960-87453-9-1 Βίκος–Αώος και ευρύτερη περιοχή
ISBN 978-960-87453-6-0 Λαύριο και ευρύτερη περιοχή
ISBN 978-960-87453-5-3 Νίσυρος
ISBN 978-960-87453-4-6 Δ. Κρήτη & ν. Γαύδος

ΙΝΣΤΙΤΟΥΤΟ ΓΕΩΛΟΓΙΚΩΝ ΚΑΙ ΜΕΤΑΛΛΕΥΤΙΚΩΝ ΕΡΕΥΝΩΝ - Διεύθυνση Γενικής Γεωλογίας και Γεωλογικών Χαρτογραφήσεων
Σπύρου Λούη 1, Ολυμπιακό Χωριό, Γ΄ Είσοδος, 136 77 Αχαρναί, Αττική
• Τηλ.: 210 2413175 • FAX: 210 2413448 • www.igme.gr

Παραθέτουμε στη συνέχεια ορισμένες σελίδες από την καρτέλα του Λαυρίου και της ευρύτερης περιοχής. Όλες οι καρτέλες είναι διαθέσιμες στον ιστότοπο του ΙΓΜΕ.

Εξερευνήστε το τοπίο, τα πετρώματα και τη φύση της Λαυρεωτικής χερσονήσου. Γνωρίστε την ιστορία και τον πολιτισμό της.

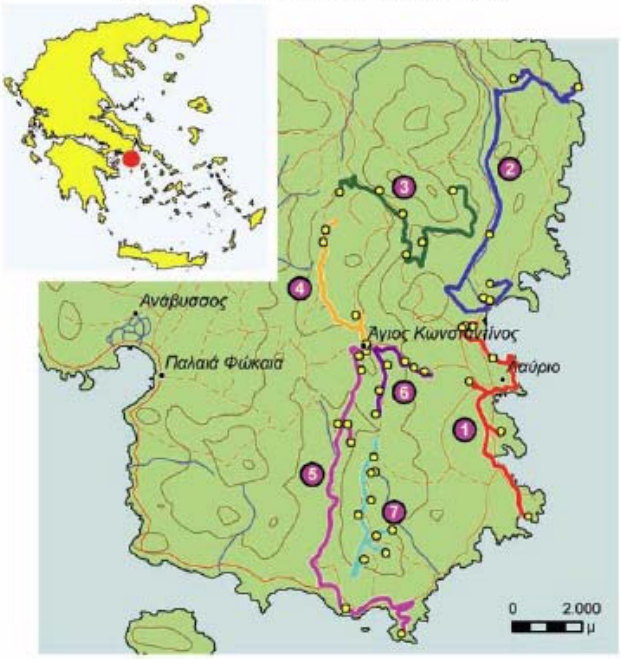


ΛΑΥΡΙΟ και ΕΥΡΥΤΕΡΗ ΠΕΡΙΟΧΗ

ΕΡΓΟ:
ΑΝΑΔΕΞΗ ΓΕΩΤΟΠΩΝ-ΓΕΩΠΑΡΚΩΝ, ΣΥΜΒΟΛΗ ΣΤΗΝ ΑΕΙΦΟΡΟ ΑΝΑΠΤΥΞΗ

ΧΑΡΤΗΣ ΠΕΡΙΟΧΗΣ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΜΕ ΤΙΣ ΠΡΟΤΕΙΝΟΜΕΝΕΣ ΓΕΩΔΙΑΔΡΟΜΕΣ

Σε αυτή τη φάση, επιλέχθηκαν και καταγράφηκαν 47 γεώτοποι ιδιαίτερου γεωλογικού, μεταλλευτικού ή μεταλλουργικού ενδιαφέροντος, που κατανεμήθηκαν σε 7 γεωδιαδρομές (6 πολυθεματικές, 1 μονοθεματική).



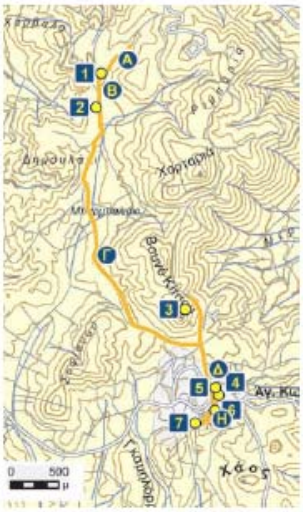
ΓΕΩΔΙΑΔΡΟΜΕΣ

1. *Λαύριο και περιαστική περιοχή*
2. *Βορειοανατολική Λαυρεωτική - Θορικό*
3. *Βορειοδυτική Λαυρεωτική (Πλάκα - Βίλλια)*
4. *Δημολιάκι - Αγ. Κωνσταντίνος (Καμάριζα)*
5. *Κοιλάδα Λεγραινών - Σούνιο*
6. *Άγ. Κωνσταντίνος-Χάος- Σούρεζα*
7. *Αγ. Τριάδα - Άνω Σούνιο*

Θέση και Μορφολογία

Η Λαυρεωτική βρίσκεται στη ΝΑ πλευρά της Αττικής. Απέχει 55 χλμ. από την Αθήνα και καταλαμβάνει έκταση 200 χλμ.^{2} περίπου. Η μορφολογία της είναι λοφώδης ως ημιορεινή, με μεγαλύτερο υψόμετρο στη θέση Μεγάλο Ριμπάρι (372 μ.). Η περιοχή είναι άνυδρη, εν μέρει πευκόφυτη και διασκίζεται από κοιλάδες. Η προσπέλαση γίνεται κατά κανόνα με ασφαλτοστρωμένους δρόμους. Η **ιστορία** της περιοχής, τα αξιοθέατα, η φυσική ομορφιά, η εύκολη σύνδεση με την Αθήνα και η ξενοδοχειακή υποδομή κάνουν τη Λαυρεωτική ιδανικό τόπο για σύντομες ή μεγαλύτερες επισκέψεις. Περπατώντας στην πόλη του Λαυρίου θα γνωρίσουμε την πλούσια ιστορία του. Το Δημαρχείο, το μνημείο του J.B. Serpieri, το Ορυκτολογικό και το Αρχαιολογικό Μουσείο, οι εκκλησίες της Αγίας Παρασκευής και της Ευαγγελίστριας, η Παλαιά Αγορά και η Γαλλική Σκάλα Φόρτωσης Μεταλλευμάτων στο λιμάνι, μοναδικό μνημείο βιομηχανικής αρχαιολογίας, αποτελούν απαραίτητα σημεία επίσκεψης.

4η ΔΙΑΔΡΟΜΗ • Δημολιάκι – Άγιος Κωνσταντίνος (Καμάριζα)



Συναλικό μήκος: περίπου 7 χλμ.
Μεγαλύτερο υψόμετρο: 298 μ.
Πρόσβαση με συμβατικό αυτοκίνητο, εκτός της θέσης 3, όπου, λόγω του ανηφορικού χωματόδρομου, είναι απαραίτητη η χρήση αυτοκινήτου 4 x 4 ή πεζοπορίας μέτριου βαθμού δυσκολίας.

Α. *Το σημείο έναρξης της γεωδιαδρομής αυτής βρίσκεται 3 χλμ. περίπου ΒΔ του οικισμού Πλάκα. Πρόσβαση εύκολη, με αφετηρία τον οικισμό. Ακολουθώντας την Παλαιά Λεωφόρο Αθηνών-Λαυρίου προς Αθήνα, φθάνουμε στη διασταύρωση προς Συντερίνα και Δημολιάκι και συνεχίζουμε. Στα 2 χλμ. περίπου, στα αριστερά του δρόμου, βρίσκεται το σημείο ενδιαφέροντος.*

1. Αρχαία δεξαμενή ύδατος για τη συγκέντρωση βρόχινου νερού, που χρησίμευε για τη λειτουργία των παρακείμενων εγκαταστάσεων πλυντηρίων εμπλουτισμού μεταλλεύματος. Πολλές παρόμοιες δεξαμενές υπάρχουν στην ευρύτερη περιοχή της Λαυρεωτικής (περίπου 200). Οι περισσότερες είναι κυκλικής διατομής με διάμετρο 5-10 μ. και βάθος 3-4 μ., λαξευμένες στο πέτρωμα ή κτισμένες με τοιχοποιία.
Για τη μείωση των απωλειών σε νερό, τόσο οι δεξαμενές όσο και τα πλυντήρια είχαν εσωτερική επένδυση με κατάλληλο σκυροκονίαμα, καθώς και ειδικό στεγανοποιητικό επίστρωμα από λιθάργυρο, που σε αρκετές περιπτώσεις διασώζονται μέχρι σήμερα.

Β. *Συνεχίζοντας δυτικά από την προηγούμενη θέση, περίπου στα 300 μ. δεξιά του δρόμου βρίσκεται η επόμενη στάση.*

Ελικοειδές μαρμάρινο πλυντήριο

2. Συγκρότημα αρχαίων πλυντηρίων εμπλουτισμού μεταλλεύματος και δεξαμενές ύδατος. Συγκρότημα για την επεξεργασία του μεταλλεύματος, το οποίο σήμερα έχει εν μέρει ανακατασκευαστεί. Επισημαίνεται η παρουσία και των δύο τύπων πλυντηρίων που χρησιμοποιήθηκαν στη Λαυρεωτική: εκτός από τα συνήθη *επίπεδα πλυντήρια έχουμε και ένα ελικοειδές μαρμάρινο πλυντήριο, εξαιρετικά σπάνιο για την περιοχή.*

Γ. *Η πρόσβαση γίνεται από την προηγούμενη θέση, ακολουθώντας την εξής πορεία: Συνεχίζουμε στον ασφάλτινο δρόμο με δυτική κατεύθυνση και στα 900 μ. στρίβουμε αριστερά σε χωματόδρομο μήκους 2 χλμ. περίπου χωρίς αλλαγή πορείας. Στη συνέχεια ο δρόμος γίνεται πάλι ασφάλτινος. Τον ακολουθούμε για 600 μ. περιφερειακά του λόφου. Στο τέλος αυτού του δρόμου παίρνουμε την αριστερή διακλάδωση (ανηφορικός χωμάτινος δρόμος) ως το διάσελο (600 μ.). Στρίβουμε αριστερά το χωματόδρομο για 150 μ., ως την αρχή τσιμεντόδρομου. Από εκεί, πάλι αριστερά, ακολουθούμε το μικρό μονοπάτι για 100 μ. περίπου, όπου και βρίσκεται ο γεώτοπος ενδιαφέροντος.*

3. Σπήλαιο Κίτσου. Σπήλαιο καρστικού τύπου, εντός του ανώτερου ασβεστόλιθου της «Σειράς Πλάκας» (Ενδιάμεση Τεκτονική Ενότητα). Το μήκος του, κατά πληροφορίες, φτάνει τα 30-40 μ.
Για λόγους ασφάλειας δεν ενδείκνυται η επίσκεψή του από μη ειδικούς.
Το σπήλαιο παρουσιάζει αρχαιολογικό και ιστορικό ενδιαφέρον, εφόσον εντοπίστηκαν εντός αυτού ευρήματα που αποδεικνύουν τη λειτουργία του ως καταφυγίου κατά την κλασική και την ελληνιστική περίοδο. Βρίσκεται σε ασφαλή στρατηγική θέση, γι' αυτό χρησιμοποιήθηκε προ του 1868 από τον ληστή Κίτσο, στον οποίο οφείλει και την ονομασία του.

ΓΕΩΛΟΓΙΚΑ ΚΑΙ ΑΛΛΑ ΤΑΞΙΔΙΑ ΑΠ' ΤΟΝ ΚΑΝΑΠΕ…

Google Maps with Street View lets you explore places around the world through 360-degree street-level imagery. You can explore world landmarks, view natural wonders, navigate a trip, go inside restaurants and small businesses - and now even hike the Grand Canyon! Browse the gallery http://maps.google.com/help/maps/streetview/index.html to see collections from around the world.

Grand Canyon

Bright Angel Trail - View 1

The trail originates at the Grand Canyon Village on the south rim of Grand Canyon, descending 4380 feet to the Colorado River. It has an average grade of 10% along its entire length. Grand Canyon National Park categorizes the Bright Angel Trail as a corridor trail. With this designation it receives regular maintenance and patrols by park rangers.

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/bright-angel-trail-view-1.html)

Bright Angel Trail - View 2

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/bright-angel-trail-view-2.html)

Bright Angel Trail - View 3

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/bright-angel-trail-view-3.html)

Bright Angel Trail - View 4

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/bright-angel-trail-view-4.html)

Bright Angel Trail - View 5

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/bright-angel-trail-view-5.html)

South Kaibab Trail

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/south-kaibab-trail.html)

Colorado River - Black Bridge

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/colorado-river-black-bridge.html)

Colorado River - Black Bridge view

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/colorado-river-black-bridge-view.html)

Colorado River - Arizona Trail View

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/colorado-river-arizona-trail-view.html)

Phantom Ranch - View 1

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/phantom-ranch-view-1.html)

Phantom Ranch- View 2

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/phantom-ranch-view-2.html)

Meteor Crater - View 1

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/meteor-crater-view-1.html)

Meteor Crater - View 2

(http://maps.google.com/help/maps/streetview/gallery/grand-canyon/meteor-crater-view-2.html)

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

"GSI Fellowships for Students"

REQUEST - FOR- PROPOSALS

The Geosynthetic Institute (GSI) is delighted to announce a worldwide call for requestsfor-proposals (RFPs) focusing on innovative geosynthetics research and development projects. There will be multiple awards made, each for $10,000 for the first year, and they are renewable for a second and third year up to a total amount of $20,000 per student. It is important to note that students must have completed their candidacy examinations leading to a doctorial degree in engineering or science to be eligible. The proposals must be submitted in the following four page format (with no exceptions).

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

Page 2 – Title and detailed abstract of project

Page 3 – Student's resume

Page 4 – Documentation of completed candidacy examination

The RFPs for the 2013-2014 academic year must be submitted to both the undersigned by e-mail by June 10, 2013 and awards will be announced on, or before, July 15, 2013. Review of the proposals is by the nine-person Board of Directors of GSI. For information on the Geosynthetic Institute and past recipients, visit us at the following website: www.geosynthetic-institute.org/gsifellows.htm.

Robert M. Koerner, PhD, PE, NAE
Emeritus Director – Geosynthetic Institute
Email Robert.koerner@coe.drexel.edu

Jamie R. Koerner
Special Projects Coordinator
Email jrkoerner@verizon.net

ΠΡΟΣΕΧΕΙΣ ΕΚΔΗΛΩΣΕΙΣ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΣΤΗΝ ΕΛΛΑΔΑ

ΕΡΓΑΣΤΗΡΙΟ ΑΝΤΟΧΗΣ ΥΛΙΚΩΝ
ΤΟΜΕΑΣ ΜΗΧΑΝΙΚΗΣ, ΣΧΟΛΗ ΕΦΑΡΜΟΣΜΕΝΩΝ ΜΑΘΗΜΑΤΙΚΩΝ & ΦΥΣΙΚΩΝ ΕΠΙΣΤΗΜΩΝ
&
ΕΡΓΑΣΤΗΡΙΟ ΘΕΜΕΛΙΩΣΕΩΝ
ΤΟΜΕΑΣ ΓΕΩΤΕΧΝΙΚΗΣ
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ

Την Παρασκευή 15 Μαρτίου 2013, ώρα 3:30-5:00 μμ θα πραγματοποιηθεί διάλεξη με προσκεκλημένο Ομιλητή τον Καθηγητή Gioacchino Viggiani (*Université Joseph Fourier*, Grenoble, France) με θέμα:

"What actually happens when granular materials deform under shear: a look (from) within..."

Strain localization presents major challenges for continuum models of geo-materials. For these models to be successful, the microstructure of the material (grain scale for sands) should be explicitly taken into account. This in turn requires experimental characterization of shear banding at the grain scale. X-ray micro tomography is used to provide complete 3D images within sand samples while they deform under triaxial compression. Images from x-rays are then analysed either in a continuum sense (using 3D Digital Image Correlation) or looking at the individual particle kinematics (Particle Tracking), where the kinematics (displacement + rotation) of each individual grain in the sample are measured. These advanced techniques offer a clear inside view at what actually happens when a granular material deforms and eventually fails by transition from homogeneous to localized deformation.

Η διάλεξη οργανώνεται στα πλαίσια του ερευνητικού προγράμματος IDEAS_SOMEF, με Επιστημονικό Υπεύθυνο τον Ι. Φ. Δαφαλιά του Τομέα Μηχανικής της ΣΕΜΦΕ, σε συνεργασία με το Εργαστήριο Θεμελιώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ.

Cino Viggiani was born in Napoli (Italy), where he obtained a B.S. in Civil Engineering (1988), his Ph.D. in Geotechnical Engineering at the University of Roma "La Sapienza" (1994), and his H.D.R. (*Habilitation*) in Mechanics at Université Joseph Fourier, Grenoble, France (2004), where he is full Professor since 2004. In 2012 he was advanced to the rank of *Professeur de Classe Exceptionnelle* by the French National Council of Universities (CNU). He served in the capacity of Vice-President for Research in Physics and Engineering, and he is Editor of the International Journal *Acta Geotechnica* (Springer) since 2006. He is the author of about 100 scientific papers and delivered numerous keynotes and invited lectures worldwide. His research involves experimental investigations as well as theoretical and numerical modeling of the behavior of geomaterials, including localized failure and hydro-mechanical coupling. Applications are principally in geoenvironmental, petroleum, and civil engineering. On the experimental side, he has been using quite a range of soils and rock testing apparatus, including plane strain compression devices for soils and rocks equipped with ultrasonic tomography / acoustic emission systems, and a generalized shear apparatus with principal stress rotation. Methods such as Digital Image Correlation and x-ray tomography, have been developed applied to detect the onset of localized deformation.

Γ. ΜΠΟΥΚΟΒΑΛΑΣ
Διευθυντής Εργαστηρίου Θεμελιώσεων

2ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΦΡΑΓΜΑΤΩΝ ΚΑΙ ΤΑΜΙΕΥΤΗΡΩΝ
Σχεδιασμός – Διαχείριση – Περιβάλλον
Αθήνα, 7 - 8 Νοεμβρίου 2013
www.eemf.gr

Μετά το πολύ επιτυχημένο πρώτο συνέδριο στη Λάρισα το 2008, η Ελληνική Επιτροπή Μεγάλων Φραγμάτων (ΕΕΜΦ) διοργανώνει το **2ο Πανελλήνιο Συνέδριο Φραγμάτων και Ταμιευτήρων στις 7 & 8 Νοεμβρίου του 2013 στην Αθήνα, στην Αίγλη Ζαππείου**.

Η απαίτηση για ορθολογική διαχείριση του υδατικού δυναμικού είναι μεγαλύτερη παρά ποτέ. Στις αυξανόμενες ανάγκες για ύδρευση, άρδευση, ενέργεια και αντιπλημμυρική 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 δεκαετίες 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.

Το συνέδριο στοχεύει στην παρουσίαση, ανάδειξη και συζήτηση των ανωτέρω ζητημάτων και απευθύνεται σε όλους όσοι με την μελέτη, κατασκευή και διαχείριση έργων φραγμάτων και ταμιευτήρων.

Θεματολόγιο

1. **Φράγματα και Ολοκληρωμένη Διαχείριση Υδατικών Πόρων**

- Ο ρόλος των ταμιευτήρων στην ολοκληρωμένη διαχείριση υδατικών πόρων
- Ταμιευτήρες πολλαπλού σκοπού
- Αντιπλημμυρική προστασία
- Τεχνικο-οικονομικά κριτήρια υλοποίησης νέων φραγμάτων
- Ο ρόλος των φραγμάτων στον ενεργειακό σχεδιασμό - Σύγχρονες τάσεις και τεχνολογικές εξελίξεις
- Ταμιευτήρες – Αντλητικά και υβριδικά συστήματα παραγωγής ενέργειας

2. Εξελίξεις στις Μεθόδους Σχεδιασμού & Κατασκευής

- Υλικά κατασκευής φραγμάτων - Μέθοδοι κατασκευής - Νέες τεχνικές
- Εκτίμηση, επιλογή και αναθεώρηση πλημμυρών σχεδιασμού
- Σχεδιασμός και αναβάθμιση υπερχειλιστών
- Έργα στεγάνωσης και αποστράγγισης φράγματος και θεμελίωσης
- Η επιρροή των γεωλογικών συνθηκών στον σχεδιασμό
- Εξελίξεις στον γεωτεχνικό σχεδιασμό
- Εξελίξεις στον αντισεισμικό σχεδιασμό
- Εξελίξεις στον Η/Μ εξοπλισμό

3. Ασφάλεια Φραγμάτων και Ταμιευτήρων

- Κανονισμοί μελέτης, κατασκευής και λειτουργίας φραγμάτων
- Η πρόταση της ΕΕΜΦ για την σύνταξη εθνικού κανονισμού ασφάλειας φραγμάτων
- Αποτίμηση της διακινδύνευσης φραγμάτων (risk assessment)
- Δημόσιοι και ιδιωτικοί φορείς εμπλεκόμενοι στη διαχείριση φραγμάτων – θέματα οργάνωσης και τεχνικής ικανότητας
- Κίνδυνοι σχετιζόμενοι με προβλήματα οργάνωσης του κυρίου - διαχειριστή του έργου
- Απαιτήσεις παρακολούθησης συμπεριφοράς
- Ασφάλεια ταμιευτήρα (ευστάθεια πρανών, εκτεταμένες διαρροές κτλ)
- Αναλύσεις θραύσης φράγματος και επιπτώσεις
- Μακροχρόνια συμπεριφορά, γήρανση των έργων και εργασίες αποκατάστασης
- 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. Φράγματα, Ταμιευτήρες και Περιβάλλον

- Φιλικές προς το περιβάλλον κατασκευές φραγμάτων και ταμιευτήρων
- Φράγματα, ταμιευτήρες και αειφορία
- Περιβαλλοντική και κοινωνικά αποδοχή φραγμάτων και ταμιευτήρων – Συμμετοχικές διαδικασίες στο σχεδιασμό και υλοποίηση
- Περιορισμός υδρομορφολογικών αλλοιώσεων και αισθητική αποκατάσταση περιβάλλοντος
- Αρχιτεκτονικός σχεδιασμός φραγμάτων και συναφών κατασκευών
- Τα φράγματα ως μέρος της πολιτιστικής κληρονομιάς
- Εμπλουτισμός και αποκατάσταση υπόγειων υδροφορέων - Δημιουργία υγροβιότοπων κ.λπ.
- Χρονική εξέλιξη των ποιοτικών χαρακτηριστικών των ταμιευτήρων - Διατήρηση και βελτίωση ποιότητας υδατικών πόρων
- Φερτές ύλες

5. Παρουσίαση έργων

Κρίσιμες ημερομηνίες για την αποστολή εργασιών:

- Υποβολή περιλήψεων: **15 Δεκεμβρίου 2012**
- Αποδοχή περιλήψεων: **15 Ιανουαρίου 2013**
- 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.

ΕΛΛΗΝΙΚΗ ΕΠΙΤΡΟΠΗ ΜΕΓΑΛΩΝ ΦΡΑΓΜΑΤΩΝ, μέσω ΔΕΗ – ΔΥΗΠ, Αγησιλάου 56-58, 104 36 ΑΘΗΝΑ, τοτ. 210 - 5241223, Η/Δ : eemf@eemf.gr, www.eemf.gr

6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ
Αθήνα 25 - 28 Νοεμβρίου 2013

Το Εργαστήριο Λιμενικών Έργων του Ε.Μ.Π. διοργανώνει το 6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ. Θα πραγματοποιηθεί στην Αθήνα στις 25 - 28 Νοεμβρίου 2013.

Αντικείμενο του Συνεδρίου είναι η παρουσίαση των νεοτέρων εξελίξεων στο χώρο των επιστημών και των τεχνολογιών που σχετίζονται με τα Λιμενικά Έργα και ειδικότερα την έρευνα, τον σχεδιασμό, την μελέτη, κατασκευή, προστασία, συντήρηση, διαχείριση, στις επιπτώσεις στο περιβάλλον καθώς και η ενημέρωση, η ανταλλαγή απόψεων και η προώθηση της τεχνογνωσίας στους τομείς αυτούς. Στόχος του είναι η ενημέρωση, η ανταλλαγή απόψεων και η προώθηση της τεχνογνωσίας.

Απευθύνεται στους ερευνητές, μελετητές, κατασκευαστές, ΑΕΙ, δημόσιους φορείς, ΟΤΑ, Ο.Λ., Λιμενικά Ταμεία, περιβαλλοντικές οργανώσεις και υπηρεσίες που ενδιαφέρονται και ασχολούνται με τα Λιμενικά Έργα, τους οποίους και προσκαλεί να παρουσιάσουν το έργο και τις εμπειρίες τους.

Θεματολόγιο

- Περιβαλλοντικά μεγέθη σχεδιασμού και κατασκευής λιμενικών έργων
- Σχεδιασμός λιμένων, μελέτη και κατασκευή λιμενικών έργων
- Χωροθέτηση λειτουργιών, διαμόρφωση λιμενικής ζώνης
- Αστοχίες, βλάβες λιμενικών έργων. Επιθεώρηση, αποκατάσταση, συντήρηση
- Μελέτη λιμένων σε φυσικό προσομοίωμα
- Περιβαλλοντικές επιπτώσεις από την κατασκευή και λειτουργία λιμένων
- Το Ελληνικό Λιμενικό Σύστημα υπό το πρίσμα της Ευρωπαϊκής οικονομικής κρίσης
- Διαχείριση, διοίκηση, λειτουργία λιμένων. Θεσμικό πλαίσιο. Ιδιωτικοποιήσεις δραστηριοτήτων.

Οι ενδιαφερόμενοι για περισσότερες πληροφορίες μπορούν να απευθύνονται στο Εργαστήριο Λιμενικών Έργων Ε.Μ.Π. τηλ.: 210.7722367, 210.7722375, 210.7722371, fax: 210. 7722368 (κες Θ. Γιαντσή, Ι. Φατούρου).

e-mail: lhw@central.ntua.gr

EETC 2014 ATHENS
2nd Eastern European Tunnelling Conference
1-2 October 2014, Athens, Greece
www.eetc2014athens.org

Η Ελληνική Επιτροπή Σηράγγων και Υπογείων Έργων (Ε.Ε.Σ.Υ.Ε.) στις 18-9-2012 στη Βουδαπέστη και στα πλαίσια των εκδηλώσεων του 1st East European Tunnelling Conference 2012, ανέλαβε από το σώμα των αντιπροσώπων των Εθνικών Επιτροπών της International Tunnelling and Underground Space Association (ITA) των χωρών της Ανατολικής Ευρώπης, και παρουσία του πρώτου αντιπροέδρου της ITA κ. Markus Thewes και του εκτελεστικού Διευθυντή κ. Olivie Vion, τη διοργάνωση του 2nd Eastern European Tunnelling Conference 2014 (EETC 2014). Το συνέδριο οργανώνεται με την επίσημη υποστήριξη της International Tunnelling and Underground Space Association (ITA).

Οι χώρες που συμμετέχουν στην διοργάνωση και στις οποίες κυρίως, αλλά όχι αποκλειστικά, απευθύνεται είναι: Ελλάδα, Κύπρος, Τουρκία, Αλβανία, FYROM, Βουλγαρία, Ρουμανία, Σερβία, Μαυροβούνιο, Βοσνία, Κροατία, Σλοβενία, Ουγγαρία, Σλοβακία, Τσεχία, Πολωνία, Λευκορωσία, Ουκρανία, Ρωσία, Αζερμπαϊτζάν, Αρμενία, ενώ επιδιώκεται η συμμετοχή και των υπολοίπων Βαλτικών χωρών, και του Ισραήλ. Γίνεται προσπάθεια για την συμμετοχή της κρατικής εταιρείας ASHGHAL και της κρατικής εταιρείας σιδηροδρόμων του Κατάρ που υλοποιούν ένα αξιομνημόνευτο πρόγραμμα υπογείων έργων.

Στις 30-9-2014 θα γίνουν οι πρόδρομες εκδηλώσεις με τη συνάντηση των Εθνικών Επιτροπών, στις 1 και 2-10-2014 οι εργασίες του συνεδρίου και την 3-10-2014 η τεχνική επίσκεψη. Το συνέδριο θα γίνει στις εγκαταστάσεις του ξενοδοχείου Royal Olympic. Το δείπνο του συνεδρίου θα δοθεί την 1-10-2014 στο εστιατόριο του 7ου ορόφου του ξενοδοχείου.

Σε λίγες μέρες θα ανοίξει η ιστοσελίδα του συνεδρίου http://www.eetc2014athens.org στην οποία θα μπορείτε να αναζητήσετε τις διατιθέμενες πληροφορίες. Το e-mail του συνεδρίου secretary@eetc2014athens.org είναι ήδη ενεργοποιημένο και μπορείτε να επικοινωνείτε.

Στη συνέχεια παραθέτουμε τη θεματολογία του συνεδρίου όπως διαμορφώθηκε από την Οργανωτική Επιτροπή.

"Tunnelling in a Challenging Environment"
Making tunnelling business in difficult times

The execution of underground projects is becoming increasingly demanding as new challenges are emerging in every aspect and sector of this multidisciplinary and multifarious business. Further to the usual geological, geotechnical, structural and operational challenges, we are now facing a stretched business and financial environment, which requires the deployment of even more intelligent and effective tools and solutions.

TOPICS:

- Innovative methods for Analysis and Design
- Tunnelling in difficult ground conditions
- Conventional urban or shallow tunnelling
- Mechanized tunnelling
- Hydraulic tunnels
- Underground complexes
- Caverns for Hydropower or Storage
- Pipe jacking and microtunnelling
- Innovations in tunnelling construction technology
- Tunnels and shafts for mining
- Rehabilitation and repair
- Safety and security in tunnels and tunnelling
- Contractual and financial issues
- Education and training
- Case histories
- Underground space use
- Tunnels and monuments

Σκοπός της ΕΕΣΥΕ με τη διοργάνωση του συνεδρίου είναι να υπάρξει μια περαιτέρω ευκαιρία για προβολή της γνώσης και εμπειρίας που παράχθηκε και σωρεύτηκε στη χώρα, να αναπτύξει τις σχέσεις συνεργασίας με τις άλλες Εθνικές Επιτροπές των χωρών αυτής της γεωγραφικής ενότητας και κυρίως να δοθεί η ευκαιρία δημιουργίας ενός βήματος επιστημονικής αλλά και επιχειρηματικής καταγραφής και συνεργασίας στην Ανατολική Ευρώπη.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

XXXVI Winter School of Rock Mechanics and Geongineering, 11-15 March 2013, Kudowa Zdroj, Poland, www.zsmgig.pwr.wroc.pl/?home,11

International Conference on Geotechnical Engineering 2013, March 14th and 15th, 2013, Lahore, Punjab, Pakistan, www.pges-pak.org/home/icge-2013

ICLR13 International Conference on «Landslide Risk», 14 – 16 March 2013, Ain Draham, Tunisia, www.iclr13.com

ARMA Forum
Rheology, Creep and Viscoplasticity: It's About Time
March 18-19, 2013, Salt Lake City, U.S.A.
www.armarocks.org/forum.html

ARMA is pleased to sponsor a multidisciplinary forum on rheology, creep and viscoplasticity and their applications.

What is Rock Rheology?

Rheology relates the macroscopic response of a material to the forces that act on it. The rheologic characteristics of a rock, the effective stress field and the appropriate boundary conditions determine deformation. Rheology is central to all aspects of rock mechanics, geomechanics and geoscience.

Forum

While rheologic properties of rock or soil and their engineering implications are common concerns for nearly every geoscientist/engineer, rheology is a topic that receives less coverage than some more glamorous, topical subjects do. Ironically, understanding many of these topical subjects hinges on appreciation of constitutive and rheologic behavior of rock or soil. The purpose of this workshop is to provide updates of recent rheologic developments, to determine relevant research and development domains, to introduce or clarify engineering implications, and to share field and laboratory experience.

In geomechanics and rock mechanics, there is a renewed and growing interest in time-rate dependency of the deformational behavior of geologic materials. The study of instabilities in the earth's crust and near-surface strata, safety in man-made excavations, and in petroleum extraction require understanding of inter-relationships among stress, strain, pore fluids, temperature, and their relative time-rates of change. Earthquake engineering, tectonics, seismic- and micro-seismicity are crosscutting technologies. This forum addresses these aspects of rock rheology from the perspectives of three areas:

1. Laboratory and field measurements
2. Numerical considerations – from simple to complex rheology
3. Field applications and Case Studies

The forum will encompass rheological considerations in three technical disciplines, each interwoven with geologic and geophysical insight. Consider interacting with colleagues whose specialties are somewhat different but who have insight into rheologic behavior. For example:

Geosciences/Geomechanics: Recent advances in viscoplasticity are focused on nano- and micro-strains, and their effects on the microstructural fabric of rocks. How do we scale up, from local grain- and pore-level strains to macro- and meso-scales of mineral/rock assemblages? How and when do subseismic microstrains propagate into detectible, locatable, dynamic micro- and macroseismic events? How do we populate the properties of large-scale geocellular models with relevant petrophysical and viscoplastic properties? How do we link multifaceted components towards a practical common-earth model?

Civil: Has consolidation theory advanced substantially? How do we view rheology and effective stress concepts – or do we? How do these improve the reliability of calculated factors of safety in various geotechnical structures? How can we improve static and dynamic structural models towards realistic, proactive risk assessment tools?

Mining: How can structural geology and rheological insight help? How do we extend ground-reaction concepts to improve predictive models of mine openings, mine-bumps, cavings, stability of pit-slopes and tailings ponds?

Petroleum: How can fracture mechanics, structural geology and rheology be better enfranchised into well construction, production and reservoir management? How do we include flow-coupling mechanisms in "shale reservoirs" during brittle-ductile transition, creep of hydraulic fractures, and in containment prediction. Subsidence prediction, subsalt drilling, and deepwater reservoirs also require viscoplasticity in their geomechanical models. Earthquake engineering and microseismicity are crosscutting technologies that require rheologic characterization. Don't forget the rheologic behavior of oil sands subjected to steam flooding (e.g. SAGD).

For More Information Contact:

Peter Smeallie (ARMA) smeallie@armarocks.org or 1-703-683-1808
John McLennan (University of Utah)
jmclennan@egi.utah.edu or 1-801-587-7925

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

4th Annual Tunnel Design & Construction ASIA 2013, 19 - 20 March, 2013, Singapore, http://www.tunneldesignconstruction.com/Event.aspx?id=847030

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

5th Symposium of Geomechanics:
Geomechanics of the Unconventional Reservoirs – Challenges of the Decade
26-27 March 2013, Mendellin, Colombia

Conference Emphasis: Specific energy sources

- Geomechanics of unconventional oil/gas reservoirs, presenting the challenges in exploration, characterization and exploration: Shale oil, tight gas, shale gas, oil shale, gas hydrate, coalbed methane.
- Geomechanics of Heavy Oil Reservoirs, presenting the impact of geomechanical aspects in these reservoirs: geomechanical issues and enhanced oil recovery.
- Wellbore Stability driving the relevant geomechanical aspects and the risksy events.
- Hydraulic Fracturing and refracturing: geomechanical aspects. Relevant topics
- Wellbore integrity, horizontal drilling, reservoir depletion and sand production.
- Hot and cold fluid injection: Water, gas and chemicals.
- Stress and deformation, temperature, pressure and displacement.
- Constitutive relations: elasticity, poroelasticity, thermoporoelasticity, plasticity and poroelatoplaticity.
- Hydraulic fracturing, stress reorientation and refracturing, fracture monitoring and microseismicity.
- Coupling between geomechanics, heat transfer and reactive transport.
- Computational developments and challenges: Finite difference and finite element, boundary element, discrete element modeling, soft computing and parallel computing, coupling methods and simulation code development.

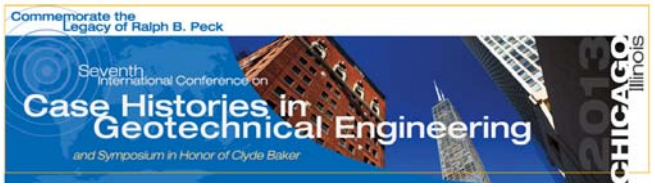
Fifth International Conference on Forensic Engineering "Informing the Future with Lessons from the Past", 16-17 April 2013, London, UK, http://www.ice-conferences.com/Upcoming-events/Fifth-International-Conference-on-Forensic-Enginee

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

From geological conditions to numerical modeling of underground excavations, 3rd International Conference on Computational Methods in Tunneling and Subsurface Engineering (EURO:TUN 2013), 17-19 April 2013, Ruhr-University Bochum, Germany, http://minelab.mred.tuc.gr

12th International Conference Underground Construction Prague 2013, 2–24 April 2013, Prague, Czech Republic, www.ita-aites.cz/en/conference_underg_constr/conference-uc-2013

First International Conference – Seminar on Deep Foundations in Bolivia, 23-24 April 2013, Santa Cruz de la Sierra, Santa Cruz, Bolivia, www.cfpbolivia.com



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

2nd International Conference on Solid Waste 2013: Innovation in Technology and Management, 5 - 8 May 2013, Hong Kong, China, http://arcpe.hkbu.edu.hk/conf2013

Symposium on Tunnelling in Mediterranean Region, 7-8 May 2013, Porec, Istria, Croatia, www.meditunnel2013.com

International Conference on Innovation in Civil Engineering
May 9th & 10th, 2013, Vidya Nagar, Palissery, Karukutty, India
www.scmsgroup.org/sset

Civil Engineering is co-evolving with the integrated global marketplace. Technology is spurring innovation and acelrating productivity. Global capital is impacting infrastructure construction, and the global supply chain is affecting project delivery. Dynamic discussions will explore the changes shaping the profession today and in the future. Civil engineers with enhanced skills and knowledge are needed to interact with multinational teams spanning cultural boundaries about global socio-technological problems.

The International Conference on Innovations in Civil Engineering **(ICICE-2013)** provides opportunities for academicians, students, and researchers to meet interational scholars, share their contributions to the Civil Engineering profession, impart a new dimension to the profession & find out the latest industry breakthroughs.

ICICE-2013 aims to create a platform for Civil Engineers and research scholars to express and share their thoughts on innovative technological trends in Structural Engineering, Concrete Technology, Environmental Engineering, Geotechnical Engineering and Transportation Engineering.

Conference Themes:

ICICE-2013 has judiciously chosen the conference themes as;

1. Structural Engineering:

Analytical and design methods, Special Structures, Case studies, Innovations in design and new technologies, Repairs and rehabilitation, Stability Engineering, Optimization, Soil-Structure Interaction, Standards and Codes of Practice, Solid

Mechanics, Experimental Studies and Testing Technologies and Structural Dynamics

2. Concrete Technology:

Properties and performance of concrete and concrete structures, Advanced and improved experimental techniques, Concrete waste management.

3.Environmental and Water Resources Engineering:

Water Supply and Sanitary Engineering, Soil, Air and Water pollution, Sustainability in Waste Management, Watershed Management, Water Resources Planning and Irrigation Engineering.

4. Geotechnical Engineering:

Advances in Geotechnical Characterization, Instrumentation and Monitoring, Design and Construction of Foundations, Geomechanics, Environmental Geotechnics, Earthquake Geotechnical Engineering, Risk Assessment and Disaster Reduction.

5. Traffic and Transportation Engineering:

Intelligent Transport Systems, Pavement Engineering, Transportation Planning, Traffic Engineering.

Ph: 91-484-2450330, Fax: 91-484 2450508
Email: icice@scmsgroup.org

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
29 -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

For general queries please contact:
info@tc301-napoli.org

For queries about paper submission please contact:
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or
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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

www.pile2013.com

Piling has been used very widely and the rapid rate of development of commercial buildings and infrastructure require intensive use of piling. Like all new development, there has been considerable time between the development of improved design method and their implementation in practice. This process can be accelerated by sharing ideas and insemination of the knowledge.

Recently established Deep Foundation Research Institute in the Department of Civil Engineering, Parahyangan Catholic University will be organizing International Conference on State of The Art of Pile Foundation and Pile Case Histories (PILE 2013). The conference will be held in Bandung, West Java, Indonesia.

This program is a result of cooperation among Civil Engineering Department, Faculty of Engineering Parahyangan Catholic University, Indonesia and Institute of Rock and Soil Mechanic (IRSM), Chinese Academy of Science Wuhan, China under the auspices of Indonesian Geotechnical Society (HATTI) and International Society of Soil Mechanics and Foundation Engineering (ISSMGE).

We cordially invite you to participate in the Conference PILE 2013.

Conference Themes:

1. Design and Analysis of Piles and Pile Group
2. Pile-Raft Foundation
3. Piles in Moving Ground
4. Negative Skin Friction on Piles
5. Piles in Liquefied Soils
6. Offshore Piles
7. Pile Static and Dynamic Tests
8. Application of Wave Mechanics on Piles
9. Method of Pile Installations
10. Effect of Pile Installations on Surrounding Soils and Structures
11. Numerical Modeling of Pile-Soil Interaction
12. Case Histories on Pile Foundations
13. Quality Assurance of Pile Production with Various Field Problem Auger Piles and Minipiles
14. Innovation in Pile Technology

If you require further information or assistance please email to pile2013@gmail.com.

The first international conference on Foundation and Soft Ground Engineering: Challenges in Mekong Delta, 5-6 June, www.ictdmu.com

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

The Airfield & Highway Pavement Conference, June 9-12, Los Angeles, USA, http://content.asce.org/conferences/pavements2013/index.html

International RILEM Symposium on Multi-Scale Modeling & Characterization of Infrastructure Materials, 10-12 June 2013, Stockholm, Sweden, www.rilem2013.org

COMPDYN 2013 4th International Conference on Computational Dynamics & Earthquake Engineering, 12 – 14 June 2013, Kos Island, Greece, http://compdyn2013.org

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

ICEGECHP 2013
International Conference on
Earthquake Geotechnical Engineering
From Case History to Practice
In honour of Prof. Kenji Ishihara
17 - 19 June 2013, Istanbul, Turkey
www.icege2013.org

On the Behalf of ISSMGE Technical Committee (TC 203) on "Earthquake Geotechnical Engineering and Associated Problems" we take great pleasure in inviting you to the International Conference on Earthquake Geotechnical Engineering From Case History to Practice in the honour of Prof. Kenji Ishihara to be organized in Istanbul, Turkey during 17-19 June, 2013 (This is actually the same conference which was planned to be in Luxor – Aswan, Egypt before. But due to the political situation in Egypt, we've decided to move the conference to Istanbul, Turkey).

Topics

- Case histories on ground motion and site effects;
- Soil investigation with field and laboratory testing;
- Dynamic Characterisation and modelling;
- Performance based design methodologies;
- Physical modelling by shaking table and centrifuge tests;
- Liquefaction;
- Lateral spreading, Slope stability;
- Embankments, landfills and dams;
- Shallow foundations;
- Pile foundations;
- Soil-structure interaction;
- Retaining wall;
- Reinforced earth;
- Underground structures

Correspondence

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Prof.Dr.A.Ansal: atilla.ansal@ozyegin.edu.tr

Congress Organizer
EVENT MANAGEMENT & CONSULTANCY
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Phone: 90 312 219 57 00 / 301
Fax: 90 312 219 57 01
E-mail: info@icege2013.org

SINOROCK 2013 Rock Characterization, Modelling and Engineering Design Methods, an ISRM Specialized Conference, 18-20 June 2013, Shanghai, China, www.sinorock2013.org

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

6th International Conference SDIMI 2013 - Sustainable Development in the Minerals Industry, 30 June – 3 July 2013, Milos Island, Greece, http://sdimi2013.conferences.gr

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

BIOT-5 5th Biot Conference on Poromechanics, 10-12 July 2013, Vienna, Austria, http://biot2013.conf.tuwien.ac.at

ICEPR 2013 3rd International Conference on Environmental Pollution and Remediation, July 15-17 2013, Toronto, Ontario, Canada, http://icepr2013.international-aset.com

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

The Third International Symposium on Computational Geomechanics (ComGeo III) Krakow, Poland, 21-23 August, 2013, www.ic2e.org/index.php/comgeo/comgeo-iii

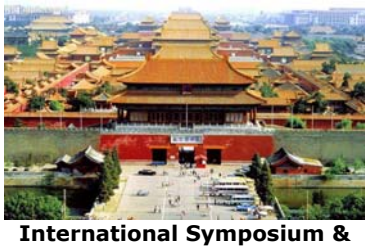
5th International Young Geotechnical Engineers' Conference (5iYGEC'13), 31 August - 01 September 2013, Paris, France http://www.lepublicsystemepco.com/EN/events.php?IDManif=696&IDModule=21&PPAGE=&PAGE=&TEMPLATE=&CSS=&IDRub

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



International Symposium &
9th Asian Regional Conference of IAEG
Global View of Engineering Geology and the Environment
24 - 25 September, 2013, Beijing, China
www.iaegasia2013.com

The International Symposium & 9th Asian Regional Conference of IAEG will be held in Beijing, China on 24th - 25th September, 2013. At the meantime, the meetings of IAEG Executive Committee and the Council also will be held on 22nd and 23rd September.

The IAEG China National Group hosts this conference, providing academic researchers, engineers in the community of

engineering geology with opportunities to present and share the art-of-state views in this field.

The theme of this conference is "*Global view of Engineering Geology and the Environment*". Four topics and a series of workshops are designed to cover the main aspects of engineering geology and the environment.Welcome to Beijing in 2013!

Topics

1. Crustal Stability and Dynamical Geo-hazards
   - Crust Stability and Engineering Geology in Asia
   - Mechanism and Risk Reduction of Geo-hazards
2. Engineering Geology in Major Construction Projects
   - Ground Engineering Projects
   - Mining and Deep Ground Engineering
   - Construction Materials for Major Engineering Projects
3. Urbanization and Geological Environment
   - Dynamical Process and Geo-hazards in Delta and Coast
   - Geological and Environmental Problems in Urban Development
4. New Ideology and Technology in Engineering Geology
   - New Techniques and Equipments
   - New Ideology on Development of Engineering Geology
   - Education and Training of Engineering Geology
5. Workshop C29: Structure & behavior of Soil & Rock Mass
6. Workshop: Geo-hazards in Karst and Loess Areas

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Conference Website: http://www.iaegasia2013.com
Postal address: Institute of Geology and Geophysics,
Chinese Academy of Sciences.
Beituchengxilu 19, Beijing 100029, China

Sardinia_2013 14th International Waste Management and Landfill Symposium, 30 September – 4 October 2013, Sardinia, Italy, www.sardiniasymposium.it

HYDRO 2013 International Conference and Exhibition Promoting the Versatile Role of Hydro, 7 to 9 October 2013, Innsbruck, Austria, www.hydropower-dams.com/hydro-2013.php?c_id=88

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

The
MEDITERRANEAN WORKSHOP ON LANDSLIDES

Landslides in hard soils and weak rocks - an open problem for Mediterraneas countries
21 and 22 October, 2013, Naples, Italy
www.mwl.unina2.it

People who live on the Mediterranean basin have a common history marked not only by bloody wars and continuous struggles, but also by a (sometimes unconsciously) shared development of science and arts, thus by an incessant growth of common or similar ideas, goals and destiny. Such an area presents also similar geological contexts and geomorphological hazards whose solution requires huge human and technological resources. The awareness of such a common history and destiny should be a trigger for closer relationships between neighbouring countries and a continuous, well-aware exchange of ideas. This simple idea, which is not always clear in the minds of people and their leaders, should be the engine of a more firm shared development of common goals and strategies.

Landslides represent a relevant problem for most of the countries located on the Mediterranean basin. Quite recently, the geo-engineering community has paid attention to the special features of hard soils and weak rocks (HSWRs), that are widespread in this area. As a matter of fact, just twenty years ago the Hellenic Society of Soil Mechanics and Foundation Engineering and the French Committee for Soil Mechanics and Foundation Engineering jointly organized, in Athens, an international symposium on "The Geotechnical Engineering of Hard Soils and Soft Rocks" (A. Anastagnopoulos, F. Schlosser, N. Kalteziotis, R. Frank eds.). Five years after (1998), the Italian Geotechnical Society decided to take over the baton, by organizing in Naples the Second International Symposium on "The Geotechnics of Hard Soils and Soft Rocks" (A. Evangelista, L. Picarelli eds.). Finally, in 2011, Greeks organised, again in Athens, the 15th European Conference of Soil Mechanics and Geotechnical Engineering devoted to "The Geotechnics of Hard Soils and Weak Rocks" (A. Anastagnopoulos, M. Pachakis, C. Tsatsanifos eds.).

HSWRs, widespread in this corner of the world, pose complex problems to tunnelling, on the stability of cuttings and natural slopes and in other domains of the geoengineering sciences. The behaviour of these geomaterials cannot be simply interpreted through the basic laws of Soil Mechanics or of Rock Mechanics, since they lay just between these two wide families of geomaterials, with their distinct features. On the other hand, is just here that emerge most of the problems, and is here that energy and efforts should be directed. Such a goal will be more easily attained if people living on the Mediterranean Sea join their wish and effort. This would make establishing common plans and guidelines and problem-solving more easy. It is just on this line of intervention that the Seconda Università di Napoli, the Università di Napoli Federico II and the Universitat Politechnica de Catalunya decided to jointly organize a Mediterranean Workshop on Landslides (MWL) that will take place in Napoli next October.

Since HSWRs have to be investigated and modelled only with an original and common effort of the geosciences, the Joint Technical Committee (JTC1) Natural Slopes and Landslides set up by the three geoengineering societies, the ISSMGE, the ISRM and the IAEG, gave its patronage to this important event.

Promoting Commitee

Prof. Luciano Picarelli : luciano.picarelli@unina2.it
Prof. Eduardo Alonso : eduardo.alonso@upc.edu
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International Conference Geotechnics in Belarus: Science and Practice, 23-25 October 2013, Minsk, Belarus, geotechnika2013@gmail.com belgeotech@tut.by

GEOMATE 2013 3rd International Conference on Geotechnique, Construction Materials & Environment, November 13-15, 2013, Nagoya, Japan, www.geomat-e.com

International Conference
Built Heritage 2013
Monitoring Conservation Management
18-20 November 2013, Milano, Italy
www.bh2013.polimi.it

In the framework of the 150th Anniversary for the foundation of the Politecnico di Milano, the Center for the Conservation and Promotion of Cultural Heritage organizes an international Conference to discuss new frontiers about the conservation and enhancement of Built Heritage.

This conference brings together university researchers, professionals and policy makers to illustrate and discuss the most pressing issues concerning the conservation of archaeological, architectural and urban landscapes. The conference official language is English.

In particular, the main goal of the conference is to discuss multi-disciplinary researches on complex Cultural Heritage sites, ranging from archaeological ruins, historical architecture and centers.

General and thematic discussions on architectural and archeological Heritage are both encouraged, taking into account the different point of view of researchers who are engaged in the enhancement of knowledge and practice, and professionals in charge of safeguarding.

Keynote speakers will present case studies representative of challenges and solutions adopted for the analysis, conservation and management of sites.

The main objectives of the conference are:

- use of cutting edge technologies for survey, representtation and imaging;
- use of cutting edge technologies for material and structural diagnostic;
- development of risk assessment and protection systems;
- new methodologies for intervention, preventive conservation and maintenance;
- sustainable management, fruition and valorization of the sites;
- development of guidelines and best practices.

The conference's main topics are:

- multidisciplinary approach for complex case studies
- cutting edge technologies for survey, representation and imaging
- cutting edge technologies for material and structural diagnostic
- development of risk assessment and protection systems
- new methodologies for intervention, preventive conservation and maintenance
- sustainable management, fruition and valorization of built heritage
- development of guidelines and best practices

For any information please contact the Conference Secretary
Dr. Maria Licia Zuzzaro
tel. +3902.2399.2232, fax +3902.2399.5638
e-mail: bh2013@polimi.it

GEOAFRICA2013
Geosynthetics for Sustainable Development in Africa
18-20 November 2013, Accra, Ghana
http://geoafrica2013.com

2nd African Regional Conference on Geosynthetics

Due to the existence of major projects in Mining, Transportation and Environmental sectors Africa presents numerous, exciting opportunities for the application of geosynthetic solutions.

Ghana in particular is busy with major oil & gas, as well as mining and infrastructure developments. GeoAfrica2013 will bring together academics, designers, manufacturers and installers from the global geosynthetics industry presenting an opportunity for exchange of views and update on geosynthetic technological developments; as well it will provide an excellent forum for business networking. Global and Africa-specific perspectives and experiences will be featured in the technical programme.

Email to: Technical@GeoAfrica2013.com

6° ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΛΙΜΕΝΙΚΩΝ ΕΡΓΩΝ, Αθήνα 25 - 28 Νοεμβρίου 2013, lhw@central.ntua.gr

10th International Symposium of Structures, Geotechnics and Construction Materials, 26-29 November 2013, Santa Clara, Cuba, ana@uclv.edu.cu, quevedo@uclv.edu.cu

International Conference on Geotechnics for Sustainable Development, 28-29 November 2013, Hanoi, Vietnam, www.geotechn2013.vn

ISAP2013 International Symposium on Advances in Foundation Engineering, 5 -6 December 2013, Singapore, http://rpsonline.com.sg/isafe2013

8th International Conference Physical Modelling in Geotechnics 2014, 14-17 January 2014, Perth, Australia, http://icpmg2014.com.au

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

1. Equipment, Testing and Procedures

Any aspect regarding CPT equipment, testing and procedures including standards, new equipment, testing techniques and procedures, innovative aspects including T-bar testing, and other modules used in geo-environmental screening.

2. Interpretation of Test Results

Any aspect of interpretation from theoretical to empirical, including case histories involving interpretation.

3. Solution of Practical Problems

Any aspect of applications of CPT results, including shallow and deep foundations, embankments, slopes, and seismic design. Geo-environmental solutions include identification of contaminated soil and/or groundwater, evaluation of groundwater flow etc.

Contact Dr. Peter Robertson at
probertson@greggdrilling.com

3rd International Symposium on
Cone Penetration Testing
13-14 May 2014, Las Vegas, Nevada, U.S.A.
www.cpt14.com

Technical Committee TC-102 of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE: www.webforum.com/tc16) in collaboration with California State Polytechnic University are pleased to announce the 3rd International Symposium on Cone Penetration Testing, CPT'14. This event built on the success of CPT'95 that was held in Linkoping, Sweden in 1995 as well as CPT'10 held in Huntington Beach, CA.

The 3rd International Symposium on Cone Penetration Testing will be held at the Mandarin Oriental hotel in Las Vegas, Nevada, May 12-14, 2014. We are currently planning the event and will release a detailed program shortly. We hope to continue to have great exhibitors (both indoor and some select outdoor CPT equipment) and are excited to host the event in the exciting city of Las Vegas! The Mandarin Oriental hotel is the ONLY non-gaming, triple 5 star hotel on the strip. With a 5 star hotel, restaurant and spa, we hope you will enjoy staying at this magnificent property. Located in the City Center complex, you will be steps away from Aria hotel and casino as well as amazing shopping at Crystals.

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

The three main themes are:

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
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E-mail: alejano@uvigo.es

26 - 28 May 2014, Shanghai, China
www.geoshanghai2014.org

GeoShanghai is a series international conference on geotechnical engineering hold in Shanghai once four years. Since the successes of the 1st GeoShanghai International Conference in 2006 and the 2nd in 2010 gathering 400 and 350 colleagues from all over the world respectively, the

geotechnical communities have witnessed many advances in soil and rock mechanics technology and engineering practices. In order to showcase the latest developments and promote international collaborations in geotechnical engineering and related areas, the organizers of the Geo-Shanghai International Conference 2014 would like to invite geotechnical researchers, practitioners and educators from all over the world to participate in the 3rd GeoShanghai International Conference to be held in Shanghai in May 2014.

Shanghai is a unique cosmopolitan city where traditional Chinese culture has been blended seamlessly into those from all over the world. Over the last three decades, Shanghai has experienced great expansion in infrastructure construction, resulting in hundreds of showcase projects representing high-level designs and theories in geotechnical engineering. The geotechnical and underground engineering in Shanghai currently is still under rapid development. The organizers are pleased to invite you to GeoShanghai 2014 conference.

Themes:

- Soil behavior
- Geomechanics
- Unsaturated soil mechanics
- Seepage and porous mechanics
- Rock mechanics and rock engineering
- Geosynthetics
- Geoinformatics
- Geotechnical in-situ testing & monitoring
- Railway geotechnics Offshore geotechnics Mining geo-technics
- Energy-related geotechnics
- Ground improvement
- Soil dynamics & earthquake engineering
- Geoenvironmental engineering
- Deep excavations & retaining structures Drilled shafts & deep foundations Tunneling and underground construc-tions Engineering in karst terrain
- Behavior of biotreated geomaterials and foundations
- Sustainability in geotechnical engineering Impact of the climatic factors on infrastructure Pavement mechanics
- Pavement materials and structures New frontiers in urban geotechnology Case studies

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E-mail: geoshanghai@tongji.edu.cn

8th European Conference "Numerical Methods in Geotechnical Engineering" NUMGE14, 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

TC204 ISSMGE International Symposium on "Geotechnical Aspects of Underground Construction in Soft Ground" - IS-Seoul 2014, 25-27 August 2014, Seoul, Korea, csyoo@skku.edu

15th Danube European Conference
8 - 10 September 2014, Vienna, Austria

IAEG XII CONGRESS Torino 2014 Engineering Geology for Society and Territory, IAEG 50th Anniversary, September 15-19, 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, 14-16 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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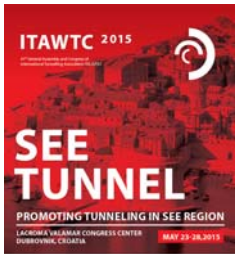

World Tunnel Congress 2015
and 41st ITA General Assembly
Promoting Tunnelling in South East European (SEE) Region
22 - 28 May 2015, Dubrovnik, Croatia
http://wtc15.com

Contact
ITA Croatia - Croatian Association for Tunnels and Underground Structures
Davorin KOLIC, Society President
Trnjanska 140
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Croatia
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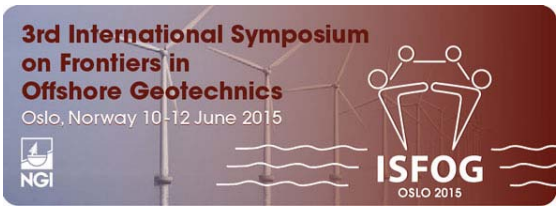

www.isfog2015.no

NGI will host the 3rd International Symposium on Frontiers in Offshore Geotechnics (ISFOG) 10-12 June 2015 in Oslo, Norway. Delegates are welcome to the bright and light Nordic summer, as ISFOG will now for the first time be held outside Australia.

ISFOG provides a specialist international forum to address geotechnical engineering challenges for those working in offshore construction, design and research.

We invite you to this specialist symposium to share in the excitement and challenge of overcoming the frontiers in offshore geotechnics and to join us in Oslo in June 2015.

Contact person:

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Questions and inquiries may also be sent to isfog2015@ngi.no.

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

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

NGM 2016
The Nordic Geotechnical Meeting
25 - 28 May 2016, Reykjavik, Iceland

The aim of the conference is to strengthen the relationships between practicing engineers, researchers, and scientists in the Nordic region within the fields of geotechnics and engineering geology.

All are invited to share their experience and knowledge with their Nordic colleagues.

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ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Μια δημοσιογραφική παρουσίαση των οργανομετρήσεων για την γεωτεχνική και δομητική παρακολούθηση των κατασκευών κατά την διάρκεια της κατασκευής σηράγγων κάτω από δομημένες περιοχές.

Gizmos may just keep 200 buildings standing in tunnel dig

Hundreds of automatic gauges, wires, probes and gnome-sized computers are being put in place throughout the Highway 99 tunnel route, a $20 mil-lion effort to reduce the odds of a soil-collapse disaster.

A prism, foreground, is attached to a building to supply data that's read by a "cyclops" device, seen behind it.

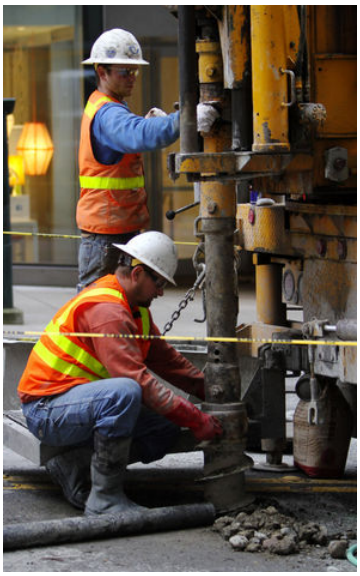
A prism attached to the side of a Pioneer Square building will be part of the soil monitoring under way in downtown Seattle during the waterfront tunnel dig, to start this summer.

Drilling will begin this summer on the two-mile tube below downtown Seattle, a few weeks delayedfrom the initial June 3 goal. The dig will start at Pioneer Square in shallow fill soil, gradually dropping to 250 feet below street level by the time it passes beneath the Pike Place Market en route to South Lake Union.

An automated survey device, likened to the little R2-D2 robot from "Star Wars," will continually pivot and bounce light beams off amber prisms mounted on surrounding structures.

The first building above the path is 1 Yesler Way, a brick triangle that's home to Al Boccalino restaurant and Runberg Architecture Group.

Technicians and electricians stopped by over several weeks to install on the roof an automated survey machine, which employees there call R2-D2, after the little droid in "Star Wars." To check for motion, the machine continually pivots and bounces invisible laser beams off amber prisms that are mounted on the surrounding buildings.



Workers drill Thursday on First Avenue in downtown Seattle to position an extensometer soil-monitoring device 150 below street level.

"I don't think this building's going anywhere, honestly," said Runberg office manager Anne O'Rourke.

Up on First Avenue, drilling rigs near Seattle Art Museum this week reamed holes to lower some of the project's 120 extensometers. These are bundles of long wire attached to probes resting within the soil. If excavation causes a void, soil pressure will change and the probes will send signals to a control room in Sodo.

The team has other tools, most of them sensitive to within one-thousandth of an inch, said David Sowers, Highway 99 engineering manager for the state Department of Transportation:

- **Crack gauges** that straddle existing cracks to measure whether they widen during construction.

- **Inclinometers**, which are hollow rods inserted vertically along each flank of the tunnel bore. If soil moves, the meters will be nudged sideways.
- **Liquid level sensors**, water-filled tubes placed in buildings and the BNSF train tunnel, to function like carpenter's levels.
- **Tiltmeters**, which are a foot long and mounted in basements to transmit data about changes in wall or foundation position.
- **Deep survey markers**, as low as 300 feet, to help calibrate the other metering devices or the path of the drilling machine. These would come in handy after an earthquake, said Sowers.
- **Satellite-based interferometric radars**, a recent technology meant to detect ground shifts to 1/8-inch accuracy. This is done by measuring whether peaks and valleys in radar waves bouncing back from the street line up with past measurements.

Satellites aren't a primary tool, as the prisms are more sensitive. "But it gives us verification," said Sowers.

A total of 200 buildings along the route will be equipped, and nearly 700 devices placed in the streets and sidewalks.

But the primary defense will be to measure the soil inside the machine, as it's being removed by conveyor belt, as well as the earth pressure against the rotating cutter head.

A few years ago, soil-measuring errors caused a void that nearly swallowed a house above Sound Transit's Beacon Hill Tunnel. Contractor Obayashi Corp. had to reimburse taxpayers $4 million to locate and fill gaps.

Soil sinkage has caused disasters elsewhere, notably the March 2009 collapse of the city archives building and nearby apartments in Cologne, Germany, which killed two people. Seattle tunnelers are limited by contract to 1/2-inch of soil settling for fragile sites such as Al Boccalino, and 1 inch elsewhere.

"I don't expect the project to go perfect," says Sowers. "But I also don't expect us to see large deformation in any of the buildings."

At this point, says O'Rourke, workers of the businesses at 1 Yesler Way worry less about the tunneling risks than what will follow in 2016, when the Alaskan Way Viaduct is demolished a few feet away.

(Mike Lindblom / Seattle Times, February 1, 2013, http://seattletimes.com/html/localnews/2020269288_99tunnelsoilgaugesxml.html)

Η Εγνατία έχει τη δική της ιστορία... και τώρα μπορεί να αναδειχθεί

Τα ευρήματα και η σημασία τους

Η ανασκαφή που πραγματοποιήθηκε από την 9η ΕΒΑ στην περιοχή του σταθμού Βενιζέλου στη Θεσσαλονίκη έφερε στο φως με εντυπωσιακή πληρότητα την «καρδιά» της κοσμικής πόλης των βυζαντινών χρόνων: τμήμα μήκους 76 μ. του κεντρικού πλακόστρωτου δρόμου (decumanus) σε πολύ καλή κατάσταση διατήρησης, κτηριακά λείψανα της πόλης από τον 6ο έως και τον 9ο αιώνα μ.Χ., αλλά και μεγάλα δημόσια οικοδομήματα του 7ου αιώνα, φαινόμενο εξαιρετικά σπάνιο για τον βυζαντινό κόσμο.

Ο κεντρικός οδικός άξονας της βυζαντινής πόλης εκτείνεται σε βάθος έξι μέτρων κάτω από τη σύγχρονη Εγνατία οδό, χαραγμένος στην ίδια κατεύθυνση, ενώ η σήραγγα του ΜΕΤΡΟ βρίσκεται και αυτή στην ίδια κατεύθυνση σε μεγαλύτερο βάθος (περίπου 11 μέτρα).

Πρόκειται για μια πραγματική «εικονογράφηση» της διαχρονικής πολεοδομικής εξέλιξης της Θεσσαλονίκης.

Η απόφαση του ΚΑΣ

Το Κεντρικό Αρχαιολογικό Συμβούλιο πριν από περίπου 20 μέρες γνωμοδότησε υπέρ της απόσπασης και της μεταφοράς των αρχαιοτήτων στο στρατόπεδο Παύλου Μελά της δυτικής Θεσσαλονίκης, συναινώντας στην εισήγηση των τεχνικών της ΑΤΤΙΚΟ ΜΕΤΡΟ.

Η θέση των αρχαιολόγων

Η προέδρος του ΣΕΑ ξεκαθάρισε ότι με το σημερινό σχεδιασμό του εν λόγω σταθμού, η παραμονή των αρχαιοτήτων στο φυσικό τους χώρο είναι πρακτικά αδύνατη.

Αυτό που προτείνουν οι αρχαιολόγοι, είναι η εξάντληση των δυνατοτήτων για μια τεχνική και αρχιτεκτονική λύση. Να σχεδιαστεί εκ νέου ο σταθμός, ούτως ώστε να ενσωματώνει και τα αρχαιολογικά ευρήματα. Με αυτό τον τρόπο θα εξυπηρετεί τη σύγχρονη ζωή και συγχρόνως θα αποτελεί ένα επιτόπιο μουσείο της ιστορίας της Θεσσαλονίκης.

«Η διαχείριση αυτού του ζητήματος μπορεί να φέρει τη Θεσσαλονίκη στο επίκεντρο του διεθνούς ενδιαφέροντος. Θα μπορούσε να γίνει ακόμα και ένα συνέδριο για τη διαχείριση των αρχαιοτήτων στη σημερινή εποχή. Θα μπορούσαμε να καλέσουμε αρχιτέκτονες από όλο τον κόσμο και να διατυπώσουν τις προτάσεις τους.

Ο αρχαιολόγος, Τάσος Αντωνάρας, από τη μεριά του είπε ότι «Το μετρό καλώς υπάρχει και δεν λέμε να καταργηθεί ο σταθμός. Αυτό που λέμε είναι ότι αποτελεί αδιαπραγμάτευτη αξία για την πόλη να διατηρήσει αυτά τα μοναδικά μνημεία εκεί που υπάρχουν και να μην τα καταστρέψει, γιατί μετά δεν θα μπορεί να τα ξαναβρεί».

Το επιχείρημα της καθυστέρησης του έργου

Η γνωμοδότηση του ΚΑΣ βασίστηκε στο σκεπτικό ότι το έργο θα έχει επιπλέον καθυστέρηση ενώ θα αυξηθεί συνάμα και το κόστος του.

Ως προς το θέμα της καθυστέρησης, η πρόεδρος του ΣΕΑ ανέφερε πως κακώς χρεώνονται οι καθυστερήσεις των έργων στους αρχαιολόγους.

«Πιθανόν ένας νέος σχεδιασμός και κατασκευή του σταθμού να φέρει κάποιες καθυστερήσεις. Θα μπορούσε όμως το μετρό να δουλεύει κανονικά αλλά να μην γίνεται στάση στην Βενιζέλου έως ότου τελειώσει η κατασκευή. Άλλωστε, ένα επιπλέον αρνητικό στον σχεδιασμό του μετρό είναι οι πολλοί σταθμοί του. Ακόμα και οι μηχανικοί λένε πως δεν θα προλαβαίνει από τον ένα σταθμό στον άλλο να αναπτύσσει την απαιτούμενη ταχύτητα».

(Θοδωρής Διαμαντόπουλος / thesspress, 04 Φεβρουαρίου 2013, http://thesspress.gr/social/item/11855-i-egnatia-echei.html)

Irish homeowners hopeful of pyritic heave solution

Publication of new standards from the National Standards Authority of Ireland (NSAI) to deal with ground heave caused by pyritic backfill material on residential properties in Ireland has been welcomed by homeowners and remediation specialists.

The new publications aim to standardise the testing and categorisation of affected properties, as well as the methodology for remediation, and were written in response to a government-commissioned report on the issue published last summer.

The pyritic heave problem is known to have affected newer properties in County Dublin, Kildare, Offaly and Meath and was first identified as being caused by the presence of reactive pyrite in quarry waste used as hardcore to backfill under the floors of houses in 2007. Ireland's new house warranty provider Home Bond first saw the effects of the problem in 2005 and initially repaired affected properties. But in August last year Home Bond withdrew cover for homeowners, which led to the launch of the government report into the problem.

"The development of these two standards represents another important step in the advancement and implementation of solutions for homeowners who have been waiting a long time for a resolution to the pyrite problem," said minister for environment, community and local government Phil Hogan.

The government report estimates that over 12,000 properties are at risk of pyritic heave and only 1,100 have been remediated.

In addition to the new standards, the government has also announced that it will establish a Pyrite Resolution Board to operate a remediation scheme that will be operated through a special purpose vehicle, funded initially by an upfront loan of €50M from six banks andmortgage providers. The loan will be repaid from a mandatory levy that will be imposed on the quarrying and insurance sectors

(New Civil Engineer, 5 February 2013, http://m.nce.co.uk/8642162.article)

Report
http://www.environ.ie/en/PyriteReport/FileDownLoad,30735,en.pdf

Learning from Nature: Using Bioengineering to Save Water Bodies

California city's efforts to stabilize creeks with plants are part of a larger paradigm shift in public works initiatives

Donna Wilson believes when you love something you should give it a name. So when she and a few other regular visitors to a greenbelt along Linda Creek in the city of Roseville, CA discovered a gathering of western pond turtles sunning themselves on an oak tree that had fallen across the creek back in 2010, they named the spot Turtle Grove in honor of the threatened species. "I got a degree in anthropology," Wilson says, as she stops to look at the spot on a recent afternoon. "Anthropology is a love of culture, and I see this creek and greenbelt as a culture, a community."

Then one day, a city crew armed with chainsaws attempted to remove the oak tree as part of a flood control measure. The measure was instituted after a torrential downpour in 1995 ruined homes and alerted city officials to the fact that Roseville's multiple creeks could quickly expand to the size of small rivers. Since fallen trees could back up water, snag debris and cause localized flooding, city policy required the removal of all large oaks that fell into creeks.

Wilson and her fellow residents, who are now part of an outfit called Friends of Linda Creek, went to bat for the turtles. Once city officials understood that downed trees can be crucial habitats for fish and bugs in creeks, they agreed to conserve the oak — crews removed a portion of the tree to ease water flow in the creek and left the rest for the turtles. The city now determines whether to remove trees on a case-by-case basis.

Turtle Cove is a testament to the efforts of Friends of Linda Creek, which now dedicates itself to the preservation, conservation and restoration of this 15-mile long Sacramento River tributary that runs through Placer and Sacramento counties.

This group has also made possible pilot efforts at biotechnical engineering — a sustainable practice that uses live, native plants to stabilize creeks. The roots of the plants grow into the soil and bind the soil particles together thereby reducing erosion.

Environmental engineer Scott Dietrich and volunteer Donna Wilson replant willow stakes on a January afternoon using a biotechnical engineering method to stabilize an eroding creek bank in Roseville, Calif.

Scott Dietrich, an environmental engineer with the city of Roseville, is the man behind the city's biotechnical engineering efforts, which is becoming the preferred method of erosion control and stream bank restoration in this Sacramento suburb. The efforts are also part of a larger paradigm shift for public works initiatives that now incorporate an environmental standpoint. No longer do crews just throw down rocks and concrete.

"The concept is nature does a better job than man when you're talking about a creek," Dietrich says.

Walking through the Linda Creek greenbelt on a warm January afternoon, Wilson stops to read a sign noting the area as an open space/wildlife preserve. The city is developing plans for a $10 million paved bike trail to cut through this land — yet another threat to her beloved creek that Wilson's actively fighting. The retired real estate sector employee's volunteer work with Friends of Linda Creek constitutes a 40-hour workweek. Wilson walks to a spot at the bank from where she spots Dietrich standing knee-deep in the creek. "Look at him in the water," Wilson says, smiling. "He's just a happy kid out here."

Last October, some 30 people had come together to plant deer grass, blue elderberry, coyote brush, bull rush, white alder, Oregon ash, oak, and willow trees as part of the grassroots-generated effort to restore stretches of bank. But vandalism and high water flows weakened the support that had been established by the plantings. Dietrich is now replanting willow in the sandbars — there's a lot of sand down there —to stabilize the area.

Salmon run in Linda Creek and members of the Indigenous Maidu tribe lived alongside this waterway for about 10,000 years. Raccoons, wild turkeys, skunks, frogs, turtles, and river otters now make their home here, along with dozens of people whose houses butt up against the creek bank. But as with several other creeks that run through this city, improper management of the waterway has led to people living next to it losing property to erosion, oak trees falling into the water and paved bike trails getting inundated.

If city officials understood how creeks work — they like to meander — trails would never have been built in those vulnerable areas, Dietrich says.

In the 25 years that Wilson has been living by Linda creek, the bank has worn down an estimated 15 feet. Wilson had met Dietrich during a bird-watching walk three years ago and convinced the city engineer to walk over to the bank behind her house and see the erosion.

The willow fence acts as a retaining wall, holding back loose soil and debris from falling into the creek

City officials didn't know how to effectively address the increasing erosion problem, so Dietrich read a few books on biotechnical engineering, attended a couple workshops, and met with a guy in another part of northern California who has been using this technique for 20 years in his business. There aren't a lot of examples to model after in the Golden State; the US East Coast and Europe are much further ahead. Nor is this method taught in school as a textbook solution. "It's not an exact science," Dietrich says. "It's something you try and get better at." And he wanted to try.

Initially, city officials weren't agreeable and he had to reassure them that the method would be effective and didn't involve much risk. "They try to control the creek," Dietrich says. "That's just how it's been taught. This [biotechnical engineering] is working more with the creek and not trying to fight it so much. How does a creek naturally dissipate? Let's work with that."

Creeks naturally want to meander, but in urban settings we try to channelize or control the direction and flow of the water. Channelizing the creek decreases the slope of the banks and increases the water's velocity, which can cause instability within the creek channel and eventually create pockets of significant erosion, Dietrich says. This threatens a creek's ecosystem and adjacent infrastructure.

Traditionally, controlling erosion was done with hard, inert structures such as rock or gabion walls — non-environmental friendly tactics known to fail easily and re-

quire regular maintenance. "Bioengineering as a solution to erosion has come to the forefront recently because of its ability to use natural plants to help stabilize high erosion areas without sacrificing many environmental benefits that old hard engineering did," Dietrich says.

Roseville's first bioengineering project was built by volunteers in 2011. It was a woven willow fence along a 240-foot long portion of the bank behind Wilson's property that acts as a retaining wall.

In the most recent project area, not far from the first fence, they planted live, native willow and alder stakes harvested from a nearby park along another 200 feet of the bank. Once the plants take root they will hold the bank's soil in place and restore the riparian habitat. Each year, the stakes will grow stronger. A biotechnical engineering approach is less expensive than conventional methods — Dietrich estimates the most recent project cost about $12,000. Plus, a priceless benefit: The approach relies on the participation of community members who, in turn, feel more personally invested in protecting the natural environment.

"I like to be out here and see the creeks and the birds and the fish, and I always wanted to use my background to protect some of these natural resources that we have," Dietrich says. "More than anything, I think it's a different way for us to look at creeks and building around them."

Last October, volunteers planted native trees and grass to stabilize an eroding creek bank.
They plan to do more of these projects this spring.

The city of Roseville had to get approval for its biotechnical engineering projects from the California Department of Fish and Game in the form of a memorandum of understanding. A permit wasn't required, as is needed for hard engineering measures such as rock and gabion walls, which can often lead to more environmental problems. The bureaucratic ease of biotechnical engineering projects is one more reason people are turning to this method, says John Williams, an ecologist who has worked in the field for 19 years, primarily in northern California.

A "lifelong native plant guy," as he calls himself, Williams co-runs EcoUrban Designs Inc., a firm that conducts stream bank stabilization work, erosion control, soil development, and lawn conversion to edible landscapes. He does some public work projects, but most of his clients are private landowners and ranchers. While some people use the term bioengineering, Williams prefers biotechnical engineering because it doesn't carry the negative association of bioengineered food and animals.

Biotechnical engineering is an ancient technique, he says, used by the Chinese and Julius Cesar's Roman empire. It's still used in Nepal where people build living bridges across creeks. Most Indigenous people are familiar with this technique, Williams says, and while the method isn't new, innovative biodegradable products that help in the stabilization process are.

Williams is currently working with a Boy Scouts troop on a biotechnical engineering stream bank project in the city of Lincoln — down the road from Roseville. While rock and concrete have an end life, sustainable methods become more successful as time passes, he says. Year after year, plants and trees grow, getting stronger over time.

"I like to think the work I'm doing has influence and impact beyond my own lifetime," Williams says. "You don't need a giant budget, big heavy equipment, just the involvement of community groups. The lifespan is really what does it for me — that this (work) will last for hundreds and thousands of years."

(Sena Christian / Earth Island Journal, 5 February 2013, http://www.earthisland.org/journal/index.php/elist/eListRead/learning_from_nature_using_bioengineering_to_save_water_bodies)

Mudslide in Everett, Washington impacts and derails a passing freight train

Mudslide in Everett, Washington*Associated Press (Print screen from Video posted on YouTube)*

The Associated Press has posted a video of a mudslide that on December 18th 2012 was mobilized while a freight train was passing. Amazing coincidence or did the vibrations from the train contributed to the mobilization of the mudslide which ended up derailing at least seven cars. In either case, someone caught the whole occurrence on video.

According to The Telegraph, The carriages were carrying various types of freight, including chemicals. A hazardous materials team responded, but there was no threat to the environment or public health.

See Telegraph article: http://www.telegraph.co.uk/news/worldnews/northamerica/9755107/Mudslide-derails-train-in-Washington-state.html

See video:
http://www.youtube.com/watch?v=ogUBMDM7ec8

(Geoengineer.org, Friday, 08 February 2013)

NASA Curiosity Rover Collects First Martian Bedrock Sample

PASADENA, Calif. -- NASA's Curiosity rover has, for the first time, used a drill carried at the end of its robotic arm to bore into a flat, veiny rock on Mars and collect a sample from its interior. This is the first time any robot has drilled into a rock to collect a sample on Mars.

The fresh hole, about 0.63 inch (1.6 centimeters) wide and 2.5 inches (6.4 centimeters) deep in a patch of fine-grained sedimentary bedrock, can be seen in images and other data Curiosity beamed to Earth Saturday. The rock is believed to hold evidence about long-gone wet environments. In pursuit of that evidence, the rover will use its laboratory instruments to analyze rock powder collected by the drill.

"The most advanced planetary robot ever designed now is a fully operating analytical laboratory on Mars," said John Grunsfeld, NASA associate administrator for the agency's Science Mission Directorate. "This is the biggest milestone accomplishment for the Curiosity team since the sky-crane landing last August, another proud day for America."

For the next several days, ground controllers will command the rover's arm to carry out a series of steps to process the sample, ultimately delivering portions to the instruments inside.

"We commanded the first full-depth drilling, and we believe we have collected sufficient material from the rock to meet our objectives of hardware cleaning and sample drop-off," said Avi Okon, drill cognizant engineer at NASA's Jet Propulsion Laboratory (JPL), Pasadena.

Rock powder generated during drilling travels up flutes on the bit. The bit assembly has chambers to hold the powder until it can be transferred to the sample-handling mechanisms of the rover's Collection and Handling for In-Situ Martian Rock Analysis (CHIMRA) device.

Before the rock powder is analyzed, some will be used to scour traces of material that may have been deposited onto the hardware while the rover still was on Earth, despite thorough cleaning before launch.

"We'll take the powder we acquired and swish it around to scrub the internal surfaces of the drill bit assembly," said JPL's Scott McCloskey, drill systems engineer. "Then we'll use the arm to transfer the powder out of the drill into the scoop, which will be our first chance to see the acquired sample."

"Building a tool to interact forcefully with unpredictable rocks on Mars required an ambitious development and testing program," said JPL's Louise Jandura, chief engineer for Curiosity's sample system."To get to the point of making this hole in a rock on Mars, we made eight drills and bored more than 1,200 holes in 20 types of rock on Earth."

Inside the sample-handling device, the powder will be vibrated once or twice over a sieve that screens out any particles larger than six-thousandths of an inch (150 microns) across. Small portions of the sieved sample will fall through ports on the rover deck into the Chemistry and Mineralogy (CheMin) instrument and the Sample Analysis at Mars (SAM) instrument. These instruments then will begin the much-anticipated detailed analysis.

The rock Curiosity drilled is called "John Klein" in memory of a Mars Science Laboratory deputy project manager who died in 2011. Drilling for a sample is the last new activity for NASA's Mars Science Laboratory Project, which is using the car-size Curiosity rover to investigate whether an area within Mars' Gale Crater has ever offered an environment favorable for life.

JPL manages the project for NASA's Science Mission Directorate in Washington.

For more about the mission, visit:
http://www.nasa.gov/msl

You can follow the mission on Facebook and Twitter at: http://www.facebook.com/marscuriosity and http://www.twitter.com/marscuriosity

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(NASA, Feb. 9, 2013,
http://www.nasa.gov/home/hqnews/2013/feb/HQ_13-044_Curiosity_Drilling.html)

How to Repel an Earthquake

Shaken up. Large metamaterials could help prevent earthquake damage.

Want to protect buildings from earthquakes? Turn the surrounding ground into Swiss cheese. Scientists have for the first time shown that a grid of holes in the ground can act as a kind of seismic wall, a development that could lead to technologies that protect buildings from the dangerous tremors of earthquakes.

"It's very cool stuff," says Ulf Leonhardt, a theoretical physicist at the University of St. Andrews in the United Kingdom who was not involved with the study. "It's a step toward manipulating seismic waves and done in a genius way."

For more than a decade, scientists have been manipulating electromagnetic waves with metamaterials—assemblages of conductors and insulators patterned at length scales shorter than the waves themselves. Metamaterials can change the speed and direction of the waves in bizarre ways, and researchers have used them to funnel light around objects in the first generation of invisibility cloaks. The successes of those experiments raise another question: Can researchers also manipulate the nonelectromagnetic seismic waves set in motion by an earthquake? Computer models imagining a

larger metamaterial seemed to suggest they could. But the new work, by a team of engineers from the French ground improvement company Ménard and physicists from Aix Marseille Université in France, is the first to put a seismic wave cloak to the test.

The scientists created their jumbo-sized metamaterial in August 2012 by drilling holes in a thick bed of silt and clay near the city of Grenoble in the French Alps. The cylindrical holes stretched down about 5 meters into the earth, but were also skinny, only 32 centimeters wide. They were arranged in a rectangular grid of three rows of 10 holes each. The holes changed the density and stiffness of the earth and, thus, the speed and direction of vibrations rippling through the ground, forming a seismic metamaterial. The scientists then shook the earth on one side of the grid using a vibrating soil-compacting machine that they had placed underground. That machine created 50 seismic surface waves per second with a wavelength of 1.56 meters—about the same as the distance between the holes, though shorter than typical wavelengths from earthquakes.

Sensors placed throughout the site showed that the waves couldn't get past the grid of holes, bouncing off of it instead, the researchers report in a paper posted on the arXiv online preprint server. The waves just barely got by the second row of holes and couldn't even touch the third row, leaving the ground on the other side unshaken.

The large scale of the experiment really stands out, says Steven Cummer, an engineer at Duke University in Durham, North Carolina. "What this group is reporting, I think that is a pretty important step."

However, the work is not yet the earth-shaking advance that will render earthquakes harmless, says Nicholas Fang, a mechanical engineer at the Massachusetts Institute of Technology in Cambridge. Fang says the new experiment is "exciting" but notes that it does not address the complexities of the interactions between temblors and buildings. For example, at the experiment site the waves had to navigate only fine silty clay, whereas a real earthquake's seismic waves would run through a broad variety of rock, influencing their strength and direction. "I think there's great potential, but we don't have a complete answer for [protecting buildings] yet."

(Sean Treacy / ScienceMag.org, 14 February 2013, http://news.sciencemag.org/sciencenow/2013/02/how-to-repel-an-earthquake.html?ref=hp)

Σπίτι στον αέρα μετά από κατολίσθηση

Ορατός είναι ο κίνδυνος της καταστροφής σπιτιού που βρίσκεται στο Σκεπαστό στην Πρέβεζα αφού κομμάτι της γης, περίπου 15 μέτρων, βρέθηκε στο κενό.

Σύμφωνα με πληροφορίες του pamepreveza.gr το φαινόμενο παρουσιάστηκε πριν δέκα μέρες περίπου ενώ έγινε πιο έντονο το περασμένο Σάββατο, όταν αποκόπηκε μεγάλο μέρος της γης με αποτέλεσμα μέρος της συγκεκριμένης οικίας να βρίσκεται κυριολεκτικά στον αέρα.

Από την κατολίσθηση παρασύρθηκαν εκτός από διάφορα δέντρα και ελιές που βρίσκονταν στην αυλή του σπιτιού, κολόνες της ΔΕΗ και του ΟΤΕ με αποτέλεσμα να δημιουργηθεί σοβαρό πρόβλημα στα δίκτυα.

Η ΔΕΗ βέβαια αποκατέστησε τη βλάβη άμεσα ενώ μετά από μια εβδομάδα περισσότερες από επτά οικογένειες δεν έχουν τηλέφωνο.

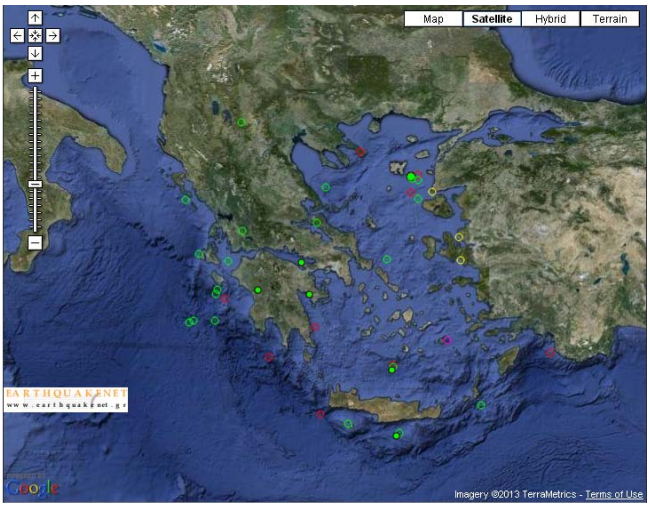
(newsbomb.gr / 23 Φεβρουαρίου 2013, http://www.newsbomb.gr/koinwnia/story/282510/spiti-ston-aera-meta-apo-katolisthisi#ixzz2Lpswclmf)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Σεισμοί στην Ελλάδα σε πραγματικό χρόνο

Μπορείτε να δείτε σε πραγματικό χρόνο τους σεισμούς που γίνονται στην Ελλάδα.

Ο χάρτης σας δείχνει την πρόσφατη σεισμική δραστηριότητα στον Ελλαδικό χώρο.



Όταν αναβοσβήνει το σήμα, σημαίνει ότι υπάρχει αυτή τη στιγμή σεισμική δόνηση στη συγκεκριμένη περιοχή.

ΠΡΑΣΙΝΟ μικρότερο από 3 R (Richter)
ΚΟΚΚΙΝΟ μεγαλύτερο από 3 R
ΠΟΡΤΟΚΑΛΙ μεγαλύτερο από 5 R, κλπ (δείτε υπόμνημα κάτω από το χάρτη).

Περισσότερες λεπτομέρειες μπορείτε να δείτε κάνοντας κλικ πάνω στα σημεία του χάρτη ή στις ημερομηνίες κάτω από το χάρτη.

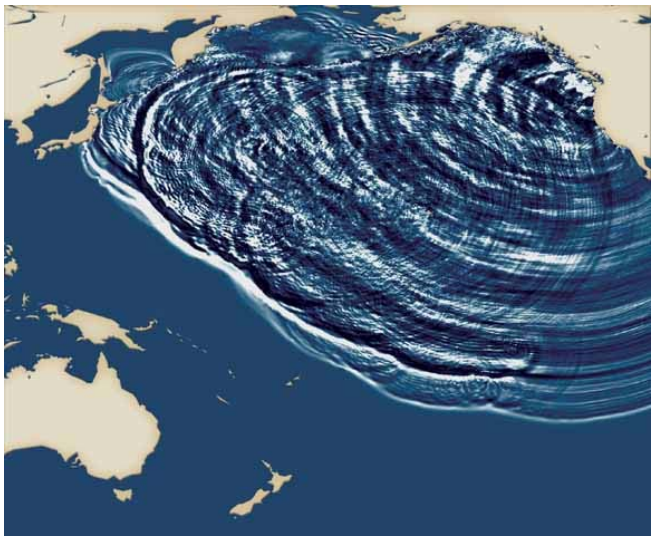
http://www.earthquakenet.gr/

The Orphan Tsunami of 1700—Japanese Clues to a Parent Earthquake in North America

Brian F. ATWATER ブライアン・F・アトウォーター,
MUSUMI-ROKKAKU Satoko 六角 聡子,
SATAKE Kenji 佐竹 健治,
TSUJI Yoshinobu 都司 嘉宣,
UEDA Kazue 上田 和枝, **and**
David K. YAMAGUCHI デイビッド・K・ヤマグチ

2005

One winter's night in the year 1700, a mysterious tsunami flooded fields and washed away houses in Japan. It arrived without the warning that a nearby earthquake usually provides. Samurai, merchants, and villagers recorded the event, but nearly three centuries would pass before discoveries in North America revealed the tsunami's source.



A simulated tsunami reaches Japan ten hours after its start along the Pacific coast of North America

The Orphan Tsunami of 1700 tells this scientific detective story through clues from both sides of the Pacific. The evidence uncovered tells of a catastrophe, a century before Lewis and Clark, that now helps guide preparations for future earthquakes and tsunamis in the United States and Canada.

(http://pubs.usgs.gov/pp/pp1707/)

Failure to warn of risks led to quake convictions

Judge says Italian scientists should have communicated L'Aquila quake risks better.

Scientists were convicted of manslaughter following the 2009 L'Aquila earthquake in Italy because they failed to communicate the risks of such an event, according to the judge who presided over the case.

Judge Marco Billi last October convicted five geologists, a physicist and a public official for manslaughter following the devastating magnitude 6.3 earthquake that killed 309 people in the small town of L'Aquila on 6 April 2009 (NCE 9 April 2009).

All seven received six year jail terms but none has begun their sentence as they plan to appeal.

Billi's "motivazione della sentenza "or reason for sentencing is unequivocal on his belief in their guilt.

"The charge against the accused seems fully valid: the statements made regarding the risk assessment of the seismic activity in the L'Aquila area were absolutely vague, generic and ineffective," said Billi.

His explanation runs for almost 900 pages and stresses that he convicted the men because they failed to communicate the risks properly and not because they failed to predict the earthquake.

"We are not putting on trial 'science' for failing to predict the earthquake," the judge wrote. "The task of the defendants was certainly not to predict or prophesy the earthquake and state its month, day, hour and magnitude, but was rather, more realistically, to predict and prevent risks, in conformity with the law."

The judge's reasoning focuses on a meeting of Italy's Commissione Grande Rischi (Commission of Big Risks) six days before the quake.

L'Aquila mayor Massimo Cialent requested the meeting following a series of foreshocks in the area. He wanted to decide whether it was appropriate to close a number of schools and evacuate older buildings.

The exact details of the meeting are still unclear but the one civil member of the commission Bernardino De Bernardinis appeared on TV assuring the population that the foreshocks were releasing energy and reducing the probability of a major shock.

Italy's geology institute the Instituto Nazionale di Geofisica e Vulcanologia (INGV) slammed the judge's ruling. "This document focuses the attention on very short-term earthquake forecasting, despite the clearly established impossibility to predict the occurrence of a strong earthquake in terms of time, location, and intensity," said INGV president professor Stefano Gresta.

Gresta rejected the claim that the scientists failed to communicate the risk. He said hazard maps were discussed in the meeting and risk was clearly communicated by the seismologists.

Consultant Arup seismic specialist Damian Grant, who has examined the ruling, said he thought it was wrong for advice offered in good faith to be used in the context of a criminal investigation."Predicting earthquakes is an inexact science," he added.

(Declan Lynch / New Civil Engineer, 7th February 2013, http://www.nce.co.uk/news/geotechnical/failure-to-warn-of-risks-led-to-quake-convictions/8642292.article?blocktitle=Exclusive-news-from-NCE-magazine&contentID=204)

Earthquake-induced tsunami kills at least 10 at Solomon Islands

A Magnitude 8 earthquake created a tsunami that swept through several South Pacific islands last Wednesday. The tsunami killed at least 10 people through 5 villages and was reported to reach 1.5 m in height in places.

Tsunami in Temotu Province of Solomon Islands

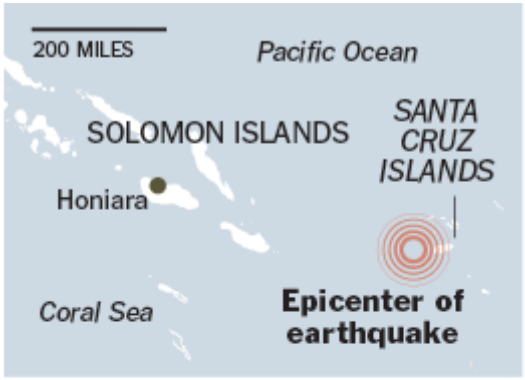
More information:

New York Times:
http://www.nytimes.com/2013/02/07/world/asia/earthquake-tsunami-solomon-islands-south-pacific.html?_r=0

Tsunami Causes Deaths and Damages Homes on Solomon Islands

AUCKLAND, New Zealand — A powerful magnitude 8 earthquake caused a tsunami that sent strong waves crashing into several South Pacific islands on Wednesday, with officials in the Solomon Islandssaying that at least four people died.

The earthquake prompted tsunami warnings and watches from several island chains to Australia and later New Zealand, but many were later canceled.



The low-lying Solomon Islands, however, were not spared. At least 100 homes in the town of Lata were destroyed by a surge of water, according to World Vision, a Christian humanitarian organization. Water and electricity also re-

mained out in the town, which is the capital of Temoto Province.

Government officials said that in addition to the four confirmed deaths in the islands, there were unconfirmed reports that some people in fishing boats were swept out to sea.

The majority of Lata's residents relocated to higher ground in central Lata, following many who fled before the surge. Even though the tsunami warning for the region was lifted, significant tremors were still being felt throughout Temotu Province and waters had not fully receded late in the day.

The Pacific Tsunami Warning Center said the tsunami warning was limited to the Solomon Islands, Vanuatu, Nauru, Papua New Guinea, Tuvalu, New Caledonia, Kosrae, Fiji, Kiribati, and Wallis and Futuna.

A lesser alert, a tsunami watch, was declared for American Samoa, Australia, Guam, the Northern Marianas, New Zealand and eastern Indonesia.

The earthquake was not only powerful but also shallow, which gave it significant potential to cause damage, said Barry Hirshorn, a geophysicist with the National Weather Service in Hawaii. Moreover, it was a thrust earthquake, he said, meaning that the seafloor moved up or down, not sideways, contributing to the potential for a dangerous tsunami.

But after the earthquake, as scientists watched to see how far a tsunami might spread, there were few early indications of a major threat beyond the immediate area, Mr. Hirshorn said. A water rise of about three feet had been observed close to the earthquake, he said, still high enough to be potentially damaging but probably not big enough to threaten distant shores.

In New Zealand, thousands of people were at the beach, swimming in the sea on a glorious summer afternoon on Waitangi Day, a national holiday - quite oblivious to the potential for a tsunami. Tsunami sirens were set off late in the afternoon there, and people in coastal areas were being told to stay off beaches and out of the sea, rivers and estuaries.

The New Zealand Herald reported Wednesday afternoon on its Web site that tsunami sirens in Suva, the capital of Fiji, had been warning people to stay inside or go to higher ground.

(Suzanne McFadden, 6 February 2013)

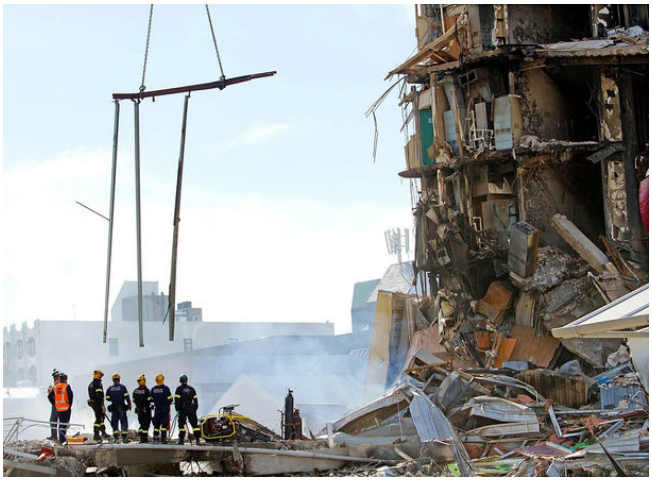
SkyNews Video:
http://www.youtube.com/watch?v=6WPEhhDVSF0&feature=player_embedded

Guardian:
http://www.guardian.co.uk/world/2013/feb/07/solmon-islands-tsunami-death-toll

(Geoengineer.org, Friday, 08 February 2013)

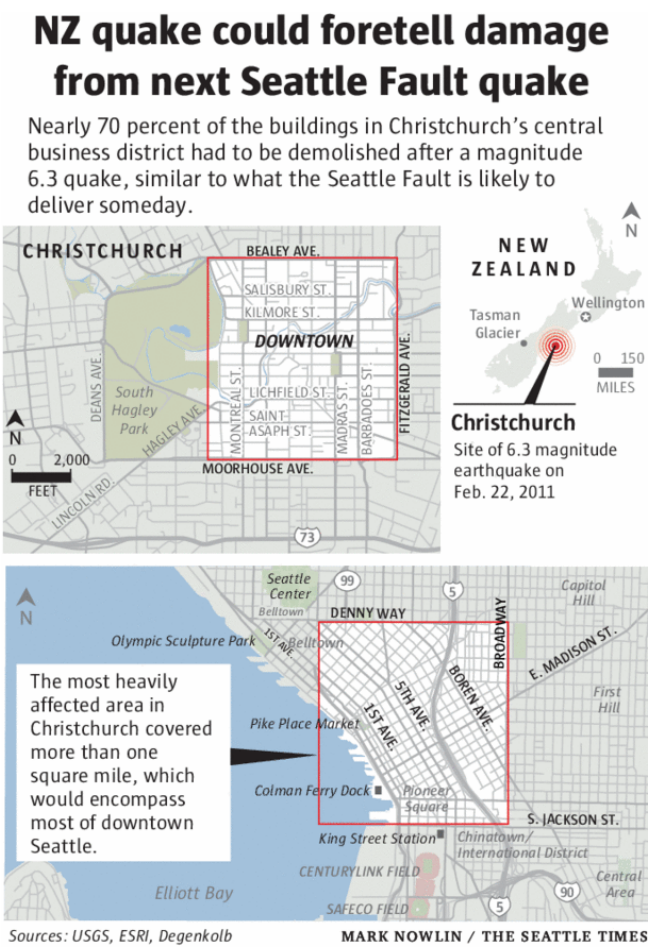
New Zealand earthquake holds lessons for Seattle

The city of Christchurch still hasn't recovered from a devastating 2011 earthquake that provides a glimpse of what could happen the next time the Seattle Fault rips.



Rescuers stand at the smoking ruins of the CTV building in Christchurch, New Zealand, on Feb. 24, 2011, two days after the earthquake. Eventually, 94 bodies were recovered from the building.

After Christchurch was hammered by an earthquake two years ago, New Zealanders found themselves groping for words to describe the devastation. So they fell back on the slang term "munted." It means trashed, destroyed — and then some, said John Hare, a structural engineer from the battered city.



Seattle could be in the same predicament the next time the geologic fault that slices through Western Washington's urban core snaps, Hare and other experts said Tuesday at a workshop on lessons from the Christchurch quake.

"Our earthquake will be worse," Seattle City Councilmember Tom Rasmussen said after addressing the group. "The Seattle Fault runs right under our city."

The death toll from the New Zealand quake was 185. A major quake on the Seattle Fault could kill nearly 10 times as many people, according to a 2005 analysis.

The fault, which scientists say passes under the city's Sodo neighborhood and continues into the Cascade foothills, last ruptured about 1,100 years ago.

Total damage from the Feb. 22, 2011, Christchurch quake is estimated at about $30 billion — though the number keeps growing, said Kelvin Berryman of New Zealand's Institute of Geological and Nuclear Science. With the second anniversary approaching, much of the city's central core remains cordoned off, and nearly 70 percent of downtown buildings are being demolished.

"There's almost nothing left untouched," Hare said in an interview. He estimates it will be another three to five years before the central business district is fully functional again.

Christchurch's historic neighborhoods, where lovely stone and brick buildings were reduced to rubble, will never be restored, said Rasmussen, who toured the city a year after the magnitude-6.3 quake.

"I came back committed to doing what we can here to prepare for an earthquake," he said. Among Seattle's recent initiatives is an inventory of nearly 800 at-risk brick buildings. The city is also considering an ordinance to mandate retrofits for those structures.

The steep economic toll in Christchurch has local engineers reconsidering the 2005 Seattle Fault study, which estimated economic losses of $33 billion from a magnitude-6.7 quake.

"I think we underestimated the cost and the recovery time," said Mark Pierepiekarz, of MRP Engineering in Seattle. Based on recent quakes around the globe, full recovery would probably take a generation, he said.

The Christchurch quake knocked out electrical power and communications and did so much damage to water and sewer systems that it was several months before service was restored in some areas, said David Johnston, director of New Zealand's Joint Centre for Disaster Research.

Schools were closed for six weeks or more. But 95 percent of the city's businesses are still in operation, and reconstruction work is buoying the local economy, Berryman said.

The quake struck on a previously unknown fault and in an area that wasn't considered at high seismic risk. Shaking was twice as strong as most buildings were designed to withstand, said Hare, of Holmes Consulting.

More than 11,000 aftershocks, some as big as magnitude 6, have rattled nerves and delayed rebuilding.

But New Zealand's recovery will be aided by the fact that nearly 80 percent of losses from the quake were insured. In the Pacific Northwest, only about 12 percent of homeowners carry earthquake coverage, Rasmussen said.

The Pacific Northwest is more seismically active than Christchurch, and is vulnerable to three types of earthquakes: deep quakes, like the 2001 Nisqually quake; coastal megaquakes and tsunamis, like the one that struck Japan in 2011; and shallow quakes on a network of faults that crisscross the Puget Sound Basin and include the Seattle Fault, the Tacoma Fault and several others.

Geologists estimate the region gets slammed with a shallow quake every thousand years, on average. Estimated at magnitude 7 or more, the most recent Seattle Fault quake lifted beaches 20 feet in West Seattle and on Bainbridge Island and triggered a tsunami in Puget Sound.

"Our risk is huge," Rasmussen said.

The Christchurch workshop was held in conjunction with the annual meeting of the Earthquake Engineering Research Institute, which is bringing more than 300 seismic researchers and engineers to Seattle this week.

(Sandi Doughton / Seattle Times, February 13, 2013, http://seattletimes.com/html/localnews/2020343625_earthquakelessonsxml.html)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Carl Sagan
The Pioneers of Science

Carl Sagan in "Cosmos" is talking about the discoveries of Thales, Empedokles, Anaximander, Theodores, the Efpalinian Trench, Democritus, Pythagoras and of Aristarchus of Samos and how the ancient Greek ideas ispired modern science.

http://www.youtube.com/watch?v=NijiYIGdIyQ&list=PLEE72FE993A375FA2

http://www.youtube.com/watch?v=LMk2hV6Ft-k&list=PLEE72FE993A375FA2

http://www.youtube.com/watch?v=fE5WHZW3taM&list=PLEE72FE993A375FA2

Indian Researchers Create Low-Cost Bricks From Recycled Paper Mill Waste

While recycling trash is preferable to simply chucking refuse into the dump, the process still creates tons of byproducts that end up making their way to the landfill. Fortunately, Professors Rahul Ralegaonkar and Sachin Mandavgane of the Visvesvaraya National Institute of Technology in India (VNIT) have developed a way to create paper bricks from recycling waste. Made from 90% recycled paper mill waste (RPMW) and 10% cement, the mixture is mechanically mixed and pressed into molds and then cured in the sun. The brilliant recycled building material is low-cost means of eking more efficiency out of an already good practice.

After visiting a recycling plant in 2009, Mandavgane and Ralegaonkar discovered that 15% of the paper taken in was left to sit in a landfill as sludge. After bringing the slurry back to their labs at VNIT, they experimented with a mixture that would make a good building material. Their bricks are made from 90% recycled paper mill waste that has already been used successfully in false ceilings and partition walls. In addition to paper waste, the team has incorporated textile effluent treatment plant (ETP) sludge, cigarette butts, fly ash, cotton waste, polystyrene fabric, waste tea, rice husk ash, granulated blast furnace slag, and dried sludge from a waste water treatment plant.

"Recycle Paper Mills (RPM) contribute 30 percent of [the] total pulp and paper mill segment in India. With 85 percent being the average efficiency of RPM, 5 per cent waste (RPMW) is produced annually. RPMW which otherwise is land filled has been utilized to make construction bricks that serve a purpose of solid waste management, new revenue generation and earning carbon credits," says Mandavgane.

Blocks made from these cast-off materials are half the cost of normal bricks and much lighter. Such inexpensive bricks would come as a great benefit to the Indian construction market, which has a 30% deficit in supply. The team is presently working on a waterproof coating for the bricks (so they can be used on housing exteriors) and determining the material's efficacy in earthquake prone areas.

(Morgana Matus / Inhabitat, 31 January 2013, http://inhabitat.com/researchers-in-india-create-low-cost-bricks-from-recycled-paper-mill-waste)

Purdue researchers create stronger, longer-lasting concrete

Purdue University graduate students Paul Imbrock, from left, Kambiz Raoufi and John Schlitter pour a new type of concrete for Indiana bridges that promises to reduce maintenance costs and allow bridge decks to last longer

When is the last time you thought about concrete? If you're Jason Weiss, the answer is every day.

Weiss, a Purdue University professor of civil engineering, has spent nine years working with researchers and students to make Indiana's concrete stronger and longer-lasting. This year, the Indiana Department of Transportation will implement Weiss' research to build four bridges with high-performance concrete that can stay strong, resist cracks and save money.

Here, Weiss explains how his innovation came to be and why everyone might want to think about concrete a little more often.

Question: How does concrete make a bridge weak?

Answer: Concrete itself looks like it's a solid, but it's really a porous solid, almost like a big sponge. It will actually transport things from the surface of the bridge down to reinforcing steel beneath it.

Q: Things like what?

A: The main concern is the de-icing salt that everybody wants on the road during the wintertime. But part of that salt is chloride. When the chloride moves through the little holes in the concrete and get to the steel reinforcing bar, it starts to corrode.

Q: This has been going on for a while. What have others done to try to fix the problem?

A: People tried to make the concrete stronger by making it more dense. But this leads to concrete that cracks easy and shrinks like a T-shirt. Once you get cracks, the chloride goes straight to the bar.

Q: What did you and the researchers at Purdue do differently?

A: We tried something called internal curing. To stop from cracking, the concrete needs water. The water reacts with the cement inside the concrete in a process called hydration. Instead of putting water on top of the concrete after its laid, we put the water inside the concrete.

Q: How does that work?

A: We replaced some of the sand in the concrete with sand that has little tiny holes in it. The holes are fueled with water. Whenever the concrete needs water, it can pull it from the sand inside it.

Q: Have you tested this process to see if it works?

A: In August 2010, we built two bridges on country roads in Bloomington. The first was made out of regular concrete. The second was made of internally cured concrete. Today, the first has three cracks and the second has none. We have also shared our work with engineers in Utah. They built two bridges too, and they found that the internally-cured bridge was 20 times less likely to crack.

Q: Does this kind of concrete cost more to make?

A: Yes, it typically is between 3 to 10 percent more expensive. But because you are getting more years of service out of the bridge, it easily covers the cost in the long run.

Q: Where did this idea come from?

A: The research community has been looking at this for 10 or 15 years. But there's a big valley between being written in a scientific journal and making a bridge out of it. That's where Purdue has a strength. We go from discovery to implementation. We're working with the right people to say this is what works and move it into practice.

Q: Why is this something we need to care about?

A: Bridges, sewers, building foundations … there are two to three tons of concrete for every person. We're at a time where the cost of repairing our infrastructure is a huge talking point every night on the news. If we can get longer life by small changes in our concrete, there can be huge benefits for all of us.

(Jessica Contrera / Journal and Courier (Lafayette, Ind.), Feb 2, 2013, http://www.jconline.com/article/20130202/NEWS0501/302020023/Purdue-researchers-create-stronger-longer-lasting-concrete)

Polish Scientists and Engineers Put A New Spin On Underwater Living

Scientists and engineers from the Faculty of Ocean Engineering and Ship Technology at Gdansk University in Poland have teamed up with other Polish scientific and R&D institutions to come up with a landmark underwater hotel.

The Water Discus Underwater Hotel, as it is called, may not be the first but plans for the Dubai venue call for the biggest site of its kind.

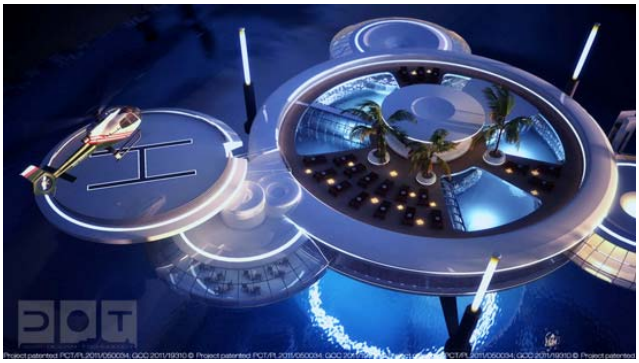
The group's background in designing manned and remotely-operated underwater vehicles and deep-sea equipment for seabed exploration has led Deep Ocean Technology to transferring this knowledge to buildings.

Water Discus Hotels comprise two discs, one underwater and one above water. The two parts of the structure are connected by five solid legs fixed to the seabed and a vertical shaft containing a lift and stairway.

A modular-based design, Water Discus can be expanded into a bigger resort complex if necessary. Each underwater disc is an independent structure with a usable area of ap-

proximately 1,000 square metres consisting of 21 fully-equipped hotel rooms.

Satellite discs located five to seven metres above the water contain a restaurant, spa and recreation zone, while the rooftop contains saltwater pools and exotic gardens.



If any changes in environmental or economic conditions occur, the Water Discus modules can be moved.

The Deep Ocean Technology website highlights the concept's flexibility and mobility.

"This offers a unique opportunity to live underwater on a permanent basis with unlimited options to change locations," it reads. "The mobility makes changes in interior design of a hotel much easier, as any disc can be detached and replaced with a new one."

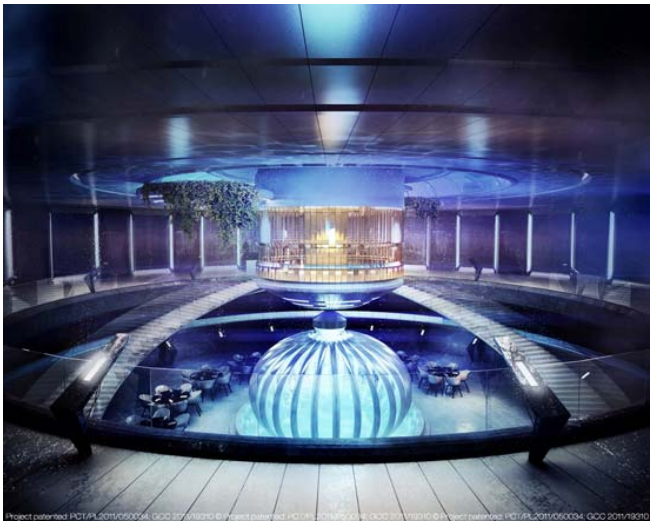
Understandably with a building of this type, safety is paramount. The hotel's monitoring system is integrated with an international earthquake and weather warning system so that in the event of a catastrophic event, any underwater disc automatically surfaces. Each of the satellite discs has been engineered for positive buoyancy, which means that they can be used as lifesaving vessels after being detached from the main body of the upper disc.

The team has used its background in the building and operation of boats, ships, offshore structures and professional diving systems to ensure that the design, construction and technical condition of the complex are under appropriate permanent supervision

Transport facilities have been designed not only to support logistics but also to improve safety. The upper deck of the complex, for example, is connected to the shaft and can be used as a landing pad for helicopters, ensuring quick and convenient access and exit.

Amenities at Water Discus include, among other things, a four-metre deep diving pool, a cave and wreck diver training facility, air-filled huts and emergency breathing stations equipped with surveillance cameras.

Special courses have been designed for pilots of underwater tourist vehicles, which are a permanent element of the infrastructure.



Building company Drydocks World has signed a contract with Swiss firm BIG InvestConsult to develop underwater hotels throughout the Middle East region, including the Water Discus Hotel.

Images Courtesy: Deep Ocean Technology

(Justin McGar / DesignBuildSource.com.au - ENGINEERING @ource, 8 February 2013, http://designbuildsource.com.au/polish-scientists-and-engineers-put-a-new-spin-on-underwater-living)

Building the World's Longest — And Smartest — Floating Bridge

The world's longest floating bridge, a 230,000-ton ribbon of concrete spanning Lake Washington, is getting longer. And smarter. The Washington State Department of Transportation is rebuilding State Route 520 that links Seattle to all points east, making it safer and more efficient for the Evergreen State's drivers.

But it's not the new bridge's 7,710 feet of tarmac, 77 concrete pontoons, 58 reinforced concrete blocks or the 3-inch-thick cables keeping it together that's impressive. After all, basic physics keep it afloat – the weight of the structure equals the weight of the water being displaced. No, advanced construction methods and new technologies, including electrified rebar and hundreds of moisture sensors, will play prominent roles in building the 116-foot-wide, 20-foot-high, six-lane structure, while helping the bridge retain its "world's longest" title.

How to Pour a (Massive) Pontoon

The new SR 520's pontoons are 360 feet long, 75 feet wide and 28 feet tall (although only six feet are visible above the water), and weigh the equivalent of to 23 Boeing 747 jets. But it's not the tonnage that's an issue.

The sheer volume of the concrete being poured causes a massive amount of heat to build up. So the team responsible for the construction had to get creative, installing tubes filled with cooling liquid (think your car's radiator, but on an epically large scale) to keep temperatures in check. "If it gets too hot, it can lose strength and lead to cracking and brittleness," says George Fies, Washington State Department of Transportation's (WSDOT) floating-bridge engineer. Before floating pontoons out to Lake Washington where they must deal with the elements, any "structural crack" over 6/1000th of an inch gets fixed with a epoxy injection and crystalline waterproofing, while smaller cracks need just a crystalline treatment.

Keeping Things Afloat

Over 1,000 water sensors located within the pontoon structures connect remotely to the bridge's main Programmable Logic Controller (PLC). As soon as a leak or any other anomaly is detected, an alert goes off and maintenance personnel are sent to investigate.

Within each pontoon-mounted, watertight cell sits a float switch, located a scant three inches off the pontoon's floor. If rising water triggers the switch, the sensor will send a signal to a central monitoring panel, then relay the information to the PLC at the east end of the bridge. From there,

the system will instruct an auto dialer to call 24-hour dispatch. "This is the first time this has been done at this scale," says Archie Allen, WSDOT bridge superintendent. And obviously, they're hoping it never goes off.

Electrifying Rebar

With steel rebar inserted throughout the concrete pontoons and steel cables connecting the bridge to anchors, corrosion is inevitable, and that's where a "cathodic protection system" comes into play.

A system keeps tabs on corrosion and a cathodic protector automatically pumps low-voltage, DC electricity into the metal to counteract the effects of the water. The bridge features one system focused solely on the pontoons and another monitoring the cables. "To start out with, [the voltage] should be very little, but it will keep electrolysis in check," Allen says.

Maintenance Finally Has a Home

Between eight and 10 maintenance personnel will be available 24 hours a day, all housed in a LEED Silver-certified building at the east approach of the bridge.

Along with a yard for equipment and offices, the facility will also contain the command station with monitors for viewing security cameras, scads of computers, a primary and backup server, along with the rest of the PLC system. Additionally, the facility has an energy-monitoring system, a backup power source, new docks for the maintenance boat and a hydroponic system to defrost the dock. Intrusion alarms on each pontoon will also alert the maintenance facility and prompt a call-out – one of 15 possible reasons the red phone will ring.

Fighting the Flames

"I wouldn't call it fire-suppression, I would call it a fire-fighting system," Allen notes when describing the automated system that will rise from the center of the bridge to douse vehicle fires.

With four 350-horsepower electrical pumps (two at each end of the bridge for redundancy) supporting almost 8,000 lineal feet of fire pipe, the bridge can stock hydrants every 900 feet with lake water. Once activated from the command room, the system can charge either the west or east sections in about eight minutes. When finished, the lines automatically drain. By using lake water, engineers didn't have to deal with the issue of running water lines through the highly movable transition point between the fixed bridge and floating bridge, allowing the placement of hydrants on a floating bridge for the first time.

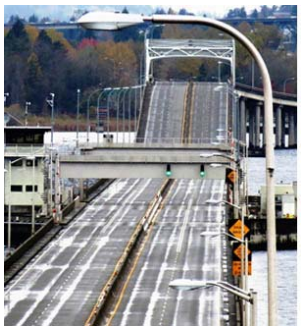
Fighting the Wind

In the bridge's current form, high winds send Lake Washington waves crashing across the roadway, prompting officials to close the floating bridge in adverse weather. By elevating the bridge deck 20 feet above the water level, weather-related events are all but eliminated. And it also takes care of maintenance concerns.

The new bridge design means crews won't have to travel on the road to perform maintenance. Instead, they'll access the pontoons through dedicated spaces under the roadway. If they need to get up to the tarmac, stairways within the bridge supports provide additional access, but that won't be happening very often – 98 percent of maintenance access to the bridge will now be done via boat and away from traffic.

Cheating Mother Nature

A custom-developed weather station located on the bridge will monitor wind speed and direction, and will be a massive improvement over the existing systems.



The current bridge system trips an alarm if sustained gusts of 40 mph last for a minute. Because of the new aerodynamic design, the wind criteria will be increased for the new bridge and the system will still tie into the PLC to alert crews to keep an eye on sway. However, Allen says, "it will take a real whopper to shut [things] down." Additionally, sensor-laden "pucks" embedded in the roadway will transmit deck temperature information to crews, alerting them of possible sand or if it's time to bust out the de-icing equipment.

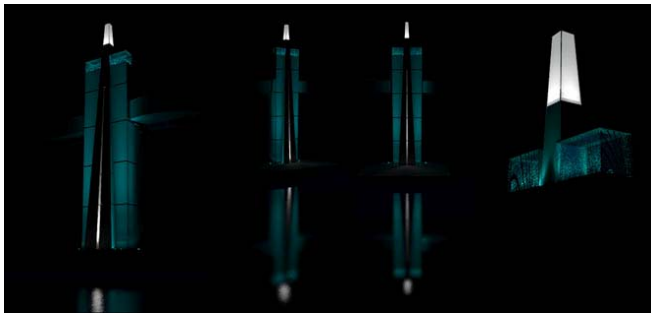
Quiet Concrete and Smart Sensors

For the first time in a project of this scale, mixed-generation concrete – or what's also known as "quiet concrete" – will cover the surface of the bridge. By using advanced grinding methods, the particles of the concrete mixture reduce the noise of vehicles traveling on pavement, which is particularly important for neighbors living on the shores of sound-reflecting water.

The roadway will also contain traffic data monitoring equipment to get speed and the amount of vehicles traveling on the roadway, along with active traffic management signage. Bridge officials hope to add a high-efficiency street sweeper to help remove debris and contaminants before it goes through the bridge's stormwater system.

Improved Lighting

Old-school streetlights will give way to LED and fluorescent lights. The iconic "sentinels" on each end of the bridge use LEDs to change the color and style of lighting. The translucent spires atop each sentinel house additional lights, illuminating the structure from the inside. Fluorescents handle roadway illumination, while metal-halide lighting will keep the 10-foot pathways for pedestrians and cyclists illuminated at night.



(Tim Newcomb / Wired.com, 11 February 2013, http://www.wired.com/autopia/2013/02/worlds-longest-floating-bridge)

Truckload of burning cheese closes Norway tunnel

Some 27t of brown cheese caught fire as it was being transported by truck in mid-January. The fire raged for five days, causing traffic blockages and closing the Brattli Tunnel in Tysfjord, Norway.

The cheese, 'brunost', which is a a caramelised brown goat cheese, blocked off the 3km tunnel when it caught fire. Brown cheese is made from whey and contains up to 30 per cent fat. Officials told local news reporters that the cheese proved extremely difficult to put out; the fire filled the tunnel with toxic gases that hampered recovery operations.

Andy Evans, owner at Aegis Tunnel Consulting, told T&TI: "Fatty foodstuffs have a tremendous energy content and can fuel a very high powered fire in a tunnel. Since such foodstuffs are not 'dangerous goods' they don't fall within the sixth issue of the ADR Directive Road Tunnel controls. In reality they can present a far more likely tunnel fire hazard than do petrochemical fuels."

The driver transporting the cheese noticed fire in his truck trailer and abandoned the truck. No one was injured in the fire and only one other vehicle was in the area at the time. The accident happened close to one of the tunnel's exits.

(Tunnels & Tunnelling, 12 February 2013, http://www.tunnelsonline.info/news/truckload-of-burning-cheese-closes-norway-tunnel-120213)

Έκλεψαν τους σωλήνες από γεώτρηση στις Βρύσες Αποκόρωνα

Δεν πίστευαν στα μάτια τους το πρωί της Τρίτης οι υπάλληλοι της υπηρεσίας ύδρευσης του Δήμου Αποκόρωνα, οι ο-

ποίοι επισκέφθηκαν τη γεώτρηση στον οικισμό "Φίλιππος" στις Βρύσες.Άγνωστοι είχαν κυριολεκτικά "γδύσει" τη γεώτρηση αφαιρώντας όλες τις σωλήνες της.

Συνολικά οι άγνωστοι δράστες αφαίρεσαν 28 εξάμετρους σιδερένιους σωλήνες βαρέως τύπου που η συνολική τους αξία ανέρχεται σε περίπου 10.000 Ευρώ.

Οι σωλήνες της γεώτρησης είχαν αποσυναρμολογηθεί προσωρινά από συνεργεία του Δήμου Αποκόρωνα για τον καθαρισμό και τη συντήρηση που πραγματοποιείται ανά τακτικά χρονικά διαστήματα και έτσι οι επιτήδειοι κλέφτες βρήκαν την ευκαιρία και τις άρπαξαν.

Ο Δήμος Αποκόρωνα κατέθεσε μήνυση κατ' αγνώστων ενώ απευθύνει έκκληση σε όποιον γνωρίζει κάτι για το περιστατικό να επικοινωνήσει με τις αστυνομικές αρχές.

Προανάκριση για την υπόθεση ενεργείται από το Αστυνομικό Τμήμα Βρυσών.

(Βαρδής Καλογεράκης / Αγώνας της Κρήτης, 15 Φεβρουαρίου 2013, http://www.agonaskritis.gr/%CE%AD%CE%BA%CE%BB%CE%B5%CF%88%CE%B1%CE%BD-%CF%84%CE%BF%CF%85%CF%82-%CF%83%CF%89%CE%BB%CE%AE%CE%BD%CE%B5%CF%82-%CE%B1%CF%80%CF%8C-%CE%B3%CE%B5%CF%8E%CF%84%CF%81%CE%B7%CF%83%CE%B7-%CF%83%CF%84%CE%B9/#)

Έκθεση "Αιγαίο" στο ΝΟΗΣΙΣ

Μία σημαντική έκθεση για τη γένεση και τη δημιουργία των γεωλογικών θησαυρών του Αιγαίου θα φιλοξενηθεί στο ΝΟΗΣΙΣ. Η έκθεση παρουσιάζει, με έναν εντυπωσιακό και ελκυστικό για το ευρύ κοινό τρόπο, τη δημιουργία του Αιγαίου πελάγους, την ομορφιά των νησιών και των ακτών του, με μια προσέγγιση μέσα από την οποία ο επισκέπτης συλλαμβάνει τις διεργασίες στον απώτατο χρόνο, αλλά και γεμίζει επίσης τις αισθήσεις του με εικόνες από τα νησιά και τη ζωή του αρχαίου αυτού πελάγους.

Μέσα από σημαντικά εκθέματα, πλούσιο φωτογραφικό υλικό, αναπαραστάσεις και οπτικοακουστικές διαδραστικές παρουσιάσεις, εμφανίζονται οι διεργασίες και τα αποτελέσματα των χερσαίων και θαλάσσιων δυνάμεων που διαμόρφωσαν τόσο το ιστορικό αρχιπέλαγος, στο πέρασμα εκατομμυρίων χρόνων, όσο και την εξέλιξη της ζωής στην περιοχή.

Η έκθεση, πέρα από την επιστημονική της επάρκεια και τον εκπαιδευτικό της χαρακτήρα, σκοπό έχει να αποκομίζει ο επισκέπτης της τη δύναμη των τοπίων και της ομορφιάς του Αιγαίου πελάγους μέσα από σύγχρονους τρόπους παρουσίασης, όπου τα εκθέματα, οι εικόνες και οι οπτικοακουστικές παρουσιάσεις συνθέτουν ένα δυνατό επικοινωνιακά και εικαστικά σύνολο, ικανό να θέλξει και να εντυπωσιάσει το ευρύ κοινό.

ΝΟΗΣΙΣ - Κέντρο Διάδοσης Επιστημών και Μουσείο Τεχνολογίας, Θεσσαλονίκη, τηλ. 2310 483 000

Ιστοσελίδες: www.aegeon.org.gr, www.lesvosmuseum.gr, www.noesis.edu.gr

Οικισμός 8.000 ετών στην Κασσαβέτεια Μαγνησίας Χρονολογείται στο β΄ μισό της 6ης π. Χ. χιλιετίας

(Φωτό αρχείου)

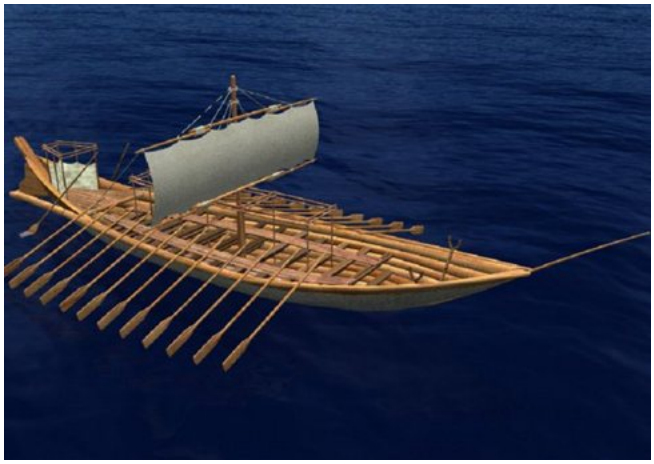
Ενα νεολιθικό οικισμό εντόπισε στην Κασσαβέτεια της Μαγνησίας η αρχαιολογική έρευνα που διενεργήθηκε εν όψει της ανέγερσης νέων φυλακών στην περιοχή. Ο οικισμός χρονολογείται στο β΄ μισό της 6ης π. Χ. χιλιετίας και σύμφωνα με τους αρχαιολόγους καταλαμβάνει έκταση 25 στρεμμάτων περίπου από τα οποία όμως έχουν ερευνηθεί μόνον 200 τ.μ.

Οπως φαίνεται εξάλλου, ο οικισμός βρίσκεται κοντά μεν στην έκταση όπου θα ανεγερθούν τα κτίρια των φυλακών, όχι όμως τόσο, ώστε να υποστεί βλάβη από τη γειτνίαση με αυτά. Το Κεντρικό Αρχαιολογικό Συμβούλιο ενέκρινε κατόπιν αυτών την κατασκευή δύο κτιρίων των νέων φυλακών Κασσαβέτειας με συνολική κάλυψη επιφάνειας 55.000 τ.μ. και με χωρητικότητα για το καθένα από αυτά, 400 άτομα.

(ΤΟ ΒΗΜΑ Πολιτισμός, 13 Φεβρουαρίου 2013, http://www.tovima.gr/culture/article/?aid=498138&h1=true#commentForm)

Εντυπωσιακά ευρήματα

Μινωικό ναυπηγείο βρέθηκε στο Ηράκλειο της Κρήτης



Γραφιστική απεικόνιση μινωικού πλοίου

Το πρώτο μινωικό ναυπηγείο κατασκευής μεγάλων πλοίων 50 μέτρων εκτιμούν ότι ανακάλυψαν Έλληνες επιστήμονες στην ακτή των Αγίων Θεοδώρων, κοντά στο μινωικό μέγαρο στη θέση Νίρου Χάνι ή Κοκκίνη Χάνι, στο Ηράκλειο της Κρήτης. Τα ευρήματα θα παρουσιάσουν σε συνέδριο για την Αρχαία Ελληνική Τεχνολογία, που θα γίνει στο Ηράκλειο στις 21 Μαρτίου, ο ερευνητής δρ. Μηνάς Τσικριτσής και ο γεωλόγος Στέλιος Μανωλιούδης.

Όπως υποστηρίζει ο κ. Τσικριτσής, «για την ανάπτυξη της μινωικής ναυτιλίας μέχρι τώρα στηριζόμαστε σε αναπαραστάσεις με εικόνες πλοίων που δείχνουν ποντοπόρα πλοία με 50 κουπιά τα οποία αντιστοιχούν θεωρητικά σε σκάφη μηκους 40 έως 50 μέτρα. Η άποψη αυτή ενισχύεται με την εύρεση στην ακτή των Αγίων Θεοδώρων κοντά στο μινωικό μέγαρο του Νίρου Χάνι (Κοκκίνη Χάνι), ενός μεγάλου ναυπηγείου».

Στην περιοχή υπάρχουν λαξεύματα και βάσεις μινωικών κτισμάτων τόσο στην ξηρά όσο και μέσα στη θάλασσα, ενώ στη βόρεια πλευρά της αμμώδους παραλίας εμφανίζονται δύο μεγάλα ορθογώνια λαξεύματα, τα οποία έχουν κατακλυσθεί από τη θάλασσα. Πιθανότατα πρόκειται για χώρο κατασκευής μινωικών πλοίων -γύρω στα 45 μέτρα και μικρότερων 15-25 μέτρα, λέει ο κ. Τσικριτσής.

Πρώτος για το ναυπηγείο των μινωικών χρόνων είχε γράψει ο αρχαιολόγος Σπύρος Μαρινάτος, ο οποίος αναφέρει ότι ο χώρος του ναυπηγείου ήταν λαξευμένος στο βάθος του ορμίσκου, που είχε εξορυχθεί πέτρωμα πωρόλιθου από μια μεγάλη ορθογώνια κοιλότητα.

Ο κ. Τσικριτσής και ο κ. Μανωλιούδης, μαζί με τους συνεργάτες τους, πραγματοποίησαν στον χώρο σειρά επισκέψεων, κάνοντας παρατηρήσεις και μετρήσεις.

«Το αποτέλεσμα είναι ότι η περιοχή ολόκληρη αποτέλεσε ένα μεγάλο λατομείο. Όταν καταδυθήκαμε εντυπωσιαστήκαμε από τις φάλκες χάραξης που είδαμε σε πολλά σημεία του πυθμένα που διατηρούνταν σε άριστη κατάσταση. Παρατηρούνται ακόμα εξορύξεις σε διάφορα σημεία του χώρου όπως στο νησάκι ΒΑ, στη βόρεια και τη δυτική πλευρά του ακρωτηρίου, τόσο επιφανειακά όσο και υποθαλάσσια. Εκείνο όμως που εντυπωσιάζει είναι το μεγάλο λάξευμα που έχει κατακλυσθεί από τη θάλασσα, αλλά και ένα σκαλοπάτι νότια του λαξεύματος αυτού» τονίζει ο κ. Τσικριτσής.

Το λάξευμα έχει μήκος 48 και πλάτος 10,60 μέτρα. Το ύψος του κατακόρυφου λαξεύματος είναι περί τα 1,80 μέτρα στο κέντρο και «σβήνει» ανατολικά, ενώ στη δυτική πλευρά κυμαίνεται περί το 1,30 μ. Σε πολλά σημεία έχει προσχώσεις με άμμο, ενώ εντυπωσιακό στοιχείο είναι πως το τεχνητό λάξευμα στο μέσο του, το διαχωρίζει μικρός τοίχος μήκους 48 μέτρων, πλάτους 0.80 μ και ύψους 0,60 μέτρα.

Νότια του λαξεύματος προς την περιοχή των μινωικών κτιρίων υπάρχει ένας άλλος λαξευτός χώρος με διαστάσεις 18 επί 6 μέτρων στο επίπεδο της θάλασσας. Στον χώρο αυτόν, υποστηρίζουν οι επιστήμονες, ίσως να αποθηκευόταν ξυλεία και ό,τι άλλο χρειαζόταν για την κατασκευή των πλοίων.

«Υπάρχουν ενδιαφέροντα ίχνη» λέει ο κ. Τσικριτσής και διευκρινίζει: «Ειδικότερα εμφανίζεται σχεδόν οριζόντιο αυλάκι 8 εκατοστών πάχους και βάθους 4 εκατοστών που γίνεται λοξό στα δυτικά. Ακόμα πάνω από το αυλάκι υπάρχει απόλυτα επίπεδη -και λοξή προς τα δυτικά- επιφάνεια, η οποία δημιουργήθηκε πιθανότατα από τριβή σχοινιών (εμφανίζει επιπέδωση και λείανση)».

Όπως εξηγεί ο κ. Τσικριτσής «το λάξευμα πιθανότατα κατακλυζόταν με νερό κατά βούληση. Δηλαδή, όταν ολοκληρωνόταν η ναυπήγηση οδηγούσαν το νερό της θάλασσας στο τετράγωνο λάξευμα και έτσι 'κατέβαζαν' (με την υποστήριξη μοχλών και σχοινιών) το μεγάλο σκάφος που είχαν κατασκευάσει στην υδάτινη δεξαμενή. Αυτό το πετύχαιναν με τη διοχέτευση θαλασσινού νερού από τα δυτικά. Αυτό προκύπτει από το γεγονός ότι δυτικά από το λάξευμα, πάνω στον ψαμμίτη έχουν λαξευτεί κανάλια. Υπάρχει δίκτυο λαξευτών καναλιών με ίχνη εργαλείων από τη λάξευση. Το μεγαλύτερο έχει μήκος γύρω στα 8 μέτρα πλάτος 10-13 εκατοστά και βάθος 12 -21 εκατοστά του μέτρου».

Η ύπαρξη λαξευτών καναλιών προς τα νότια οδήγησε την έρευνα στο δυτικό τμήμα όπου διαπιστώθηκε η ύπαρξη δεύτερου λαξεύματος διαστάσεων 25 επί 8 μέτρα. «Θεωρούμε ότι πιθανότατα είναι ένα δεύτερο μικρότερο ναυπηγείο κατασκευής μικρότερων σκαφών» καταλήγει ο κ. Τσικριτσής.

(Newsroom ΔΟΛ, με πληροφορίες από ΑΠΕ-ΜΠΕ,
26.02.2013,
http://news.in.gr/culture/article/?aid=1231236975)

Ανακαλύφθηκαν οι βαθύτερες υποθαλάσσιες υδροθερμικές πηγές στον κόσμο

Βρετανοί επιστήμονες ανακάλυψαν στον βυθό της Καραϊβικής τις βαθύτερες υδροθερμικές πηγές που έχουν εντοπιστεί μέχρι σήμερα, σε βάθος σχεδόν πέντε χιλιομέτρων κάτω από την επιφάνεια της θάλασσας (συγκεκριμένα στα 4.968 μετρα). Η θερμοκρασία των πηγών είναι καυτή, φθάνοντας τους 401 βαθμούς Κελσίου, μια από τις πιο καυτές περιοχές του πλανήτη, τη στιγμή που το νερό γύρω από τις υδροθερμικές πηγές έχει θερμοκρασία μόλις 4 βαθμών Κελσίου.

Η ανακάλυψη από ερευνητές του Εθνικού Ωκεανογραφικού Κέντρου και του πανεπιστημίου του Σαουθάμπτον της Βρετανίας, με επικεφαλής τον δρα Γιον Κόπλεϊ, σύμφωνα με το BBC, έγινε με το τηλεκατευθυνόμενο υποβρύχιο όχημα (ROV) «Ίσις» στην Τάφρο Καϊμάν, στα νότια της Κούβας.

Οι βιντεοσκοπημένες εικόνες που μετέδωσε το όχημα από το βυθό, δείχνουν θεόρατες «καμινάδες» ύψους έως δέκα μετρων, οι οποίες εκλύουν καυτά αέρια από το εσωτερικό της Γης στο παγωμένο νερό γύρω τους.

Οι υδροθερμικές πηγές, που ανακαλύφθηκαν για πρώτη φορά στη δεκαετία του ΄70 (μέχρι σήμερα έχουν εντοπιστεί περίπου 200 στους ωκεανούς της Γης), αποτελούν οικοσυστήματα στο βυθό με ακραίες φυσικοχημικές συνθήκες, οι οποίες παρόλα αυτά φιλοξενούν εξωτικές μορφές ζωής, όπως τυφλές γαρίδες, περίεργα σκουλήκια και διάφορα α-

κραιόφιλα μικρόβια. Σύμφωνα με πολλούς επιστήμονες, τέτοια περιβάλλοντα είναι πιθανό να αποτέλεσαν την κοιτίδα της εμφάνισης της ζωής στον πλανήτη μας, πριν από δισεκατομμύρια χρόνια, προτού αυτή σταδιακά επεκταθεί στην επιφάνεια της Γης.

Οι Βρετανοί ερευνητές αισιοδοξούν ότι η αποστολή τους, που επιβαίνει του ερευνητικού πλοίου «Τζέημς Κουκ» και θα διαρκέσει έως τις αρχές Μαρτίου, θα ανακαλύψει γύρω από τις εν λόγω υδροθερμικές πηγές για μια ακόμη φορά νέα είδη, άγνωστα έως τώρα. Ήδη οι επιστήμονες έχουν συλλέξει, χάρη στους βραχίονες του οχήματος «Ίσις», τα πρώτα υποθαλάσσια δείγματα, που θα δοθούν για μελέτη.

Άλλες αμερικανικές και ιαπωνικές ερευνητικές ομάδες πρόκειται να ακολουθήσουν τους Βρετανούς στη συνέχεια για μελέτες στην ίδια περιοχή του βυθού.

(Η ΚΑΘΗΜΕΡΙΝΗ, 22 Φεβρουαρίου 2013 - Πηγή: ΑΜΠΕ, http://portal.kathimerini.gr/4dcgi/_w_articles_kathciv_1_22/02/2013_484122)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

Νέο περιοδικό!

Environmental Geotechnics

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Κυκλοφόρησε το Τεύχος #97 του **Newsletter του Geoengineer.org** (Φεβρουάριος 2013) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωτεχνικής μηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).

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