Everest Anniversary Summit 1963

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ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

121

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Καλά Χριστούγεννα

Καλή Χρονιά

Αρ. 121 – ΔΕΚΕΜΒΡΙΟΣ 2018

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Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

An algae-filled pond glows under the moonlight within the alien landscape of White Pocket, Arizona

Evening settles onto Mount Everest as a group of climbers hike into the Khumbu Icefall in 2012

ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
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ΜΗΧΑΝΙΚΗΣ

Αθηναϊκή Διάλεξη Γεωτεχνική Μηχανικής

Η **Ε**λληνική **Ε**πιστημονική **Ε**πιτροπή **Ε**δαφομηχανικής και **Γ**εωτεχνικής **Μ**ηχανικής (**ΕΕΕΕΓΜ**) οργανώνει την «**Αθηναϊκή Διάλεξη**» του 2019 με Ομιλήτρια την καθηγήτρια στο Imperial College **Δρ. Lidija Zdravkovic** με θέμα:

"Assessing the geotechnical risk associated with natural and cut slopes"

Η διάλεξη θα δοθεί στην Αίθουσα Τελετών της Πρυτανείας του ΕΜΠ **την Τετάρτη 23 Ιανουαρίου 2019 ώρα 5:30 μ.μ.**

Assessing the geotechnical risk associated with natural and cut slopes

Professor Lidija Zdravkovic, Imperial College London, UK

ABSTRACT

Natural and infrastructure slopes are invariably exposed to seasonal variations of atmospheric conditions. Statistics from around the world are showing that the effects of climate change in the recent decade have increased the frequency and intensity of extreme atmospheric events, with material devastation and loss of life being frequent consequences. With current design requirements for a life-cycle assessment of civil engineering construction, the need for robust and reliable assessment tools has become pertinent. Evidently, computational analysis of some form is the main candidate to enable predictions of the long-term behaviour of civil infrastructure and to quantify the geotechnical risk associated with extreme atmospheric conditions.

The lecture starts with a brief overview of advanced computational tools, in conjunction with the finite element method, necessary for realistic modelling of soil-atmosphere interaction. A study is then presented of the whole life-cycle of an infrastructure slope, capturing the recorded seasonal rainfall, as well as the vegetation growth before and after slope excavation. Advanced algorithms for assessing safety factors at various stages of the slope's life are employed to demonstrate and quantify the geotechnical hazard associated with extreme changes in seasonal patterns and how such knowledge can be used to inform the safe design and maintenance of infrastructure slopes. In continuation, triggering mechanisms for catastrophic mudslides are discussed based on a case study of a natural slope, using the same computational tools. This study highlights and quantifies the prerequisite geotechnical conditions that can lead to slope failure as a result of changes in atmospheric conditions on the slope.

SPEAKER

Lidija Zdravkovic is Professor of Computational Geomechanics and Head of the Geotechnics Division at Imperial College London, UK. She holds a MEng degree in Civil Engineering and an MSc in Geotechnical Engineering from the University of Belgrade in Serbia, and obtained a PhD degree in Geotechnical Engineering from Imperial College in 1996. Lidija has led and managed several research projects in collaboration with industry and other academic groups, focusing on the development and application of numerical methods in geotechnical design and providing solutions to a wide range of geotechnical problems, including renewable energy, nuclear waste disposal and infrastructure resilience. Lidija has authored and co-authored over 150 technical publications and received prizes from the Institution of Civil Engineers and the British Geotechnical Association, UK. She is also active in the profession, advising on recent projects involving Heathrow Terminal 5 development, Crossrail excavations, and embankments and cut slopes on the High Speed Rail route in the UK. From 2010 to 2013 she served as an elected member on the British Geotechnical Association's Executive Committee.

ΑΡΘΡΑ

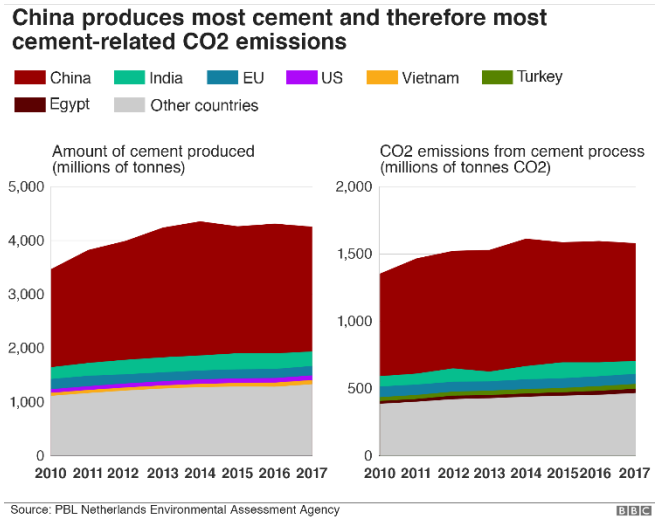
Climate change: The massive CO_2 emitter you may not know about

Concrete is the most widely used man-made material in existence. It is second only to water as the most-consumed resource on the planet.

But, while cement - the key ingredient in concrete - has shaped much of our built environment, it also has a massive carbon footprint.

Cement is the source of about 8% of the world's carbon dioxide (CO_2) emissions, according to think tank Chatham House.

If the cement industry were a country, it would be the third largest emitter in the world - behind China and the US. It contributes more CO_2 than aviation fuel (2.5%) and is not far behind the global agriculture business (12%).



Cement industry leaders were in Poland for the UN's climate change conference - COP24 - to discuss ways of meeting the requirements of the Paris Agreement on climate change. To do this, annual emissions from cement will need to fall by at least 16% by 2030.

So, how did our love of concrete end up endangering the planet? And what can we do about it?

In praise of concrete

As the key building material of most tower blocks, car parks, bridges and dams, concrete has, for the haters, enabled the construction of some of the world's worst architectural eyesores.

In the UK, it helped the massive wave of post-World War Two development - much of it still dividing opinion - with several of the country's major cities, such as Birmingham, Coventry, Hull and Portsmouth, largely defined by the concrete structures from that building push.

Birmingham is known for its concrete structures

But concrete is also the reason some of the world's most impressive buildings exist.

Sydney Opera House, the Lotus Temple in Delhi, the Burj Khalifa in Dubai as well as the magnificent Pantheon in Rome - boasting the largest unsupported concrete dome in the world - all owe their form to the material.

The unreinforced concrete dome of the Pantheon in Rome has yet to be beaten in size

A mix of sand and gravel, a cement binder and water, concrete is so widely embraced by architects, developers and builders because it is a remarkably good construction material.

"It's affordable, you can produce it almost anywhere and it has all the right structural qualities that you want to build with for a durable building or for infrastructure," explains Felix Preston, deputy research director at the Energy, Environment and Resources Department at Chatham House.

Despite known durability problems with using steel reinforcement, which can crack concrete from the inside, it is still the go-to material across the world.

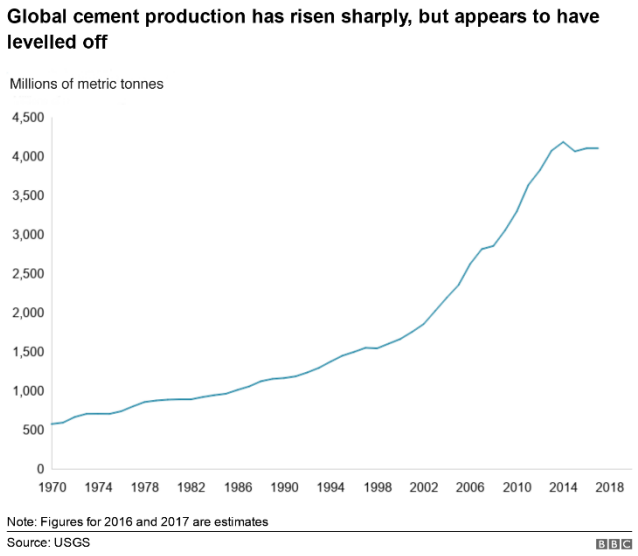
"Building without concrete, although it is possible, is challenging," says Mr. Preston.

Growth of cement industry

It is these unrivalled attributes of concrete that have helped boost global cement production since the 1950s, with Asia and China accounting for the bulk of growth from the 1990s

onwards.

Production has increased more than thirtyfold since 1950 and almost fourfold since 1990. China used more cement between 2011 and 2013 than the US did in the entire 20th Century.



But with Chinese consumption now appearing to level off, most future growth in construction is expected to happen in the emerging markets of South East Asia and sub-Saharan Africa - driven by rapid urbanisation and economic development.

The floor area of the world's buildings is projected to double in the next 40 years, say Chatham House researchers, requiring cement production to increase by a quarter by 2030.

Concrete has a long history

While many of us assume concrete is a recent addition to our cities, architects and builders have actually been using it for millennia.

The earliest use of concrete is believed to have been more than 8,000 years ago, with traders in Syria and Jordan creating concrete floors, buildings and underground cisterns.

Later, the Romans were known to be masters of concrete, building the Pantheon in Rome in 113-125AD, with its 43m-diameter free-standing concrete dome the largest in the world.

But the concrete used in our modern-built environment owes much of its make-up to a process patented in the early 19th Century by bricklayer Joseph Aspdin of Leeds.

His new technique of roasting limestone and clay in an oven and then grinding it to a powder to make "artificial stone" is now known as Portland cement - still the key ingredient in almost all modern concrete.

But, despite its ubiquitous presence, concrete's environmental credentials have come under increased scrutiny in the last couple of decades.

Not only does the production of Portland cement involve quarrying - causing airborne pollution in the form of dust - it also requires the use of massive kilns, which require large amounts of energy.

The actual chemical process of making cement also emits staggeringly high levels of CO_2.

'Action needed'

The sector has made progress - improvements in the energy-efficiency of new plants and burning waste materials instead of fossil fuels has seen the average CO_2 emissions per tonne of output fall by 18% over the last few decades, according to Chatham House.

The newly-established Global Cement and Concrete Association (GCCA), currently representing about 35% of the world's cement production capacity and with a focus on sustainable development, was at COP24.

Chief executive Benjamin Sporton says the fact the organisation now exists "is a demonstration of the commitment of the industry to sustainability, including taking action on climate change".

The GCCA is due to publish a set of sustainability guidelines, which its membership will have to follow.

"By bringing together global players to provide leadership and focus, as well as delivering a detailed work programme, we can help ensure a sustainable future for cement and concrete, and for the needs of future generations," Mr. Sporton says.

Shanghai, like many Chinese cities, has seen a rapid rise in development

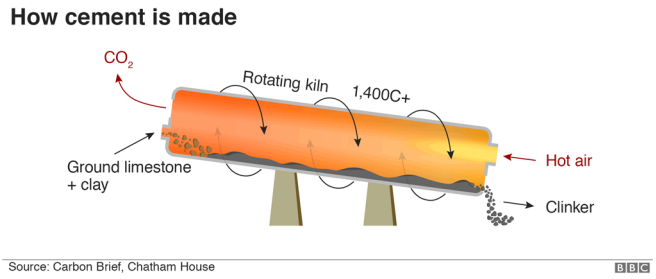
But despite the promise, Chatham House argues that the industry is reaching the limits of what it can do with current measures.

If the sector has any hope of meeting its commitments to the 2015 Paris Agreement on climate change, it will need to look at overhauling the cement-making process itself, not only reducing the use of fossil fuels.

'Clinker' - the big polluter

It is the process of making "clinker" - the key constituent of cement - that emits the largest amount of CO_2 in cement-

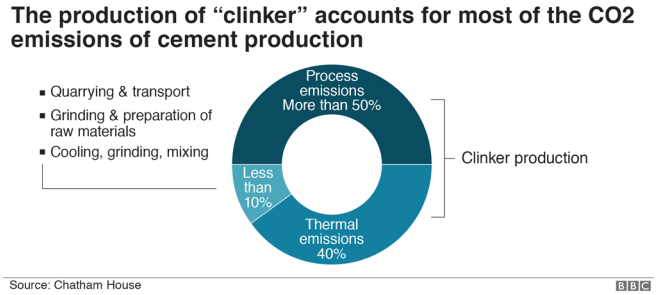
making.



- 1. Raw materials, mainly limestone and clay, are quarried and crushed
- 2. They are ground and mixed with other materials - such as iron ore or ash
- 3. They are fed into huge, cylindrical kilns and heated to about 1,450C (2,640F)
- 4. The process of "calcination" splits the material into calcium oxide and CO2
- 5. A new substance called clinker emerges as marble-sized grey balls
- 6. The clinker is cooled, ground and mixed with gypsum and limestone
- 7. The cement is transported to ready-mix concrete companies

In 2016, world cement production generated around 2.2 billion tonnes of CO_2 - equivalent to 8% of the global total. More than half of that came from the calcination process.

Together with thermal combustion, 90% of the sector's emissions could be attributed to the production of clinker.



Because of this, Mr. Preston and his colleagues argue the sector urgently needs to pursue a number of CO_2 reduction strategies.

Further efforts on energy efficiency, a move away from fossil fuels and pursuing carbon capture and storage will help, but can only do so much.

"We've got a long way to close the gap," Mr. Preston says.

What the industry really needs to do is plough efforts into producing new types of cement, he argues. In fact, low-carbon cements and "novel cements" might do away with the need for clinker altogether.

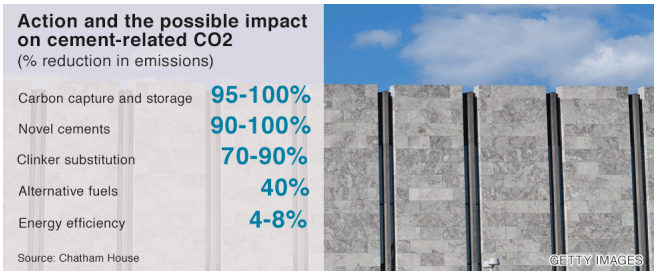
New cements

One of those trying to drum up greater support for such alternative cements is Ginger Krieg Dosier, co-founder and CEO of BioMason - a start-up in North Carolina that uses trillions of bacteria to grow bio-concrete bricks.

The technique, which involves placing sand in moulds and injecting it with microorganisms, initiates a process similar to the one that creates coral.

"I have a long fascination with marine cements and structures," explains Ms. Krieg Dosier, a trained architect who was surprised to find no real green alternatives to bricks and masonry when she began research at an architectural firm more than 10 years ago.

The discovery led her to create her own solution, which, after years of development, now takes only four days. It happens at room temperature, without the need for fossil fuels or calcination - two of the main sources of the cement industry's CO2 emissions.



Ms. Krieg Dosier believes green cements and technologies such as hers offer a solution to the sector's emissions issue.

"Traditional Portland-based cement production practices will continue to release CO2 due to its fundamental chemistry," she says, adding that rather than turning to carbon capture and storage, we should be investing more in techniques that actively remove carbon from the atmosphere.

"Alternative cements and binding technologies go beyond evolutionary CO2 capture to revolutionary methods that fundamentally sequester CO2."

'Disruptive forces'

Alongside such alternative cements, other "disruptive" forces are also beginning to drive change. Digitalisation, machine learning and an increasing awareness of sustainability are all having an impact on the cement industry's culture.

"It's partly changing because of how people want to live, but also because of our ability to dream up new and innovative structures and test those with computer models," says Mr. Preston. "There's also the ability to build things more cheaply with robots - with automation."

But changing processes quickly enough to meet the cement industry's obligations will be a challenge.

Bio-cement start-up BioMason grows bricks out of sand and bacteria

The sector is dominated by a small number of major producers who are reluctant to experiment or change business models. Architects, engineers, contractors and clients are also,

rather understandably, cautious about using new building materials.

"This quite slow-moving, difficult-to-change sector is starting to bump against these quite profound disruptions that we're starting to see in the built environment," says Mr. Preston.

But, with very few low-carbon cements reaching commercialisation, and none being applied at scale in an industry where bigger and taller is often the ambition, it looks likely that sustained government support will be needed.

Without governments applying pressure on the industry or providing funding, it may not be possible to get the next generation of low-carbon cements out of the laboratory and into the market within the required timescale.

And the timescale is ever-shrinking.

The Intergovernmental Panel on Climate Change - the leading international body on global warming - last month argued the global average temperature rise needed to be kept below 1.5C - not 2C as noted in the Paris Agreement. This means CO_2 emissions need to decline by 45% from 2010 levels by 2030.

Like other young companies, Ms. Krieg Dosier describes the difficulties of simultaneously developing and marketing her products and scaling up manufacturing processes to compete within the wider construction industry.

Concrete is the chosen material for most large-scale projects

But she thinks there are reasons to be optimistic.

"I do believe the construction industry is approaching a point where alternative materials will be more widely adopted," she says. "This is in part due to market demand, other innovative technologies and wider concern for climate change."

The cement industry, too, points to more optimistic assessments of the industry's progress on emissions and suggests that, across its lifetime, concrete could make a net climate benefit when all possible action is taken into account.

This includes re-carbonation (or the re-absorption of CO_2 by cement), concrete's contribution to the energy efficiency of buildings, and innovation in the way cement is manufactured - including carbon capture and storage.

The GCCA says such innovation is its key priority in the months and years ahead. Projects are already underway and showing promise, it added.

But Mr. Preston says it is imperative that governments and industry now act quickly at a time when global development is expected to rise but CO_2 emissions need to fall.

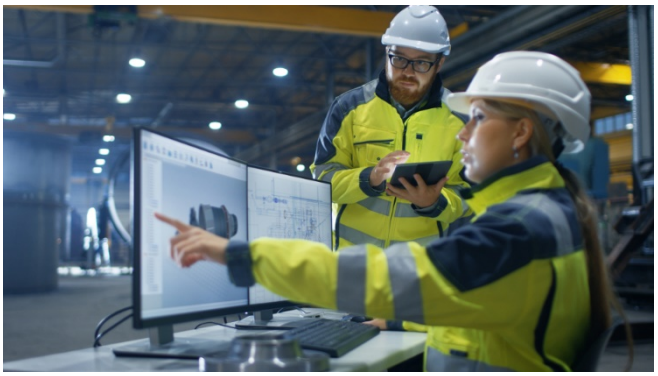
"There's a desperate need for quality, affordable homes," he says. "There's a need for new infrastructure. We can only square this circle if we can dramatically improve the way that we build, so that overall these buildings are constructed with, as close as possible, net zero emissions."

(Lucy Rodgers / BBC News, 17 December 2018, https://www.bbc.com/news/science-environment-46455844)

How engineers are redefining design

Historically, design has always been a challenging term to define with any accuracy, its meaning left almost intentionally ambiguous. Henry Dreyfuss, one of the founders of modern industrial design, stated in 1955 that the term 'leaves much to be desired'. As design is culturally-defined by people with a self-interest in either aligning themselves with it or distancing themselves from it, the definition has shifted over time and across geographies in the last half-century.

In the middle of the 20th century, design was seen as the application of engineering to problems. Thus, mechanical engineering was design, structural engineering was design and electronics engineering was design. Long seen as equivalent to engineering, this is why magazines with titles like *Design Engineer* are still in circulation. Such magazines focus primarily on mechanical engineers, but the practitioners define themselves as part of the design continuum.



Design involves changing the courses of action to change a situation into a preferred state, as Herbert Simon said

At some point in the last quarter century, the definition of design, at least in Silicon Valley, has shifted to implicitly refer to only the visible aspects of a product such as the interface, the appearance and the brand. Design has moved to a focus on the surface and any designer working on other aspects must be given another title, whether it be creative coder or front-end engineer. However, if we look at the goals of traditional design engineers and how we define user experience today, there's significant overlap. As Herbert Simon famously wrote in the late 60s:

"Everyone designs who devises courses of action aimed at changing existing situations into preferred ones."

Simon's definition encompasses both engineering and what we would now call user experience design and architecture. At PARC we focus on the process of design, so we look to the work of Simon and others such as Margaret Mead and John Chris Jones, who proposed that, 'designers have to work backwards in time from an assumed effect upon the world to the beginning of a chain of events that will bring the effect about' (Jones, 1970). They saw design not simply as a superficial process of making novel products more palatable through visual styling and better ergonomics, but a way to envision more positive futures. By working backwards in time from this assumed effect on the world, the designer takes where we are right now to conceptualise, visualise and ultimately design a better society and world.

We also take our cues from 20th century cybernetics, which looked at the world as a set of feedback processes in human and technological systems, which interact repeatedly and non-obviously to shape each other. As Simon and Jones suggest, the designer looks forward into the future and then works backwards to create a loop, in which they can create that design in the future. This puts design at an interesting counterpoint to science, as largely practiced since the beginning of the Enlightenment. The scientific method aims to define questions as clearly as possible so that empirical evidence can be gathered to identify universal truths as they exist right now. This means that most scientific practices, and the way people work in science, tend to favour descriptive precision. Whereas scientists are rewarded for finding results that are as clearly distinct from other results as possible, design, on the other hand, has a different goal. Rather than describing what exists now, how the world works today in absolute terms everywhere in the universe forever, design's aim is to use whatever tools are available to make a future that's relatively better for people tomorrow.

Whereas science builds the building blocks of the world, design cuts across all of the other disciplines, assembling these building blocks synthetically to create a more desirable future state. Science and design are thus complementary, the two in tandem with one another. As we believe at PARC: *Science reads the world, design writes it*.

Mike Kuniavsky is a user experience designer, researcher, author and twenty-year veteran of digital product development. He has worked with some of the world's top technology companies, such as Samsung, Sony, Nokia, Whirlpool, and Qualcomm, on new products, and guiding product strategy. He is the author of "Observing the User Experience: A Practitioner's Guide to User Research" and "Smart Things: Ubiquitous Computing User Experience Design" both of which are used as standard university textbooks.

(theENGINEER, 17th December 2018, https://www.theengineer.co.uk/engineers-redefining-design/?cmpid=te-news_6927481&utm_medium=email&utm_source=newsletter&utm_campaign=tenews&adq=25D5594B-61A5-4477-9BBF-F97F87829407)

ΠΡΟΣΦΟΡΑ ΕΡΓΑΣΙΑΣ

Senior academic staff
Civil Engineering - Hybrid Structures

(ref. ZAP-2018-85)

There is a vacancy for a full-time academic position in the field of hybrid structures In the Civil Engineering Department of the KU Leuven. The vacant position is on Campus De Nayer in Sint-Katelijne-Waver, part of the Faculty of Engineering Technology of the Science, Engineering and Technology Group KU Leuven. We are looking for international oriented candidates with an excellent research record and with good educational competence in the field of civil engineering.

Research in the Department of Civil Engineering (https://bwk.kuleuven.be/English/ResearchNewPage) is organized in 4 sections (Building Materials and Building Technology, Building Physics, Hydraulics, Structural Mechanics) based in Leuven and the Technology Cluster (TC) Construction spread geographically over three campuses: Campus De Nayer Sint-Katelijne-Waver, Technology Campus Gent and Campus Brugge.

The Materials and Structures group at Campus De Nayer Sint-Katelijne-Waver is part of the TC Construction. Research in this Materials and Structures group focuses on components and structures in steel and concrete, optimisation of material usage, and construction technologies in view of sustainable construction. Results are implemented into structural codes of practice and practical tools tailored to companies operating in the construction sector. Life cycle assessment (focussing on embodied impacts and cost) is also utilised in the frame of multi-criteria comparative analyses. The laboratory is well equipped to perform full-scale tests on members and structures as well as material characterization.

These research activities are embedded in the research activities of other groups of the TC Construction (in particular of the Recycling of Construction and Demolition Waste (RecyCon) group on Campus Brugge and of the Structural Mechanics and Building Materials group on Technology Campus Gent) and of the Building Materials and Building Technology Section in Leuven. There is also close collaboration and complementarity with the research activities of the Structural Mechanics Section in Leuven. These research groups have an extended international and regional network, strong connections with industry and non-profit organisations and stable recruitment of talented PhD students in a supportive working environment. It has very good experimental infrastructure.

Teaching duties of the academic staff in the Department of Civil Engineering are primarily performed in the Faculty of Engineering Science and in the Faculty of Engineering Technology. Teaching duties connected to this vacancy will be primarily in the Faculty of Engineering Technology.

For more information about the contents of the job, please contact:

Prof. Dr. Ir. Jan Ivens, head of Campus De Nayer Sint-Katelijne-Waver (jan.ivens@kuleuven.be; tel. +32 16 32 86 12) or

Prof. Dr. Ir. Jaak Monbaliu, head of the Department of Civil Engineering (jaak.monbaliu@kuleuven.be; tel. +32 16 32 16 61)

You can submit your application until **28/02/2019**, only through our online application system. If you have problems submitting your application online, please send an email to solliciteren@kuleuven.be.

More information on the position, as well as a link to the website where applications can be submitted until the deadline of **28/02/2019** can be found on:

https://www.kuleuven.be/personeel/jobsite/jobs/54866855?hl=en&lang=en

ΝΕΑ ΑΠΟ ΤΙΣ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

ISRM International Society for Rock Mechanics and Rock Engineering

INFOMAIL

Dear ISRM Members and Rock Mechanics Colleagues,

For the 24th ISRM Online Lecture the ISRM invited Professor Claudio Olalla, from Universidad Politécnica de Madrid, Spain. The title of the lecture is "*Computing Foundations with Hoek and Brown Failure Criteria*". It was broadcasted on Thursday, 13 December, at 10 AM GMT and will remain available in the online lectures dedicated webpage.

Claudio Olalla is Full Professor at the "Civil Engineering School" of the Universidad Politécnica de Madrid (Spain) at the Ground Engineering Department. During more than 30 years has been member of the prestigious "Laboratory of Geotechnics" of CEDEX.

He has nearly 45 years of experience as geotechnical engineer related to all kinds of civil works, such as dams, foundations, slopes, tunnels, earthworks, hydraulic and maritime facilities. He formed part of various technical commissions who elaborated different geotechnical regulations and manuals in Spain He has published multiple articles in journals and international congresses related to rock and soil mechanics, particularly at the "International Journal of Rock Mechanics and Mining Sciences", "Geotechnique" and "Canadian Geotechnical Journal".

He was President of the "Spanish Society of Rock Mechanics" from 2006 to 2012. He is member of the Board of the "Spanish Society of Soil Mechanics and Geotechnical Engineering" and member of the Spanish Committee on Large Dams (SPANCOLD).

Previous ISRM Online Lectures were given by Wulf Schubert, John Hudson, Pierre Dufaut, Eduardo Alonso, John Read, Herbert Einstein, Shunsuke Sakurai, Resat Ulusay, Dick Stacey, Jean Sulem, Nick Barton, Ove Stephansson, Peter Kaiser, Walter Wittke, Nielen van der Merwe, Giovanni Barla, Charles Fairhurst, Marc Panet, Xia-Ting Feng, Milton Kanji, Laura Pyrak-Nolte, Håkan Stille and Maurice Dusseault.

The lecture will remain online so that those unable to attend at this time will be able to do it later. As usual, the attendees will be able to ask questions to the lecturer by e-mail during the subsequent five days. All online lectures are available from **this page**.

E.T. Brown Colloquium - A celebration of Prof. Ted Brown's 80th anniversary

The "ET Brown Colloquium" was organized in Brisbane, Australia, on 4th December 2018, by some of his former students, friends and colleagues to celebrate his 80th birthday and his long and distinguished career in rock mechanics and rock engineering. The event was held in the Queensland Club (Brisbane) and included six eminent speakers in rock mechanics including Prof. Brown. The full day of lectures was followed by a celebratory dinner in the same venue.

During the Colloquium, Prof. Resat Ulusay (ISRM President Elect) substituted the ISRM President Dr. Eda Quadros who, already on her way to Brisbane, had to cancel her presence due to unforeseeable circumstances. He delivered Dr. Quadros' addess and presented to Prof. Brown a specially designed commemorative plaque on behalf of the ISRM, during the celebratory dinner, The plaque reads "*Commendation issued by the ISRM for invaluable contributions to Rock Mechanics and Rock Engineering and continuous dedication to the ISRM, including the participation in all 13 ISRM Congresses, since 1966 in Lisbon*".

In addition, an ISRM gift was also presented to Prof. Ted Brown by Professors Resat Ulusay and Xia-Ting Feng (ISRM Immediate Past President). Messages from two ISRM Past Presidents, Professors Charles Fairhurst and John A. Hudson, sent to Prof. Brown were also read. Prof. Fairhurst's message was a video film specially prepared for this event.

The Colloquium was opened with the remarks by Mr. Rob Morphet, Colloquium Secretary, and consisted of four sessions, which were chaired by Dr. Tao Li (Ted Brown's student), Emeritus Professors Barry Brady and Don McKee (Ted Brown's colleagues and friends) and Prof. Qihu Qian (China), respectively, who shared their memories about Prof. Brown with the participants.

The speakers and the titles of their lectures are given below:

- Ted Brown: "Reflections on a fortunate career in rock mechanics and herding cats"

- Evert Hoek: "Hoek-Brown failure criterion and GSI -2018 Edition"
- Hai-Sui Yu (Ted Brown's student): "On a unified critical state model for geomaterials"
- Ernesto Villaescusa (Ted Brown's student): "Probabilistic estimation of rock mass static and dynamic demands for excavation stabilization"
- Robert Bertuzzi (Ted Brown's student): "Rock mass properties for tunneling"
- Xia-Ting Feng (ISRM Immediate Past President): "Rock mechanics contributions to recent hydroelectric developments in China"

The lecture program was closed with an open discussion including recollections and anecdotes facilitated by Prof. Mike Hood, friend of Prof. Brown. The lectures given in this Colloquium will be published in the Journal of Rock Mechanics and Geotechnical Engineering in 2019, a Special Edition in honour of Prof. Brown.

Resat Ulusay
President Elect, ISRM

ISRM Suggested Method for Determining Basic Friction Angle of Planar Rock Surfaces by Means of Tilt Tests

The new ISRM Suggested Method for Determining the Basic Friction Angle of Planar Rock Surfaces by Means of Tilt Tests, prepared by a working group chaired by Prof. Leandro Alejano, as part of the work of the ISRM Commission on Testing Methods was recently finalized and approved.

The new Suggested Method was published, as usual, in the journal **Rock Mechanics and Rock Engineering** (**vol. 51, Dec. 2018**) and is available on the ISRM website, under Products and Publications | Suggested Methods (free download for ISRM members).


ISRM SUGGESTED METHOD

ISRM Suggested Method for Determining the Basic Friction Angle of Planar Rock Surfaces by Means of Tilt Tests

1 Introduction

2 Scope

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Introduction

The basic friction angle plays a key role when estimating the shear strength of discontinuities for rock engineering projects, since a large body of research has shown that rock joint shear strength models that consider it are able to provide realistic results (Barton 1973; Barton and Choubey 1977; Kulatilake et al. 1995; Grasselli and Egger 2003; Xia et al. 2014; Tang and Wong 2016).

The concept behind the basic friction component of shear strength is related to the angle of repose observed for solid bodies on inclined surfaces or granular materials. Based on this analogy, the basic friction angles of planar rock surfaces can be determined by means of tilt tests. Gravity provides both the shear and normal stress components in tilt tests. In this suggested method, the testing device, specimen preparation, shapes and sizes, and testing procedure are described. In addition, other issues related to the tilt test and basic friction angle, such as the effect of vibrations...

International Commission on Large Dams
ICOLD Celebrates Its 90th Anniversary

ICOLD was established by 5 countries in Paris, on 6th July 1928, after three years of gestation promoted by a variety of organizations encouraged by the french civil engineering community.

Since 1928 the number of countries that have become members of our organization has been gradually growing **to reach the 100 mark**, with the Kingdom of Bhutan joining ICOLD in 2017. The same growth has been observed in the number of experts who contribute to our work, which is now reaching 15 000.

ICOLD has operated with **a strong and permanent structure**, but was has been able to adapt to the way the science of dam engineering has evolved and to the technical breakthroughs that have been made. There are reasons to be proud of our contribution to the sustainable development of water and energy resources, and satisfied with the countless benefits dams and reservoirs have provided throughout all these years.

Our organization is based upon four pillars: the National Committees, the Board, the Central Office, and the Technical and Special (Ad Hoc) Committees. **The National Committees are our central pillar and our purpose**, and one of our main tasks is to support, encourage and promote the activities of these National Committees, in order to ensure that we are forever present in the different regions and countries of the world. Regional clubs have been gradually created to take into account the specificities of each region. First the European club of ICOLD, then the Americas, then Asia-Oceania and Africa. They are also helping the national Committes in their tasks.

ICOLD's mission statement is that: "ICOLD advances the Art, Science and Engineering techniques for the Planning, Design, Construction, Operation, and Maintenance of safe dams to

ensure the sustainable development and management of the world's water resources".

This challenge is all the more important in view of the growing awarness of Climate Change, which is bringing with it a higher variability in water flows and a greater need for reservoirs to regulate it. As ICOLD has shown during its intervention earlier this year in the 8th World Water Forum, **dams can play a crucial role** in the mitigation of climate change (low carbon production of power) and for the adaptation to climate change (reservoirs for water storage to face drought or prevent floods)

We must never forget that the achievements of ICOLD have been possible only thanks to the commitment and dedication of many civil engineers, hydrologists, hydromechanical engineers, biologists, environmentalists and many other professionals, who have been working constantly over the past 90 years. It is important to remember that all of them worked voluntarily.

This glorious past is helping us in planning for the future. Today, most of the investments in new dams are made for hydropower. This will continue for a few more years until we reach the maximum potential for hydropower generation.

We will then enter **a new situation** where most of the investments will be made for **energy storage** rather than for energy generation as such, as it is the case today. The massive new development of intermittent renewable energies like wind and solar power **will necessitate corresponding massive means to store that energy**, which is not controllable. The pumping storage capacity is now 10% of the generation capacity and it is expected that it will be 100% in 2050.

Thus, **it is a new Golden Age for dam construction** which is coming, but it will not be the same as the Golden Age from the post-war period. The future of hydropower will rest on new technologies, some of them still unknown today. And that is the reason why the role of ICOLD will continue to be essential.

The creation of our young engineers' forum in 2011 and its rapid developement choose that the young generations of civil engineers are ready to contribute.

It is therefore important to celebrate our 90th anniversary both to commemorate the important contributions of the past and to anticipate for the contributions of the near future.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

Winter School on GEOMECHANICS for ENERGY and the ENVIRONMENT, 22nd-24th January 2019, Villars-sur-Ollon, Swiss Alps, https://gete-school.epfl.ch

Intensive Short-Course on "Energy Geostructures: Analysis and Design" - 2nd Edition, March 6 to 8, 2019, Lausanne, Switzerland, www.formation-continue-unil-epfl.ch/en/formation/energy-geostructures-analysis-design

International Conference on Geotechnics Fundamentals and Applications in Construction: New Materials, Structures, Technologies and Calculations (GFAC 2019)
6 – 8 February 2019, Saint Petersburg, Russia
http://geoconf2019.spbgasu.ru/en

We are pleased to invite you to GFAC 2019 hosted by Saint Petersburg State University of Architecture and Civil Engineering

GFAC 2019 aims to bring together leading universities, research institutes and design organizations from Russia, Japan, South Korea, India and other countries.

GFAC 2019 is to provide an ideal interdisciplinary platform to share research results in the sphere of geotechnics, modern geotechnologies, soil mechanics, foundations, geological engineering and share experience in design of complex geotechnical objects in various conditions.

Topics

- Analytical decisions and numerical modeling of the system joint operation: "base — foundation – building";
- Design and construction in geologically hazardous conditions (karst, landslides, mudflows, seismic activity, etc.);
- Methods for surveying the features of dispersed, rocky soils, foundations and structurally unstable soils (permafrost, subsidence, peaty, swelling, etc.);
- Exploration, territory improvement and reconstruction in conditions of compact urban planning and enterprises, etc.;
- Construction, reconstruction and exploitation of railways, highways, pipes, utilities and other infrastructure facilities in different soil conditions;
- R&D support and quality control of new materials, design and technology solutions in constructing bases, foundations, underground and surface constructions;
- Condition survey and accident evolution analysis in construction;
- Up-to-date monitoring techniques in building construction and exploitation.

Contacts

Saint Petersburg State University of Architecture and Civil Engineering
4 2-ya Krasnoarmeiskaya Str., 190005, Saint Petersburg
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4th Annual URBAN UNDERGROUND SPACE & TUNNELLING 25th – 27th March 2019, Singapore, http://email.marcusevans-lse.com/files/amf_marcus_evans/project_3935/ASIF5039_-_Catherine.pdf

ICASGE'19 International Conference on Advances in Structural and Geotechnical Engineering 2019, 25 - 28 March 2019, Hurghada, Red Sea, Egypt, http://icasge.com/conference/308

Ground Engineering Instrumentation and Monitoring 2019 Sharing best practice and driving project efficiency, 26 March 2019, London, United Kingdom, https://monitoring.geplus.co.uk

13th Australia New Zealand Conference on Geomechanics 2019, 01 ÷ 03-04-2019, Perth, Australia, http://geomechanics2019.com.au

AFRICA 2019 Water Storage and Hydropower Development for Africa, 2-4 April 2019, Windhoek, Namibia, www.hydropower-dams.com/pdfs/africa19.pdf

EGU General Assembly 2019, NH9.12 Natural hazard impacts on technological systems and infrastructures, 7–12 April 2019, Vienna, Austria, https://meetingorganizer.copernicus.org/EGU2019/session/32510

OMIŠ 2018 8th Conference of Croatian Geotechnical Society with international participation Geotechnical challenges in karst - Karl Terzaghi and karst in Croatia 110 years ago, 11.-13. April 2019, Omiš, Split, Croatia, www.hgd-cgs.hr/savjetovanja/omis-2019

IICTG 2019 2nd International Intelligent Construction Technologies Group Conference "Innovate for Growth, Collaborate for Win-Win", 23-04-2019 - 25-04-2019, Beijing, China, www.iictg.org/2019-conference

WTC2019 Tunnels and Underground Cities: Engineering and Innovation meet Archaeology, Architecture and Art and ITA - AITES General Assembly and World Tunnel Congress, 3-9 May 2019, Naples, Italy, www.wtc2019.com

3rd Meeting of EWG Dams and Earthquakes An International Symposium, May 6-8, 2019, Lisbon, Portugal, http://ewg2019.lnec.pt

2019 Rock Dynamics Summit in Okinawa, 7-11 May 2019, Okinawa, Japan, www.2019rds.org

International Conference on Silk-roads Disaster Risk Reduction and Sustainable Development, May 11-12, Beijing, China, www.sidrr.com

4th Joint International Symposium on Deformation Monitoring (JISDM), 15 to 17 May, 2019, Athens, Greece, www.jisdm2019.survey.ntua.gr

TRANSOILCOLD 2019 Transportation Soil Engineering in Cold Regions, 20 –23 May 2019, St. Petersburg, Russia, http://conf-geotech.wixsite.com/transoilcold2019

International Course on GEOTECHNICAL and STRUCTURAL MONITORING, 27-31 May 2019, Rome, Italy, www.geotechnicalmonitoring.eu

Underground Construction Prague 2019, June 3–5, 2019, Prague, Czech Republic, www.ucprague.com

ICOLD 2019 Annual Meeting/Symposium
June 9-14, Ottawa, Canada
www.icold-cigb2019.ca

On behalf of ICOLD I'm delighted to invite delegates from the National Committees of the International Commission on Large Dams (ICOLD), and specialists and experts working in the field of dams and reservoirs as well as their accompanying persons, to the 87th Annual Meeting and Symposium in Ottawa, Canada, which will take place from 9 – 14 June in 2019.

Sixteen years after the very successful ICOLD Congress in Montreal in 2003, the Canadian Dam Association (CDA) has again taken on the challenge of organizing an ICOLD Annual Meeting and Symposium in 2019. With an installed capacity of about 80,000 MW and an annual generation of 380 TWh, Canada is among the most important hydropower producers in the world. Almost 1,000 large dams are in operation. Canada has developed and is still developing its large hydropower resources in an exemplary and sustainable way.

The delegates of the 87th Annual Meeting will have the chance to participate in the Symposium "Sustainable and Safe Dams Around the World" which will focus on innovation, sustainable development, hazards and extreme conditions. Furthermore, current issues will be addressed in special workshops including the workshops of the ICOLD Technical Committees. The outcomes of the ICOLD 87th Annual Meeting and Symposium will certainly contribute significantly to our governing long-term mission, "Better dams for a better world".

In view of our challenge to further develop this century's dams and reservoirs worldwide, which will also be urgently required to mitigate the negative effects of climate change, I encourage you to come to the 87th Annual Meeting, not only to discuss the emerging professional and socio-economic issues, but also to meet the ICOLD family. I'm convinced that CDA will ensure a high quality technical content for the meeting and an attractive social and accompanying person's programme. Besides excellent technological examples of dams and hydropower plants, the delegates will also have the opportunity to discover beautiful and impressive tourist sites in Canada during the study tours.

Theme: Sustainable and Safe Dams Around the World

The theme will be addressed through technical papers and a poster session presented on the following topics.

1 Innovation

Recent advancements and techniques for investigation, design, construction, operation and maintenance of water or tailings dams and spillways.

2 Sustainable Development

Planning, design, construction, operation, decommissioning and closure management strategies for water resources or tailings dams (e.g. climate change, sedimentation, environmental protection, risk management).

3 Hazards

Design mitigation and management of hazards to water or tailings dams, appurtenant structures, spillways and reservoirs (e.g. floods, seismic, landslides).

4 Extreme Conditions

Management for water or tailings dams (e.g. permafrost and ice loading, arid/wet climates, geo-hazards)

For information, please contact

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VII ICEGE ROMA 2019 - International Conference on Earthquake Geotechnical Engineering, 17 - 20 June 2019, Rome, Italy, www.7icege.com

ICONHIC2019 - 2nd International Conference on Natural Hazards and Infrastructure, 23-26 June 2019, Chania, Crete Island, Greece, https://iconhic.com/2019/conference

COMPDYN 2019 7th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, 24-26 June 2019, Crete, Greece, www.compdyn.org

IS-GLASGOW 2019 - 7th International Symposium on Deformation Characteristics of Geomaterials, 26 - 28 June 2019, Glasgow, Scotland, UK, https://is-glasgow2019.org.uk

cmn 2019 -Congress on Numerical Methods in Engineering, July 1 - 3, 2019, Guimarães, Portugal, www.cmn2019.pt

Meeting of the European Clay Groups Association (ECGA) jointly with the 56th annual meeting of The Clay Minerals Society (CMS) and the 6th Mediterranean Clay Meeting (MCM)
https://euroclay2019.sciencesconf.org

EUROCLAY is amongst the foremost scientific meetings in the field of clays and clay minerals, and upholds the tradition of presenting every four years, the latest cutting-edge results of this scientific field. EUROCLAY 2019 will be held at **Pierre & Marie Curie University (UPMC) in the center of Paris, 1st-5th July 2019**, and will be organized by the French Clay Group (GFA), under the auspices of ECGA and AIPEA. It will consist of scientific and technical sessions with both oral and poster presentations, arranged around **four main themes**, namely:

- Crystallography, mineralogy and modelling
- Environment and geological processes
- Resources, energy, storage
- Functionalized clays and archeology

Sessions

A. Crystallography, mineralogy and modelling
B. Environment and geological processes
C. Resources, energy, storage
D. Functionalized clays, health and cosmetics
E. Miscellaneous

Contact

For any inquiry, please contact us directly! euroclay2019@sciencesconf.org

7th Asia-Pacific Conference on Unsaturated Soils, August 23~25, 2019, Nagoya, Japan, www.jiban.or.jp/e/activities/events/20190823-25-seventh-asia-pacific-conference-on-unsaturated-soils

The 17th European Conference on Soil Mechanics and Geotechnical Engineering, 1st - 6th September 2019, Reykjavik Iceland, www.ecsmge-2019.com

SECED 2019 Conference Earthquake risk and engineering towards a resilient world, 9-10 September 2019, Greenwich, London, U.K., www.seced.org.uk/2019

15th International Benchmark Workshop on Numerical Analysis of Dams, 9th - 11th September 2019, Milano, Italy, www.eko.polimi.it/index.php/icold-bw2019

3rd International Conference "Challenges in Geotechnical Engineering" CGE-2019, 10-09-2019 - 13-09-2019, Zielona Gora, Poland, www.cgeconf.com

14th ISRM International Congress, 13-18 September 2019, Iguassu Falls, Brazil, www.isrm2019.com

12th Asian Regional Conference of IAEG
23 ~ 27 September 2019, Jeju Island, Republic of Korea (South Korea)
www.iaegarc12.org

The Korean Society of Engineering Geology and Korea national group of International Association of Engineering Geology and the Environment (IAEG) would like to present the 12th Asian Reginal Conference to be held in Autumn of 2019 in Jeju Island, Korea.

The conference's main goal is to share knowledge and practical experience in dealing with issues on "Role of Engineering in Geology for the Safe Society and Environment".

This symposium will offer the various conference experiences: Keynote lecture, social events, technical tours and other activities which will ensure unforgettable memories in Jeju, a world recognized Geopark for its diversity of volcanic formations and geological resources.

[Jeju Island is awarded as 'World New 7 Wonders of Nature (2011)', 'UNESCO Global Geopark Network (2010)', 'UNESCO Natural Heritage Site (2007)', and UNESCO Biosphere Reserve (2002)].

Topics

1. **Description and Behavior of Soils and Rocks**
   - Soil mechanics, Rock mechanics
2. **Analysis and Prediction of Geo-hazards**
   2.1 Landslides and Debris flow
   2.2 Earthquake and faulting
   2.3 Land subsidence
3. **Site Investigation, Ground Characteristics and Geophysical Exploration**
4. **Environmental Geology and Hydrogeology**
5. **Engineering Geology in Construction and Maintenance**

- Foundations, Tunnels and Underground Space, Slopes, Dams, Earth Structures

6. **Application of New Technology in Engineering Geology**
   - Remote Sensing, UAV, Terrestrial LiDAR etc.

Contact

12th ARC of IAEG Secretariat office Email: secretariat@iaegarc12.org

1st MYGEC 1st Mediterranean Young Geotechnical Engineers Conference, Double Events – MYGEC & EYGEC, 23-24th September, 2019, Bodrum, Muğla, Turkey, http://mygec2019.org

27th EYGEC 27th European Young Geotechnical Engineers Conference, Double Events – MYGEC & EYGEC, 26-27th September, 2019, Bodrum, Muğla, Turkey, http://eygec2019.org

3rd ICTITG International Conference on Information Technology in Geo-Engineering, Sep. 29-02 Oct., 2019, Guimarães, Portugal, www.3rd-icitg2019.civil.uminho.pt

11th ICOLD European Club Symposium, 2 - 4 October 2019, Chania Crete – Greece, www.eurcold2019.com

4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας *20 Χρόνια Μετά...*, Αθήνα, 4-6 Οκτωβρίου, 2019, www.eltam.org

XVII African Regional Conference on Soil Mechanics and Geotechnical Engineering

07-10 October 2019, Cape Town, South Africa

The South African Institution of Civil Engineering cordially invites all our colleagues from Africa and beyond to attend the 17th African Regional Conference on Soil Mechanics and Geotechnical Engineering.

Hosted in one of the continent's most iconic cities, this conference will serve practitioners, academics and students of all geotechnical backgrounds. The conference will take place at the Cape Town International Convention Centre (CTICC) offering world class conferencing facilities in the heart of South Africa's mother city and will offer extensive opportunities for Technical Committee Meetings, Workshops, Seminars, Exhibitions and Sponsorships. Exciting Technical Visits, including tours to the famous Robben Island, await.

The 7th African Young Geotechnical Engineers' Conference (8 – 10 October 2019) will commence on 8 October 2019, the day following the African Regional Conference (ARC) opening. The conference venue will be shared with the ARC delegates to initiate dialogue between junior and senior engineers while young geotechnical engineers acquaint themselves with the industry standards, new geotechnical developments and resources available to further their careers. The YGE conference provides an approachable audience within a vibrant environment where young presenters under the age of 35 are encouraged to exercise their presentation and technical writing skills on a continental platform.

Organiser: SAICE
Contact person: Dr Denis Kalumba
Email: denis.kalumba@uct.ac.za

HYDRO 2019 Concept to closure: practical steps, 14-16 October 2019, Porto, Portugal, www.hydropower-dams.com/hydro-2019

XVI Asian Regional Conference on Soil Mechanics and Geotechnical Engineering, 21 - 25 October 2019, Taipei, China www.16arc.org

GEOMEAST 2019 International Congress & Exhibition

10 -14 November 2019, Cairo, Egypt

We are delighted to invite you to join us at the GeoMEast International Conference in November 2019. This is the third in this series of such conferences to be held in Middle East's great cities. It will be held in Cairo and being located in the heart of the Middle East.

Our conference theme, Sustainable Civil Infrastructure: Beyond The Horizon, is broad and inclusive. We believe that this presents a multitude of opportunities for all parts of the industry (including consultants, contractors and materials and equipment manufacturers, as well as academics) and at all career stages to attend and to present papers.

GeoMEast 2019 will provide a showcase for recent developments and advancements in design, construction, and safety inspections of transportation infrastructures and offer a forum to discuss and debate future directions for the 21st century. Conference topics cover a broad array of contemporary issues for professionals involved in Geosynthetics, Geotechnical, Geo-environmental, Geomechanics, Geosciences, Geophysics, Tunnel, Water Structures, Bridge, Pavement, Railway and emerging techniques for safety inspections. You will have the opportunity to meet colleagues from all over the world for technical, scientific, and commercial discussions.

Technical Themes

Geotechnical, Geological, Geoenvironmental and Geosynthetics:

1. Geotechnical, Geoenvironmental and Earthquake Geotechnical Engineering;
2. Soil and Rock Mechanics, Geomechanics, Mining, and Geological engineering;

3. Geosynthetics and Reinforced Soil Retaining Structures;
4. Behavior, Identification and In-situ Test Methods for Site Characterization of Soils, and Lateritic, Problematic, Collapsible, Swelling, Soft, Sabkha and Uncommon Soils;
5. Design and Quality Control of Earth Structures and Subgrades;
6. Soil Stability and Landslide, Ground improvement and Seismic Hazards;
7. Soil-Structure Interaction, Advanced Analysis of Shallow and Deep Foundations, Foundation Failure and Repair, and MicroPiles and its innovative applications;
8. Computational Mechanics, Innovative Soil Models, Discrete Element and Boundary Element Modelling, Mesoscale Modeling, and Advanced Numerical and Analytical Analyses;
9. Physical Modelling in Geotechnics;
10. Saturated and Unsaturated Soil Mechanics;
11. Oil and Gas, and Petroleum Geotechnical Engineering; and
12. Geosciences, Geomatics, Geoinformatics, Geophysics and Global Hazards.

Sustainable Civil Infrastructures:

1. **Structures and Bridges Engineering:** Advanced Analysis of Structures; Non-Destructive Evaluation; Inspection Technologies; Structural Health Monitoring; Remote Monitoring of Structures; Scour Assessment; Seismic Design Issues for Bridges, Super Structures and Underground Structures; Design Methods and Materials, Innovative Repair Methods and Materials, Durable and Sustainable Designs, Innovative Materials, Advances in Foundation Design/Construction, Accelerated and/or Performance Based Design/Construction, Aesthetics and Environment; State-of-the-Arts and State-of-the-Practices on Bridge Design, Construction and Maintenance; Special Foundation Treatment and Settlement Control Technology.

2. **Tunneling Engineering:** Tunnel Management and Inventory, Monitoring and Settlement Control; Emerging Technologies, Lining Design & Precast Segment Advances; Innovation in Tunneling Design, Construction, Repair, Rehabilitation; Fire & Life Safety, Vulnerability & Security; Tunneling in Soft Ground, Ground Conditioning and Modification; Advanced prediction technology of tunnel construction geology; Deep excavations and urban tunneling.

3. **Pavement Engineering, Airports and Advances in Pavement Techniques:** Airfield pavement analysis, rehabilitation and performance; Recycled Asphalt Pavement; Pavement Design, Modeling, Performance Evaluation, & Management; Sustainable Long Life Pavement; Ground Improvement, and Chemical/Mechanical Stabilization for Pavement and Geotechnical Applications; Moisture Damage in Asphaltic Concrete Materials; Pavement Foundations: Modelling, Design and Performance Evaluation; Geotechnical Properties and Their Effects on Portland Concrete Pavement Behavior and Performance; Warm Mix; Rehabilitation strategy selection and preventative maintenance treatments; Accelerated Testing of Pavement Structures and Materials; Material, Design, Construction, Maintenance and Testing of Pavement; Asphalt Binder and Mixture Characterization; Construction and Rehabilitation of Jointed Concrete Pavement, Reinforced Concrete Pavement, and Continuously Reinforced Concrete Pavement; Bridges Deck Pavement; Stabilization, Recycling, Foamed Bitumen and Emulsion, Granular Materials; Roadway Widening; Asphalt Mix-Design,HMA; Testing &Material; Property Characterization.

4. **Transportation Engineering:** Highway Pavements: Design, Materials, and Construction; Transportation Operations and Safety; Advanced Technologies, Infrastructure Systems, Intermodal Transportation, Planning, and Development; Rail and Transit; Aviation

5. **Railroad and Railway Engineering:** Railway and Railroad Track Substructure; High Speed Rail System; Seismic Design for Railway and Roadway Structures; Economics of Railway Engineering and Operations; Structures, Maintenance and Construction; Innovative Procedures and Precautions; Long Term Pavement Performance Contest; BIM and Contract Administration.

6. **Engineering geology for urban and major infrastructure development:** The ongoing population growth is resulting in rapid urbanization and new infrastructure development. This, together with the current climate change and increasing impact of natural hazards, imply that the engineering geology profession is called upon to respond to new challenges. It is recognized that these challenges are particularly relevant in the developing and newly industrialized regions. The idea beyond this Theme is to highlight the role of engineering geology in fostering sustainable urbanization and infrastructure construction (e.g., major buildings and facilities, water supply and distribution systems, roads, railways, tunnels, ports, dams, powerlines, pipelines). We invite contributions that illustrate how engineering geologists can support civil, geotechnical and environmental engineers in different phases of infrastructure development including sustainability assessment, pre-design site investigation, design and construction. Papers related to ageing infrastructure maintenance, structural stability control and monitoring, environmental impact studies and protection from geohazards are also welcome.

7. **Dams Engineering, Canals and Levees, Irrigation and Water Sources and Structures, and Ports, Offshore and Marine Technologies.**

Climate Change and effects on Infrastructure:

1. **Sustainability and Energy Engineering;**

2. **Environmental and Waste / Sediment Management, Characterization, Treatment and Re-Use;**

3. **Energy Geotechnics and Geo-Energy Infrastructure.**

4. **Materials Engineering, Nanotechnologies, Advances in Composite Materials, Climate-Friendly Technologies, and Damage Mechanics.**

5. **Structural Health Monitoring, and Sustainable Construction Technologies;**

6. **Advanced Analysis for Sustainable Design.**

7. **Worldwide innovative procedures and precautions for the Design;**

8. **Building Information Modeling (BIM), Building and Construction Engineering, Project Management, and Contract Administration; and**

9. **Sustainable Infrastructure:** Current and Projected; Financing Infrastructure Projects; Cross-cutting Issues; Materials, Tools, and Methodologies; Innovation; Sustainability and Competitiveness; Risk, Resiliency, and Adaptation to Climate Change; Sustainable Cities; Sustainability, Society and Culture; Envision™ and Other Rating Systems; Special Topics on Middle East Urbanization; Smarthome, barrier-free building and reconstructing

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XVI Panamerican Conference on Soil Mechanics and Geotechnical Engineering, 18-22 November 2019, Cancun, Quintana Roo, Mexico, http://panamerican2019mexico.com/panamerican

YSRM2019 - The 5th ISRM Young Scholars' Symposium on Rock Mechanics and REIF2019 - International Symposium on Rock Engineering for Innovative Future - Future Initiative for Rock Mechanics and Rock Engineering - Collaboration between Young and Skilled Researchers/Engineers – 1-4 December 2019, Okinawa, Japan, www.ec-pro.co.jp/ysrm2019/index.html

The 4th International Conference on Geotechnics for Sustainable Infrastructure Development
November 28 – 29, 2019, Hanoi, Vietnam
https://geotechn.vn

The series of International Conference on Geotechnics for Sustainable Infrastructure Development (GEOTEC HANOI) was organized successfully in 2011, 2013 and 2016 in Hanoi and it has become a well-known event not only in Vietnam but also internationally for its excellent quality and organizational scale. The number of accepted papers and attendees increased significantly over the times. In the latest event, GEOTEC HANOI 2016, there were 135 published papers and more than 600 attendees from 31 countries and territories. More remarkably, in the GEOTEC HANOI (GH) conferences world-class keynote lectures were delivered by leading experts as: Prof. Sven Hansbo (Sweden), Prof. Kenji Ishihara and Dr. Hiroshi Yoshida (Japan), Prof. Harry G. Poulos (Australia), Prof. Pieter A. Vermeer (Netherlands), and Prof. Alain Guilloux (France) in GH2011; Prof. Rolf Katzenbach (Germany), Prof. Alain Guilloux (France), Prof. Fumio Tatsuoka (Japan), Prof. Kenichi Soga (United Kingdom), Prof. Helmut Schweiger (Austria), and Prof. Sven Hansbo (Sweden) (honorable lecture) in GH2013; and Prof. Bengt H. Fellenius (Canada), Prof. Buddhima Indraratna (Australia), Prof. Chang-Yu Ou (Taiwan), Dr. Jamie Standing (United Kingdom), and Prof. Kazuya Yasuhara (Japan) in GH2016.

Following the success of the three previous events, the 4th International conference, GEOTEC HANOI 2019 (GH2019) will be organized by FECON Corporation, the Vietnamese Society for Soil Mechanics and Geotechnical Engineering (VSSMGE), the Thuyloi University (TLU), and Kokusai Kogyo Co., Ltd (KKC) on November 28-29, 2019 at the National Convention Center, Hanoi, Vietnam. GEOTEC HANOI 2019 will be honorably patronized by the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) and Japan International Cooperation Agency (JICA).

In this 4th conference, besides the four typical themes of GEOTEC HANOI series, i.e. Deep foundations, Tunnelling and underground spaces, Ground improvement, and Geotechnical modelling and monitoring, two new and imperative topics in sustainable development, namely, Landslide and erosion, and Coastal foundation engineering, are also included.

Conference Themes

- Deep Foundations
- Landslide and Erosion
- Tunnelling and Underground Spaces
- Geotechnical Modelling and Monitoring
- Ground Improvement
- Coastal Foundation Engineering

Contact

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15th International Conference on Geotechnical Engineering, and
9th Asian Young Geotechnical Engineers Conference
05-12-2019 ÷ 07-12-2019, Lahore, Pakistan

The Pakistan Geotechnical Engineering Society (PGES) under the aegis of International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) takes pleasure in hosting 9th Asian Young Geotechnical Engineers Conference and its 15th International Conference on Geotechnical Engineering from December 5 to December 7, 2019; in Lahore, Pakistan.

9AYGEC

This conference will be the ninth in its series following the first in Bangkok (1991), the second in Singapore (1994), the third in Singapore (1997), the fourth in Seoul (2001), the fifth in Taipei (2004), the sixth in Bangalore (2008), the seventh in Tokushima (2012) and the eighth in Astana (2016). This conference aims at providing an interactive platform for

the young geotechnical engineers from across Asia. Young Geotechnical Engineers and researchers below the age of 35 years from Asian countries will participate in this Conference. Each of the National Geotechnical Societies in Asia is invited to nominate two participants from its country to submit research papers in the conference.

15ICGE

The 15th international conference with broad theme of "Geotechnical Engineering" has been kept to attract a diversity of quality papers from around the globe. This Conference will act as a platform for the exchange of technical ideas between Clients, Consultants, Contractors, and Manufacturers. Outstanding keynote lectures, presentations, and technical discussions will afford the opportunity to explore the advancements in geotechnical engineering. 15ICGE will provide the attendees to share their expertise along with seeking new collaborations and meet the expertees of the relevant fields.

CONFERENCE THEMES

- Ground Improvement
- Liquefaction Potential and Mitigation
- Risk Assessment in Geotechnical Engineering
- Geomatics Techniques
- Earthquake Geotechnical Engineering
- Deep Excavations
- Numerical Modelling
- Geotechnical Analysis & Design
- Case Histories
- Natural and Induced Seismicity
- Risk Preparedness and Early Warning Systems
- Dams And Hydropower
- Field Investigations and Laboratory Testing
- Environmental Geotechnics
- Tunneling and Underground Structures
- Hazard Zonification
- Problematic Soils

Contact

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14th Baltic Sea Geotechnical Conference 2020
25 ÷ 27 May 2020, Helsinki, Finland

Organiser: Finnish Geotechnical Society
Contact person: Leena Korkiala-Tanttu
Email: leena.korkiala-tanttu@aalto.fi
Website: http://www.ril.fi/en/events/bsgc-2020.html
Email: ville.raassakka@ril.fi

Nordic Geotechnical Meeting
27-29 May 2020, Helsinki, Finland

Contact person: Prof. Leena Korkiala-Tanttu
Address: SGY-Finnish Geotechnical Society,
Phone: +358-(0)50 312 4775
Email: leena.korkiala-tanttu@aalto.fi

EUROCK 2020
Hard Rock Excavation and Support
14-19 June 2020, Trondheim, Norway
www.eurock2020.com

The Norwegian Group for Rock Mechanics welcomes you to Norway for EUROCK 2020, the international symposium of ISRM.

The event will take place at the Clarion Hotel & Congress in the beautiful city of Trondheim from June 14th to 19th.

The historical city of Trondheim was founded in 997 as a trading post during the Viking Age and served as the capital of Norway until 1217. Today it is the third largest city in Norway and known as the technological hub of Norway, hosting the largest university, the Norwegian University of Science and Technology (NTNU), as well as the Foundation for Science and Industrial Research (SINTEF), St. Olavs University Hospital and several other technology-oriented institutions.

Trondheim offers easy access by direct flights from several European airports, as well as direct flights from all major Norwegian airports and several daily departures by train and bus from Oslo.

EUROCK 2020 Hard rock Engineering Themes at a glance:

- Hard rock tunneling and rock support
- Weakness zone issues
- Design of unlined hydropower tunnels
- Rock stress estimation and measurement

- Characterization of rock mass
- Recent advances in rock mechanics theory
- Brittle failure
- Rock falls/Rock avalanches - mapping and monitoring
- Abrasivity/advance and cutter wear in hard rock conditions
- Rock support design in swelling clay conditions

For questions please contact EUROCK2020@event123.no

DFI Deep Mixing 2020
15 to 17 June 2020, TBD, Gdansk, Poland

Organizer: Deep Foundations Institute
Contact person: Theresa Engler
Address: 326 Lafayette Avenue, Hawthorne, NJ 07506, USA
Phone: 19734234030
Fax: 19734234031
Email: tengler@dfi.org
Website: http://www.dfi.org
Email: staff@dfi.org

International Conference on Geotechnical Engineering Education
June 24-25, 2020 | Athens, Greece

www.erasmus.gr/microsites/1168

The Conference Geotechnical Engineering Education 2020 (GEE2020) is organized by the Technical Committee TC306 for Geo-Engineering Education of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), under the auspices of the Hellenic SSMGE and the School of Civil Engineering of the National Technical University of Athens.

The International Conferences on Geotechnical Engineering Education are now well established since TC306 took over their organization under the auspices of ISSMGE. The conference in Athens will be the fifth, after Sinaia, Romania (2000), Constantza, Romania (2008), Galway, Ireland (2012) and Belo Horizonte, Brazil (2016). The proceedings of the 2008, 2012 and 2016 conferences are available through the Online Library of ISSMGE.

The Conference GEE2020 has two priority themes (in addition to more typical education themes such as curricula, coursework and educational material) that include: (A) two-way interaction between industry and academia for co-production of educational material and curriculum development and (B) familiarizing young geotechnical faculty and late-stage PhD candidates with research-based good practices in engineering education. Priority theme (B) will be reinforced by awarding –on a competitive basis– the surplus of the conference to covering the expenses of young geotechnical engineering researchers participating in engineering education conferences.

The organizing committee of GEE2020 plans to set a standard for a "next generation" conference by opening it to remote participants through the internet. Invited presentations and panel discussions will be broadcasted with live streaming. In addition, some key lectures will be videotaped, edited and made available online. The design and the publicity of the conference aim to make it attractive to a critical mass of participants contributing papers and of active attendees. These features, together with publishing the proceedings online immediately after the conference, will maximize its impact.

Guidelines for abstract submission will be available **by January 15, 2019**.

Contact

Conference Organizing Committee gee2020athens@gmail.com

Conference Secretariat info@gee2020.org

E-UNSAT 2020
LISBOA • PORTUGAL

4th European Conference on Unsaturated Soils - Unsaturated Horizons
24-06-2020 ÷ 26-06-2020, Lisbon, Portugal
https://eunsat2020.tecnico.ulisboa.pt

The Instituto Superior Técnico (IST), Lisbon, in collaboration with Delft University of Technology (TUDelft), The Netherlands, and Universitat Politècnica de Catalunya (UPC), Barcelona, are organizing E-UNSAT2020 - 4th European Conference on Unsaturated Soils.

THEMATIC SYMPOSIA

- Climate Stresses
- Environmental Geotechnics
- Energy Geotechnics
- From Micro to Macro
- Linear Infrastructures
- Nano-Micro Technology
- Bio-Inspired Technology
- Powder-Grain Technology

Any topic related to unsaturated soils and rock mechanics and geoengineering

Unsaturated Horizons...

Contact Us

e-mail : info@eunsat2020.tecnico.ulisboa.pt

Address

IST, DECivil
Av Rovisco Pais, 1
1049-001 Lisboa
Portugal

Telephone (+351) 21 841 84 22

Geotechnical Aspects of Underground Construction in Soft Ground
29 June to 01 July 2020, Cambridge, United Kingdom

Organiser: University of Cambridge
Contact person: Dr Mohammed Elshafie
Address: Laing O'Rourke Centre, Department of Engineering, Cambridge University
Phone: +44(0) 1223 332780
Email: me254@cam.ac.uk

16th International Conference of the International Association for Computer Methods and Advances in Geomechanics – IACMAG
29-06-2020 ÷ 03-07-2020, Torino, Italy

The 16th International Conference of the International Association for Computer Methods and Advances in Geomechanics (15IACMAG) will be held in Turin, Italy, 29 June - 4 July 2020. The aim of the conference is to give an up-to-date picture of the broad research field of computational geomechanics. Contributions from experts around the world will cover a wide range of research topics in geomechanics.

Pre-conference courses will also be held in Milan and Grenoble.

Contact Information

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Phone: +390119211467
Email: info@symposium.it, marco.barla@polito.it

EUROGEO WARSAW 2020 7th European Geosynthetics Congress, 6-9 September 2020, Warsaw, Poland, www.eurogeo7.org

6th International Conference on Geotechnical and Geophysical Site Characterization
07-09-2020 ÷ 11-09-2020, Budapest, Hungary
www.isc6-budapest.com

Organizer: Hungarian Geotechnical Society
Contact person: Tamas Huszak
Address: Muegyetem rkp. 3.
Phone: 0036303239406
Email: huszak@mail.bme.hu
Website: http://www.isc6-budapest.com
Email: info@isc6-budapest.com

3rd International Symposium on Coupled Phenomena in Environmental Geotechnics
October 28th – 29th, 2020, Kyoto, Japan
https://cpeg2020.org

CPEG2020 is organized under the auspices of the Technical Committee TC215 (Environmental Geotechnics) of ISSMGE, and follows the very successful first two CPEG symposiums held in Torino (Italy) in 2013, and in Leeds (UK) in 2017.

CPEG2020 will be hosted in conjunction with the Japanese Geotechnical Society (JGS) and Kyoto University, and it will be followed by the 'Fifth World Landslide Forum' from November 2nd, making this a great opportunity to join both ISSMGE events in the Ancient Capital of Japan.

As we polish the details of the symposium, we will update the CPEG2020 website with further information, including keynote speakers, detailed symposium themes, and key dates. Please, keep the address of this site (www.cpeg2020.org) among your bookmarks for updated information.

5TH World Landslide Forum Implementation and Monitoring the USDR-ICL Sendai Partnerships 2015-2015, 2-6 November 2020, Kyoto, Japan, http://wlf5.iplhq.org

EUROCK 2021
the ISRM European Rock Mechanics Symposium
June 2021, Torino, Italy

UNSAT2022
8th International Conference on Unsaturated Soils
June or September 2022, Milos Island, Greece

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Μυστηριώδης σεισμός: Ταρακούνησε τον πλανήτη για μισή ώρα και κανείς δεν τον κατάλαβε

Στις 11 Νοεμβρίου, κάτι… αναδεύτηκε κοντά στο γαλλικό νησί Μαγιότ, ανοιχτά των δυτικών ακτών της Μαδαγασκάρης, προκαλώντας ένα **«υπόκωφο» σεισμικό τσουνάμι σε όλο τον κόσμο.**

Το σεισμικό αυτό κύμα που ξεκίνησε περίπου 25 χιλιόμετρα ανοιχτά των ακτών του Μαγιότ, «αφύπνισε» τους σεισμικούς αισθητήρες σε Ζάμπια, Κένυα και Αιθιοπία, διαπέρασε τους ωκεανούς, φτάνοντας στις **ακτές της Χιλής, της Νέας Ζηλανδίας, ακόμη και της Χαβάης**, σχεδόν 15.000 χιλιόμετρα μακριά. Κι όμως, κανείς δεν φάνηκε να καταλαβαίνει το παραμικρό.

On 11-11 "Strange earthquake waves rippled around Earth, and nobody knows why"

Well did anybody check ANTARCTICA ???!!!

See timestamp here for Nov11 AND Nov13. #Mayotte Island is directly north of the Northeastern coast of #Antarctica.https://t.co/Yag7hE0vxn pic.twitter.com/3pREcWaBK6

— BANKSTER SLAYER (@banksterslayer) 29 Νοεμβρίου 2018

Το φαινόμενο ήρθε στη δημοσιότητα μέσω Twitter, όταν οι φαν της σεισμολογίας πόσταραν αλλόκοτα σήματα που είχαν καταγράψει σε ένα ευρύ δίκτυο σεισμολογικών σταθμών, από την Κένυα έως τη Χαβάη. Έχοντας αποκλείσει το ενδεχόμενο να επρόκειτο για τους **κλυδωνισμούς ενός βίαιου σεισμού**, οι σεισμολόγοι, επαγγελματίες και ερασιτέχνες, έμειναν μόνο να εικάζουν για το τι πραγματικά είχε συμβεί. Τα μέσα κοινωνικής δικτύωσης πλημμύρισαν με **θεωρίες και σενάρια**: Ήταν κάποιου είδους εξωπραγματική κατολίσθηση που προκάλεσε το φαινόμενο; Μήπως ένας μετεωρίτης που εξερράγη στην ατμόσφαιρα; Ή μήπως η αφύπνιση ενός θαλάσσιου τέρατος;

Τώρα, οι επιστήμονες θεωρούν πως έχουν μία απάντηση – πολύ πιο… ρεαλιστική από τις θεωρίες που διατυπώθηκαν στα μέσα κοινωνικής δικτύωσης.

Scientists investigate mysterious seismic waves occurred all over the world. Researchers tracked source of the seismic waves to near the island of Mayotte, a collection of French islands in the Indian Ocean between Madagascar and Mozambique . . . this how Godzilla was discovered pic.twitter.com/VXSrJO2aO8

— Sherman (@Shermanbot) 29 Νοεμβρίου 2018

Ο **Στίβεν Χίκς**, σεισμολόγος στο Πανεπιστήμιο του Σαουθάμπτον, ήταν ένας από αυτούς που συνέλεξε κι ανέλυσε δεδομένα από ένα παγκόσμιο δίκτυο σεισμολογικών σταθμών. «Το ασυνήθιστο σ' αυτήν την περίπτωση ήταν πως **επρόκειτο για ένα πολύ μεγάλο σήμα** που ταξίδεψε σε όλο τον κόσμο και το οποίο δεν ανιχνεύθηκε από τα επιχειρησιακά συστήματα ανίχνευσης σεισμών».

Wow, the #Mayotte seismic rumblings were a trending news story on twitter last night. pic.twitter.com/vAeppqSKgB

— Stephen Hicks (@seismo_steve) 30 Νοεμβρίου 2018

Όπως διαπίστωσε, οι δονήσεις διήρκησαν κατά μέσο όρο μισή ώρα από τη στιγμή της εκδήλωσης του μυστηριώδους σεισμού, στη θάλασσα του Μαγιότ. Χρειάστηκαν 40 λεπτά ώστε το σήμα να φτάσει στους σεισμολογικούς σταθμούς της Βρετανίας και μία ώρα και 15 λεπτά για τη Χαβάη.

Τόσο χαμηλής συχνότητας δονήσεις, λένε οι επιστήμονες, **είναι σπάνιες αλλά όχι ανήκουστες.** Έχουν καταγραφεί στις περιπτώσεις «γέννησης» ενός παγετώνα, όταν σημειώνονται κατολισθήσεις και σε απότομη κατάρρευση θαλάμων μάγματος. Δεδομένου πως στην συγκεκριμένη περιοχή δεν υπάρχουν παγετώνες και πως μία υποθαλάσσια κατολίσθηση θα είχε καταγραφεί από τους υποθαλάσσιους καταγραφείς της περιοχής, **η εις άτοπον απαγωγή οδήγησε τους επιστήμονες στη θεωρία του μάγματος**.

'Something quite new': Mystery rumblings off #Mayotte never felt by locals https://t.co/C9iaXjnXnO pic.twitter.com/eFODvuXeM9

— Sputnik (@SputnikInt) 29 Νοεμβρίου 2018

Όπως υποστηρίζει ο Χικς, **όγκος μάγματος αποκολλήθηκε απότομα από ηφαιστειακό θάλαμο**, σε βάθος περίπου 16 χιλιόμετρων από τον πυθμένα της θάλασσας του Μαγιότ, προκαλώντας ένα **παγκόσμιο σεισμικό τσουνάμι**, με δονήσεις αρκετά ισχυρές ώστε να καταγραφούν από τα ευαίσθητα σεισμόμετρα αλλά και ανεπαίσθητες για να τις αντιληφθεί ο άνθρωπος. Στο ανάλογο συμπέρασμα καταλήγει και ο Πιερ Μπριόλ, γεωεπιστήμονας στο École Normale Supérieure του Παρισιού, ο οποίος εκτιμά πως η αποστράγγιση μεγάλης μάζας μάγματος και η κατάρρευση της οροφής του ηφαιστειακού θαλάμου προκάλεσαν τον αργό και πολύωρο αυτόν παγκόσμιο σεισμό.

«Όπως και να 'χει, ήταν μία συναρπαστική επίδειξη επιστημοσύνης στο Twitter και αγαστής συνεργασίας επιστημόνων και ερασιτεχνών σεισμολόγων», καταλήγει, χαριτολογώντας ο Χικς.

(Newsroom , CNN Greece, Σάββατο, 01 Δεκεμβρίου 2018, https://www.cnn.gr/news/kosmos/story/156665/mystiriodis-seismos-tarakoynise-ton-planiti-gia-misi-ora-kai-kaneis-den-ton-katalave?utm_source=newsletter&utm_medium=email&utm_campaign=Newsletter+1%2F12%2F2018)

Τρόμος στην Τουρκία: Πρόβλεψη για σεισμό-μαμούθ – «Θα γίνει βιβλική καταστροφή» – Πότε θα «χτυπηθεί» η Κωνσταντινούπολη

Τρόμο και πανικό προκαλούν στην Τουρκία οι προβλέψεις του γνωστού Τούρκου σεισμολόγου, Αχμέτ Ερτζάν, ο οποίος γνωστοποίησε στα τουρκικά μέσα ενημέρωσης ότι τουλάχιστον τρεις ισχυροί σεισμοί αναμένεται ότι θα

συγκλονίσουν την Κωνσταντινούπολη μετά το 2033 και σύμφωνα με τις προβλέψεις το χτύπημα του Εγκέλαδου θα επηρεάσει το 35% της ασιατικής πλευράς της πόλης και το 65% της ευρωπαϊκής.

Ο ίδιος εκτιμά ότι ο σεισμός που αναμένεται από το ρήγμα Βόρεια Ανατολή θα είναι 6,4 με 6,7 Ρίχτερ στην περιοχή μεταξύ Κιουτσιούκμετσε και Σιβρίαντα της ασιατικής πλευράς της Κωνσταντινούπολης, ωστόσο μεταξύ Τεκίρνταγ και Σιλίβρι θα είναι μεταξύ 7 και 7,3 Ρίχτερ.

Όπως αναφέρει ο σεισμός δεν θα γίνει πριν το 2045, ωστόσο οι καμπάνες θα αρχίσουν να χτυπούν μετά το 2033. «***Δεν πιστεύω ότι θα γίνει σεισμός μέχρι το 2033. Το πιο πιθανόν είναι να γίνει σεισμός μεταξύ 2040 και 2050***», ανέφερε, προσθέτοντας ότι στην περίπτωση που γινόταν σήμερα αυτός ο σεισμός θα υπήρχαν 15 – 20 χιλιάδες απώλειες ζωών και εκατομμύρια άνθρωποι θα έμεναν άστεγοι λόγω της κακής αρχιτεκτονικής των κτηρίων και της έλλειψης αντισεισμικής προστασίας.

Ο Αχμέτ Ερτζάν προβλέπει ακόμη ότι ο σεισμός θα χτυπήσει και την Αγία Σοφία μέχρι το μεγάλο τζαμί του Σουλεϊμάν στον Κεράτιο Κόλπο. «Ο σεισμός κάτω από αυτή την περιοχή θα είναι πάρα πολύ ισχυρός», εκτιμά ο Τούρκος σεισμολόγος. προβλέποντας μεγάλες καταστροφές στα ιστορικά μνημεία, σύμφωνα με το ΚΥΠΕ.

Ανάλογη πρόβλεψη είχε γίνει και από τον επικεφαλής της Αρχής Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών της Τουρκίας (AFAD), Μουράτ Νουρλού, ο οποίος τον Αύγουστο του 2018 προειδοποίησε για ισχυρό σεισμό στην Κωνσταντινούπολη, που μπορεί να στοιχίσει τη ζωή έως και 30.000 ανθρώπων.

«Το σενάριό μας λέει ότι το βόρειο ρήγμα της Ανατολίας, στη Θάλασσα του Μαρμαρά, μπορεί να δώσει ένα σεισμό μεγέθους 7,5 Ρίχτερ, προκαλώντας το θάνατο 26.000 – 30.000 ανθρώπων», προειδοποίησε ο Νουρλού, σύμφωνα με δημοσίευμα της εφημερίδας Hurriyet, υπενθυμίζοντας πως η Τουρκία είναι μία από τις πιο σεισμικές περιοχές του πλανήτη.

Η εφιαλτική πρόβλεψη του Νουρλού διατυπώθηκε σε ημερίδα που διοργάνωσε η Αρχή Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών της Τουρκίας σε συνεργασία με το δήμο Κωνσταντινούπολης, στη διάρκεια της οποίας έγινε γνωστό πως η AFAD επεξεργάζεται σχέδιο έκτακτης ανάγκης για την περίπτωση σεισμού στην τουρκική μεγαλούπολη.

«***Το κλειδί στη διαχείριση μιας καταστροφής και μιας κρίσης, είναι να είσαι προετοιμασμένος για τα χειρότερα. Με βάση το σενάριό μας για την Κωνσταντινούπολη, σε έναν πιθανό σεισμό, ως και 60.000 άνθρωποι μπορεί να τραυματιστούν σοβαρά. Περίπου 44.802 κτήρια θα υποστούν ζημιές, ενώ 2,4 εκατομμύρια άνθρωποι θα μείνουν χωρίς στέγη***», τόνισε ο Νουρλού, προειδοποιώντας και για το ενδεχόμενο να σημειωθεί τσουνάμι.

«Τα δημόσια όργανα, οι δήμοι και η Αρχή Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών, προετοιμαζόμαστε για ένα σεισμό και στο πλαίσιο αυτό έχουμε σχεδιάσει ένα σύνολο 150.000 προσωρινών καταφυγίων», είπε ο ίδιος.

«***Επικεντρωνόμαστε στην περιοχή του Μαρμαρά***»

Εξίσου ανησυχητική ήταν και η τοποθέτηση του καθηγητή Σουκρού Ερσόι, σύμφωνα με τον οποίο το χειρότερο σενάριο μιλά για σεισμό 7,7 βαθμών της κλίμακας Ρίχτερ στην περιοχή.

«***Υπάρχει μια σειρά από ρήγματα στην Τουρκία που θα μπορούσαν να δώσουν ισχυρούς σεισμούς. Όμως, επικεντρωνόμαστε στην περιοχή του Μαρμαρά, καθώς σε αυτή την περιοχή, που αποτελεί και το οικονομικό κέντρο της χώρας, υπάρχουν πολλά κτήρια, πολλοί άνθρωποι***», είπε χαρακτηριστικά, εξηγώντας ότι για αυτό το λόγο ένας σεισμός στην συγκεκριμένη περιοχή θα πρέπει να θεωρείται θέμα εθνικής ασφαλείας.

Σημειώνεται πως το παρατηρητήριο Καντιλί του Πανεπιστημίου του Βοσπόρου έχει καταγράψει περισσότερες από 5.000 σεισμικές δονήσεις φέτος, σύμφωνα με το τουρκικό πρακτορείο ειδήσεων Ανατολή.

Το Παρατηρητήριο, που παρακολουθεί τη σεισμική δραστηριότητα μέσω ενός δικτύου 240 σταθμών, καταγράφει περί τους 10.000 σεισμούς στην Τουρκία κάθε χρόνο. Ενδεικτικά αναφέρεται πως από το 1900 ως το 2017 σημειώθηκαν στην Τουρκία 10.503 σεισμικές δονήσεις πάνω από 4 Ρίχτερ.

Υπενθυμίζεται ότι πριν από 19 χρόνια έγινε ο χειρότερος σεισμός στην πρόσφατη ιστορία της Τουρκίας. Είχε μέγεθος 7,5 Ρίχτερ και επίκεντρο την περιοχή του Μαρμαρά, την πιο πυκνοκατοικημένη περιοχή της Τουρκίας και προκάλεσε το θάνατο 17.480 ανθρώπων. Από την ισχυρή σεισμική δόνηση, που είχε διάρκεια 45 δευτερολέπτων, καταστράφηκαν 285.000 κτήρια, 600.000 άνθρωποι έμειναν άστεγοι, ενώ οι κοινωνικές και οικονομικές «πληγές» που προκάλεσε χρειάστηκαν πολλά χρόνια για να επουλωθούν.

Ποιες οι πιθανές επιπτώσεις στην Ελλάδα

Σχετικά με το ενδεχόμενο εκδήλωσης μεγάλου σεισμού στο βόρειο τμήμα του ρήγματος της Ανατολίας, ο σεισμολόγος και διευθυντής Ερευνών του Εθνικού Αστεροσκοπείου Αθηνών, Θανάσης Γκανάς είχε παλαιότερα διευκρινίσει στην εφημερίδα «Δημοκρατία» ότι «οι σχετικές μελέτες υπάρχουν ήδη από το 2000, δηλαδή ένα χρόνο μετά τον καταστροφικό Εγκέλαδο στη Νικομήδεια». Τόνισε, δε, ότι το «χειρότερο σενάριο κάνει λόγο για σεισμό μεγέθους 7,6 Ρίχτερ στη θάλασσα του Μαρμαρά, με 60.000 τραυματίες στην Κωνσταντίνουπουλη, 45.000 κατεστραμμένα κτήρια και 2.400.000 άστεγους. Ένας τέτοιος σεισμός θα προκαλούσε μεταφορά τάσης προς τα δυτικά, η οποία ενδεχομένως θα ενεργοποιούσε κάποια ρήγματα και στον ελλαδικό χώρο. Είναι ένα σενάριο που δεν μπορεί να αποκλειστεί».

(30 Νοεμβρίου 2018,
https://www.pentapostagma.gr/2018/11/τρόμος-στην-τουρκία-πρόβλεψη-για-σεισ.html)

Yalova quake triggers fear of 'big one'

A 4.1-magnitude earthquake in Yalova, a province south of Istanbul, sparked fears of the "big one" expected to hit Istanbul in the coming decades.

No casualties or damage to buildings were reported in the quake that was followed by a series of lesser aftershocks. Still, it was strong enough to remind Yalova residents of the 7.4-magnitude earthquake in 1999 that killed thousands in the region and devastated Yalova.

Experts played down the risk of a large magnitude earthquake for Istanbul, which is divided by the Marmara Sea with Yalova though they warned for a big earthquake in the immediate vicinity of Yalova.

The epicenter of the earthquake that took place at 5:36 a.m. was Çınarcık, a sleepy coastal town popular among pensioners. The epicenter was at a depth of 14 kilometers below the surface. Tremors were felt as far as Istanbul, Bursa which neighbors Yalova as well as Kocaeli, a province north of Yalova, which also suffered heavily from 1999 earthquake. Professor Ahmet Ercan, a seismology expert, told Demirören News Agency that the earthquake "had nothing to do" with the anticipated Istanbul earthquake, adding that it was "only a warning" for the region. "An earthquake bigger in magnitude, at 6.3 or 6.4, is actually expected for the Cape of Armutlu, İmralı island and Gemlik Bay," he said, referring to a cape in Yalova, the Marmara Sea island which is home to a prison and a bay where a busy commercial port is located in the province of Bursa. "Such an earthquake will affect Bursa, Balıkesir, a province neighboring Bursa, and certainly Yalova," Ercan said. Oğuz Gündoğdu from the Geophysics Department of Istanbul University said that it indicated that breaking of a fault line that partially cracked in the 1999 earthquake, apparently continued.

(DAILY SABAH, December 1, 2018, https://www.dailysabah.com/turkey/2018/12/01/yalova-quake-triggers-fear-of-big-one)

Strict building codes helped Anchorage withstand quake

ANCHORAGE, Alaska (AP) — The magnitude 7.0 earthquake that rattled Alaska's largest city cracked roads and collapsed highway ramps, but there were no reports of widespread catastrophic damage or collapsed buildings.

There's a good reason for that.

This aerial photo shows damage at the Glenn Highway near Mirror Lake after earthquakes in the Anchorage area Friday.

A devastating 1964 Alaska earthquake — the most powerful on record in the United States — led to stricter building codes that helped structures withstand the shifting earth Friday.

"Congratulations to the people of Alaska for being really prepared for this earthquake," U.S. Geological Survey Geophysicist Paul Caruso said Saturday. "Because a magnitude 7.0 in a city like that, you know, it could have been significantly worse."

A seismic expert said Alaska and California use the most stringent standards to help buildings withstand earthquakes.

Sterling Strait, a member of the Alaska Seismic Hazards Safety Commission, said the states use the International Building Code, considered the best available standard for seismic safety.

It requires buildings to be designed to resist possible ground motion determined by location and earthquake histories.

It also mandates structural connections — such as beams and columns — be reinforced to resist damage from shaking, said Strait, seismic program coordinator for Alyeska Pipeline Service Co., operator of the 800-mile (1,287-kilometer) Alaska oil pipeline.

This aerial photo shows damage on Vine Road, south of Wasilla, Alaska, after earthquakes Friday.

One of the top seismologists in the U.S. says residents near Anchorage should expect aftershocks following the 7.0 magnitude quake that struck near that city early Friday. (Nov. 30).

Gov. Bill Walker said sometimes people, including himself, grouse about stringent building codes. But he's "really glad" they were in place as he only had minor water damage at his home.

"Building codes mean something," he said.

The quake was centered about 7 miles (12 kilometers) north of Anchorage, which has a population of about 300,000. People ran from their offices or took cover under desks. A 5.7 aftershock followed within minutes. Then came a series of smaller quakes.

The two big back-to-back quakes knocked items off shelves, disrupted power, broke store windows and briefly triggered a tsunami warning for islands and coastal areas south of the city. Walker issued a disaster declaration, and President Donald Trump declared an emergency, allowing the Federal Emergency Management Agency to coordinate disaster relief.

There were no reports of deaths or serious injuries.

The oil pipeline was shut down for hours Friday while crews were sent to inspect it for damage. Alyeska spokeswoman Michelle Egan said it was restarted at 3:30 p.m. Friday.

She said Saturday there were no obvious signs of damage and no operational impact on the pipeline. Its closest section is 120 miles (193 kilometers) from the epicenter of the seismic activity.

A ramp from International Airport Road to Minnesota Drive was damaged in an earthquake on Friday, Nov. 30, 2018, in Anchorage, Alaska. Alaska Gov. Bill Walker says it will take more than a week or two to repair roads damaged by the powerful earthquake.

Aftershocks Saturday continued to fray nerves, with people worrying about being caught in more massive shakers.

"They're disturbing, and I'm not putting anything away that could fall until they calm down," Randall Cavanaugh, an Anchorage attorney, said following a restless night at home. "I kept waking up."

By mid-morning, there had been about 550 aftershocks, including 11 with magnitudes of 4.5 or greater, Caruso said.

The aftershocks should be weaker and less frequent in the coming days, but officials can't say for sure when they'll stop, he said.

Anchorage Mayor Ethan Berkowitz said the extent of damage was "relatively small" considering the scale of Friday's earthquake. He also credited building codes for minimizing structure damage.

"In terms of a disaster, I think it says more about who we are than what we suffered," he said at a press briefing, adding that Anchorage was prepared for such an emergency.

"People pulled together. We followed the plans that were in place. We looked after one another. And when people around the country and around the world look at this, they're going to say, 'We want to do things in the Anchorage way because Anchorage did this right'," Berkowitz said.

After the first earthquake, Alaska's largest hospital activated its incident command center, but the trickle of patients into the emergency room at Providence Alaska Medical Center in Anchorage was like a normal workday.

"It wasn't a situation where there was a mass rush of people," hospital spokesman Mikal Canfield said.

Roads didn't fare so well. The Alaska Department of Transportation counted about 50 sites with damage, including eight considered major. Most of the damage was done to highways north of Anchorage. The agency also was planning to conduct bridge inspections.

Transportation officials said in a release that the aftershocks continue to contribute to settling and additional cracking. Rock falls exacerbated by the aftershocks were causing some problems on the Seward Highway south of Anchorage.

Earthquake damage also was preventing Alaska Railroad trains from making the trek between Anchorage and Fairbanks. The trip is 350 miles (563 kilometers) each way.

Train service south of Anchorage is scheduled to resume Sunday.

Normal operations resumed at Ted Stevens Anchorage International Airport after flight operations were suspended Friday, Transportation Department spokesman Meadow Bailey told The Associated Press.

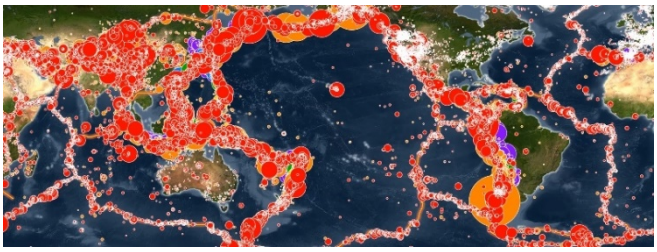
Anchorage's school system canceled classes through Tuesday while it examined buildings for damage.

Alaska's 1964 earthquake, with a 9.2 magnitude, was centered about 75 miles (120 kilometers) east of Anchorage. It and the tsunami it triggered claimed about 130 lives.

The state averages 40,000 earthquakes a year, with more large quakes than the 49 other states combined.

(Rachel D'Oro, December 2, 2018, https://www.apnews.com/018a78f7cfb646b8a6653766a953cacd)

Earthquakes of the 20th Century



This animation shows every recorded earthquake in sequence as they occurred from January 1, 1901, through December 31, 2000, at a rate of 1 year per second. The earthquake hypocenters first appear as flashes then remain as colored circles before shrinking with time so as not to obscure subsequent earthquakes.

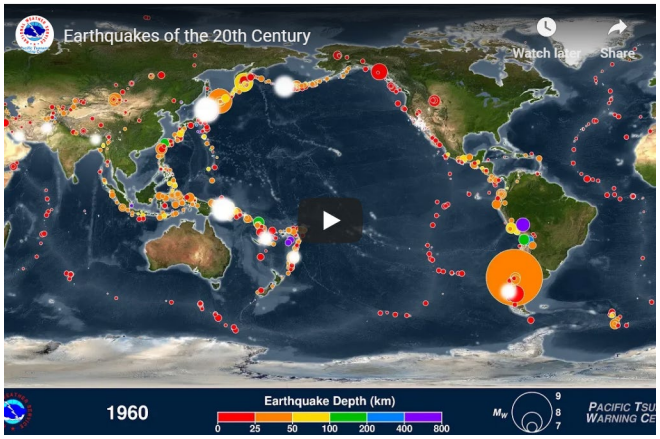
The size of the circle represents the earthquake magnitude while the color represents its depth within the earth. At the end of the animation, it will first show all quakes in this 100-year period.

Next, it will show only those earthquakes greater than magnitude 6.5, the smallest earthquake size known to make a tsunami. It will then show only those earthquakes with magnitudes of 8.0 or larger, the "great" earthquakes most likely to pose a tsunami threat when they occur under the ocean or near a coastline and when they are shallow within the earth (less than 100 km or 60 miles deep).

The animation concludes by showing the plate boundary faults responsible for the majority of all of these earthquakes.

The era of modern earthquake seismology—the scientific study of earthquakes—began in the 20th Century with the invention of the seismometer and its deployment in instrument networks to record and measure earthquakes as they occur.

Therefore, when the animation begins only the largest earthquakes appear as they were the only ones that could be detected at great distances with the few available instruments available at the time. But as time progresses, more and more seismometers were deployed and smaller and smaller earthquakes could be recorded.



https://www.youtube.com/watch?time_continue=4&v=jhmF-IwP6uM

For example, note how in the 1930's many small earthquakes suddenly seem to appear in California, but this illusion results from the installation of more and more instruments in that region. Likewise, there appears to be a jump in the number of earthquakes globally in the 1970's when seismology took another leap forward with advances in telecommunications and signal processing with digital computers, a trend that continues today.

20th Century seismology revealed the global geographic distribution of earthquakes and helped to solidify the Theory of Plate Tectonics. Notice how earthquake epicenters do not occur randomly in space but form patterns over the earth's surface, revealing the boundaries between tectonic plates as shown toward the end of this animation. This time period also includes some remarkable events, including those that generated devastating tsunamis:

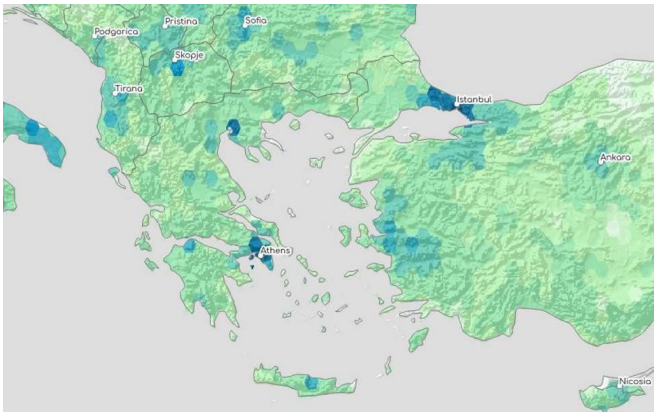
M8.8 — Ecuador — January 31, 1906
M8.4 — Kamchatka, Russia — February 3, 1923
M8.4 — Sanriku, Japan — March 2, 1933
M8.6 — Unimak Island, Aleutian Islands — April 1, 1946
M9.0 — Kamchatka, Russia — November 4, 1952
M8.6 — Andreanof Islands, Aleutian Islands — March 9, 1957
M9.5 — Valdivia, Chile — May 22, 1960
M9.2 — Prince William Sound, Alaska — March 28, 1964
M8.7 — Rat Islands, Aleutian Islands — February 4, 1965

These earthquakes represent some of the largest ever recorded. Note how they all occur at a particular type of plate boundary, subduction zones where tectonic plates collide, so these are the regions where we expect future devastating tsunamis to be generated.

Video and caption by Pacific Tsunami Warning Center (PTWC)

(The Watchers, December 09, 2018, https://watchers.news/2018/12/09/earthquakes-of-the-20th-century/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+adorraeli%2FtsEq+%28The+Watchers+-+watching+the+world+evolve+and+transform%29)

Οι περιοχές με τον μεγαλύτερο σεισμικό κίνδυνο στην Ελλάδα



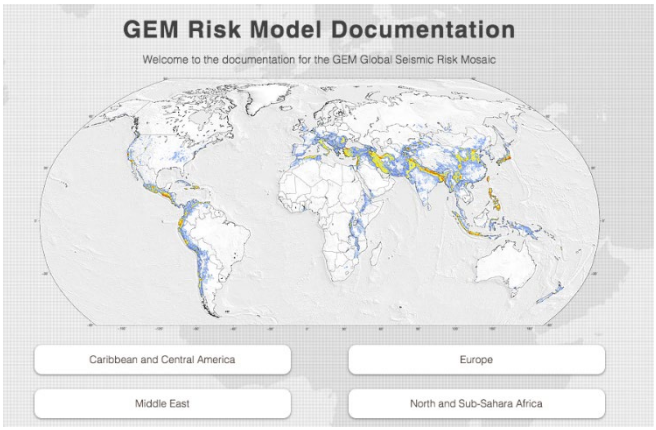
Τους πρώτους στον κόσμο online χάρτες κινδύνου από σεισμούς σε όλες τις χώρες, της Ελλάδας συμπεριλαμβανομένης, παρουσίασε ο μη κερδοσκοπικός οργανισμός GEM (Global Earthquake Model), με έδρα την Ιταλία.

Οι τρεις χάρτες, που αποτελούν προϊόν μακρόχρονης διεθνούς προσπάθειας και θα ανανεώνονται κάθε ένα χρόνο περίπου, αποκαλύπτουν ποιες περιοχές της Γης είναι πιο επιρρεπείς σε σεισμούς, σε ποιες χώρες είναι πιθανότερο τα κτίρια να υποστούν ζημιές από το κούνημα του εδάφους και ποιές περιοχές είναι πιο εκτεθειμένες στο σεισμικό κίνδυνο λόγω του μεγάλου αριθμού κτιρίων που μπορεί να καταρρεύσουν.

Στην Ελλάδα, σύμφωνα με τους χάρτες GEM, η Αττική είναι - με διαφορά- η περιοχή με τον μεγαλύτερο σεισμικό κίνδυνο, από την άποψη των πιθανών συνολικών υλικών ζημιών. Ακολουθεί η περιοχή Πελοποννήσου-Δυτικής Ελλάδας και Ιονίων, ενώ έπονται οι περιοχές Μακεδονίας-Θράκης, Θεσσαλίας-Κεντρικής Ελλάδας και Αιγαίου.

Στη χώρα μας, όπου εκτιμάται ότι υπάρχουν συνολικά 3,33 εκατομμύρια κτίρια εκτεθειμένα σε κίνδυνο σεισμού, το συνολικό κόστος αντικατάστασης των υποδομών υπολογίζεται σε 571,1 δισεκατομμύρια δολάρια για τον τομέα των κατοικιών, 123,2 δισ. δολ. για τον εμπορικό και 100,1 δισ. δολάρια για τον βιομηχανικό τομέα - συνολικά 794,3 δισ. δολάρια.

Η πρωτοβουλία GEM δημιουργήθηκε το 2007 από ερευνητικά ινστιτούτα και τον ΟΟΣΑ, με τη χρηματοδοτική υποστήριξη της μεγάλης γερμανικής αντασφαλιστικής εταιρείας Munich Re. Οι ψηφιακοί χάρτες ενσωματώνουν περισσότερα από 30 εθνικά και περιφερειακά μοντέλα σεισμικού κινδύνου από διάφορους φορείς όπως η Γεωλογική Υπηρεσία των ΗΠΑ, η Διοίκηση Σεισμών της Κίνας και οι αρμόδιες αρχές της Ιαπωνίας.



https://www.globalquakemodel.org/gem-risk-mosaic

Η δημιουργία των χαρτών έχει λάβει υπόψη της πληθώρα παραγόντων, όπως τα υλικά κατασκευής των κτιρίων, πόσους ορόφους αυτά έχουν, αν πληρούν τις αντισεισμικές τεχνικές

προδιαγραφές κ.α. Στόχος του GEM είναι να υπάρξουν μοντέλα πραγματικού σεισμικού κινδύνου για κάθε χώρα, ώστε να μπορεί να γίνει υπολογισμός για πιθανές μελλοντικές υλικές ζημιές, κάτι δύσκολο έως τώρα, ιδίως για τις αναπτυσσόμενες χώρες.

Από το 1980 μέχρι σήμερα, το 92% όλων των θυμάτων από σεισμούς έχουν υπάρξει σε αναπτυσσόμενες και αναδυόμενες οικονομίες χαμηλού και μέσου εισοδήματος. Περίπου έξι στους δέκα σεισμούς (το 61%) συμβαίνουν κάθε χρόνο σε αυτές τις χώρες. Από την άλλη όμως, μόνο το 3,6% των συνολικών θυμάτων, αλλά πάνω από το 60% των υλικών ζημιών καταγράφονται στις ανεπτυγμένες πλουσιότερες χώρες που έχουν εκτεταμένες κτιριακές και άλλες υποδομές. Περίπου τα δύο τρίτα όλων των κτιρίων της Γης βρίσκονται σε 15 μόνο χώρες.

Πηγή: ΑΠΕ - ΜΠΕ

(Η ΚΑΘΗΜΕΡΙΝΗ, 10 Δεκεμβρίου 2018, http://www.kathimerini.gr/999319/gallery/epikairothta/ellada/oi-perioxes-me-ton-megalytero-seismiko-kindyno-sthn-ellada)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Thriving Plateau Region That Slipped Beneath North Sea 8,000 Years Ago Reveals Its Secrets

Doggerland, named for Dogger Bank, is now beneath the North Sea off the east coast of England.

A vast plateau of land between England and the Netherlands was once full of life before it sank beneath what is now the North Sea some 8,000 years ago. Archaeologists now hope to find out what the vast landscape looked like before it slipped beneath the salty water so long ago.

To do this, they've hauled up cores of sediment from the bottom of the North Sea in an area called Doggerland. It's named for the shoal called Dogger Bank in the southern part of the North Sea, which in turn is named for a type of medieval Dutch fishing boat called a dogger. The land became ice-free about 12,000 years ago, after the end of the last ice age.

More recently, about 8,000 years ago, the plateau of land between what is now the east of England and the Netherlands was flooded by the sea. This brought an end to the forests and animal life that had colonized the region from other parts of Europe, including early human communities.

The chief marine geoarchaeologist for Wessex Archaeology, Claire Mellett, said that 10 of the sediment cores taken by an offshore wind-farm developer from the North Sea contained ancient deposits of peat. This organic material can form only in marshes on land.

Those cores are now being studied for clues about the flooded region. This research includes studies of ancient pollen grains and other microscopic fossils contained in the peat samples, which would reveal details of the landscape and climate of Doggerland before it sank.

Wind farm finds

The latest sediment cores were taken from the Norfolk Boreas site, a wind farm about 45 miles (72 kilometers) from the shore at its nearest point that covers 280 square miles (725 square km). Mellett said that the sediment cores containing ancient peat deposits covered a fairly wide area of around 32 square miles (85 square km) of the flooded Doggerland region. This was the first time that sediment cores covering such a wide area were recovered from the underwater region, she said

Researchers say that the sediment cores contain an environmental record of the flooded Doggerland region over more than 4,000 years, from the end of the last ice age about 12,000 years ago.

The researchers cross-referenced the core locations with remotely sensed images of the seafloor where the samples were taken, which could show the hidden structure of the flooded landscape.

"The remote sensing provides us an image of the seabed, but no physical material — so when we get the cores, that gives us the actual evidence," Mellett told Live Science.

"We can see where the old rivers are. We can see the peat lands, and we can see the extent of them, so we know how big they are. We're essentially reconstructing the geography of the North Sea around 10,000 years ago," she said.

Flooded landscape

The peat deposits were particularly important because they contain an environmental record of the changing landscape and climate of the area, spanning from about 12,000 to 8,000 years ago, Mellett explained.

The Doggerland region, now beneath the North Sea, was home to forests, wildlife, and early humans from after the last ice age, about 12,000 years ago, until it flooded about 8,000 years ago.

"Not only is the peat hard evidence of a former land surface, [but] it [also] has excellent preservation of microscopic fossils — and that is what gives us the information to reconstruct climate, sea levels and what trees were growing in the area," she said.

"We also look at things like microscopic charcoal, so we can see when there has been a big burning event. We don't know whether that burning was driven by humans or whether it was a natural forest fire, but we can all see all that within these peat deposits," she said.

Some human remains — including part of an ancient skull and several human artifacts, like fragments of stone tools — have been recovered by fishing and dredging operations in the parts of the North Sea that cover the flooded Doggerland region.

The work being done by Wessex Archaeology could help scientists find more potential sites of early human habitation in Doggerland, Mellett said.

"Our ultimate endgame will be to produce maps of the area at different time periods, so we'll do one for just after the ice age. We expect it will be quite a sparse landscape without many trees, a bit like Arctic Canada today.

"And then, the trees start to come back as the climate warms. We know that the woodland was quite open and that there were wide areas where we had marshlands growing, so we'll do another reconstruction for that."

Finally, she said, "we can see when the sea level starts to rise and the area floods. And then you get drowning of the area. You get tidal creeks, and you get bits of coastline."

One of the lasting mysteries of Doggerland is just how quickly the region flooded, and the sediment studies by Mellett and her colleagues will try to answer that question.

"The life span of the people at this time was about 30 years, so [even] if sea level was rising, they probably wouldn't have been able to observe it," Mellett said. "But in geological history, it's one of the fastest-rising sea levels that we've ever experienced."

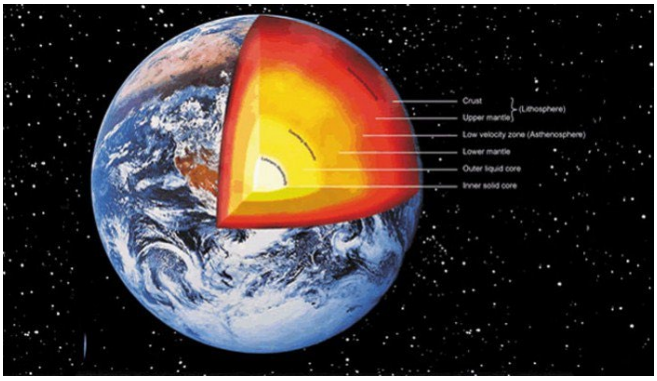
It might have taken only a few centuries for Doggerland to go from a forested plateau to being completely covered by the sea: "[it was] less than 1,000 years, and it might be closer to 500 years," she said.

(Tom Metcalfe, Live Science Contributor, December 3, 2018, https://www.livescience.com/64214-drowned-landscape-north-sea-doggerland.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20181203-ls)

HELPOS, το Ελληνικό σύστημα παρατήρησης της Λιθόσφαιρας

Η Εθνική υποδομή «HELPOS», όπως ονομάζεται το Ελληνικό Σύστημα Παρατήρησης της Λιθόσφαιρας, αποτελεί ένα σημαντικό εργαλείο στα χέρια της επιστήμης και ταυτόχρονα έχει ανοίξει ήδη τον δρόμο νέοι επιστήμονες να επιστρέψουν στη χώρα μας, επισημάνθηκε απόψε, μεταξύ άλλων, σε ενημερωτική ημερίδα για τις γεωεπιστήμες που πραγματοποιήθηκε στο Κέντρο Αρχιτεκτονικής Μεσογείου στα Χανιά σύμφωνα με το ΑΠΕ-ΜΠΕ. Σύμφωνα με τον καθηγητή γεωφυσικής Φίλλιπο Βαλιαννάτο, το «HELPOS» είναι μια μεγάλη προσπάθεια ενοποίησης όλων των γεωφυσικών και σεισμολογικών υποδομών στην Ελλάδα, με ταυτόχρονη ανταλλαγή δεδομένων πληροφοριών και εξοπλισμού.

Αυτό θα βοηθήσει πάρα πολύ στο να μπορούμε να έχουμε μια καλύτερη απεικόνιση της σεισμικής δραστηριότητας στον ελληνικό χώρο και αυτή η δραστηριότητα να είναι συνδεδεμένη με αντίστοιχο ευρωπαϊκό πρόγραμμα και την ευρωπαϊκή υποδομή».



Στο πλαίσιο του «Helpos» προβλέπεται ένας σημαντικός αριθμός υποτροφιών και συμβολαίων για νέους ερευνητές

Όπως ακόμα επεσήμανε ο κ. Βαλιαννάτος, «ένα από τα κύρια χαρακτηριστικά είναι ότι στο πλαίσιο της εθνικής υποδομής «Helpos», προβλέπεται ένας σημαντικότατος αριθμός υποτροφιών και συμβολαίων για νέους ερευνητές και είμαστε στην ευχάριστη θέση να σας πούμε ότι ένας ικανοποιητικός αριθμός από νέους επιστήμονες γυρνάνε πίσω από το εξωτερικό και υπογράφουν συμβόλαια με την εθνική υποδομή για να κάνουν την έρευνα τους. Αυτό, είναι μια μικρή συνεισφορά στην ανάσχεση της απώλειας ανθρώπινου δυναμικού από τον τόπο μας».

Όπως ακόμη τόνισε «το μεγαλύτερο και σημαντικότερο στοιχείο αυτής της δράσης της εθνικής υποδομής είναι ότι ενοποιεί όλες τις επιμέρους υποδομές σε μια εθνική οντότητα η οποία μπορεί να προσφέρει μια καλύτερη απεικόνιση. Ταυτόχρονα προχωρά στην ανταλλαγή τεχνογνωσίας υπηρεσιών και ανταλλαγής δεδομένων έτσι ώστε όλες οι διαδικασίες να γίνονται με τον καλύτερο δυνατόν εξοπλισμό και με την καλύτερη υπηρεσία».

Στην ημερίδα μεταξύ άλλων έδωσε το «παρών» και ο καθηγητής σεισμολογίας του Εθνικού Καποδιστριακού Πανεπιστημίου Αθηνών Άκης Τσελέντης που απαντώντας σε ερωτήσεις δημοσιογράφων αναφέρθηκε στην ανάγκη της μικροζωνικής αποτύπωσης των πόλεων που βοηθά στην καλύτερη μελέτη της συμπεριφοράς των εδαφών σε περίπτωση σεισμών.

Αναφερόμενος ειδικότερα στην Κρήτη υποστήριξε ότι «Στα Χανιά έχει γίνει καλή δουλειά. Έχει γίνει μία σωστή μικροζωνική και έχουμε αποτυπώσει καλά την πόλη. Έχουμε μελετήσει σε περίπτωση διάφορων σεισμών πως συμπεριφέρονται τα εδάφη. Έχουμε καταλάβει πώς ο κύριος παράγοντας της καταστροφικότητας ενός σεισμού δεν είναι τόσο το μέγεθός του, αλλά κυρίως είναι οι τοπικές εδαφικές συνθήκες».

Από τα Χανιά ο κ Τσελέντης εξέφρασε τον προβληματισμό του για το φαινόμενο της αυθαίρετης δόμησης που παρατηρείται και στην Κρήτη. Όπως χαρακτηριστικά υποστήριξε «δυστυχώς σήμερα έχουμε χτίσει σε ρέματα, έχουμε χτίσει σε περιοχές προσχώσεων, είναι ότι χειρότερο μπορούμε να κάνουμε στο πλαίσιο επέκτασης των σχεδίων πόλης. Αυτό το φαινόμενο είναι ακόμα πιο έντονο στο Ηράκλειο. Πιστεύω ότι το Ηράκλειο είναι λίγο ανοχύρωτο ακόμα και πρέπει να ληφθούν κάποια μέτρα» είπε για να προσθέσει ότι «τα Χανιά πιστεύω ότι είναι σε καλή φάση. Έχουν γίνει υποδομές και μελέτες που μας δίνουν πληροφορίες σχετικά με την σεισμική συμπεριφορά της πόλης. Το Ρέθυμνο έχει πιο καλές κατασκευές και πιο καλή πολεοδομική ανάπτυξη και το Λασίθι δεν έχει τόσο πρόβλημα. Πιστεύω ότι η πιο επικίνδυνη πόλη είναι το Ηράκλειο και τα Χανιά σε επίπεδο οικιστικό θέλουν λίγη προσοχή αλλά αυτό είναι θέμα πολιτικών μηχανικών».

Παράλληλα ο κ. Τσελέντης επεσήμανε την ανάγκη να περιοριστεί το φαινόμενο της αυθαίρετης δόμησης και της νομιμοποίησης αυθαιρέτων λέγοντας πως «στην Κρήτη υπάρχει ένα τρομακτικό πρόβλημα των αυθαιρέτων. Πρέπει να σταματήσει η νομιμοποίηση των αυθαιρέτων. Δεν μπορούμε να κάνουμε νομιμοποίηση αυθαιρέτων αν δεν ληφθούν τα απαραίτητα μέτρα που προβλέπονται από τις επιτροπές ελέγχων».

«Στα Χανιά υπάρχουν πολλά παλιά κτίρια κατασκευασμένα με παλιούς αντισεισμικούς κανονισμούς τα οποία και αυτά είναι ευάλωτα μερικές φορές. Δεν λέω πώς είναι όλα επικίνδυνα απλώς πρέπει να κάνουμε βήματα παραπάνω. Σήμερα η επιστήμη επιτρέπει να δούμε την συμπεριφορά κτιρίων για διάφορους σεισμούς σε επίπεδο συνοικίας» κατέληξε.

https://meetingorganizer.copernicus.org/EGU2018/EGU2018-9737-1.pdf

Στην Εθνική υποδομή HELPOS συμμετέχουν το Γεωδυναμικό Ινστιτούτο (συντονιστής), και τα συναφή Εργαστήρια Γεωφυσικής/Σεισμολογίας από το ΑΠΘ, το ΕΚΠΑ, το Πανεπιστήμιο Πατρών, το ΤΕΙ Κρήτης, το ΕΜΠ, το ΕΛΚΕΘΕ, ΟΑΣΠ/ΙΤΣΑΚ.

https://flashnews.gr/post/373232/sta-xania-oi-teleytaies-ekselikseis-sth-seismologia-apo-gnwstoys-episthmones

High-impact eruption at Krakatau volcano, deadly tsunami produced, Indonesia

Powerful eruptions are taking place at Indonesian Krakatau volcano over the past 24 hours. The volcano is producing large lava flows and undersea landslides believed to be the cause of at least one deadly tsunami.

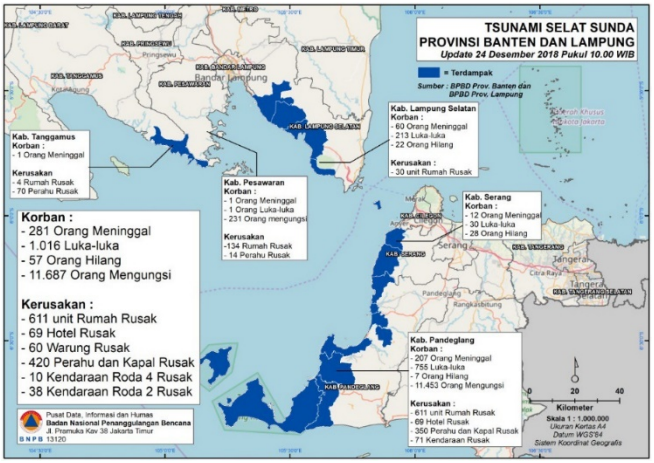
Krakatau erupting on December 22, 2018

According to the Darwin VAAC advisory issued 00:25 UTC, December 23, satellite imagery suggest a high-level eruption, with ash rising up to 16.7 km (55 000 feet) above sea level.

The Aviation Color Code was raised to Red.

According to the country's disaster management agency, at least 281 people have been killed, 1 016 injured and 57 are still missing after a tsunami hit villages located around Sunda Strait. 11 687 people have been displaced.

At least 611 homes have been damaged, 69 hotels were severely damaged, 60 small commercial units and 450 boats and ships.



Officials said it is possible that the full moon may have contributed to the strength of the wave.

According to locals, the tsunami hit around 04:30 LT, December 23 (21:30 UTC, December 22).

One of the eyewitnesses told BBC that there had been heavy eruption sound prior to the tsunami.

"The island of Anak Krakatau now has the shape of a 270 deg almost closed crescent, with a water-filled crater in the center where once the 330 m (1 062 feet) tall summit cone stood," Dr. Tom Pfeiffer said December 31.

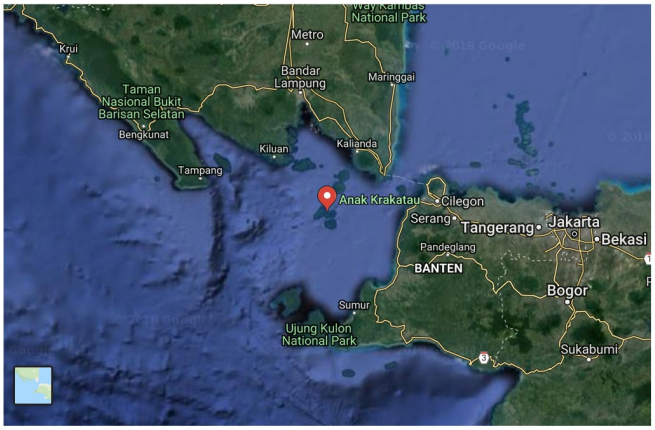
"Processed satellite image acquired December 28 shows the change in morphology even clearer but includes a significant land gain after the collapse as well, which seems to have built most of the southern 'arm' of the crescent. Most of the new land is probably due to accumulated material (tephra) from the intense Surtseyan activity in the days after the landslide, building a new large tuff ring around the crater."

Geological summary

The renowned volcano Krakatau (frequently misstated as

Krakatoa) lies in the Sunda Strait between Java and Sumatra. The collapse of the ancestral Krakatau edifice, perhaps in 416 CE, formed a 7-km-wide (4.3 miles) caldera.

Remnants of this ancestral volcano are preserved in Verlaten and Lang Islands; subsequently Rakata, Danan and Perbuwatan volcanoes were formed, coalescing to create the pre-1883 Krakatau Island. Caldera collapse during the catastrophic 1883 eruption destroyed Danan and Perbuwatan volcanoes, and left only a remnant of Rakata volcano.



This eruption, the 2nd largest in Indonesia during historical time, caused more than 36 000 fatalities, most as a result of devastating tsunamis that swept the adjacent coastlines of Sumatra and Java. Pyroclastic surges traveled 40 km (25 miles) across the Sunda Strait and reached the Sumatra coast.

After a quiescence of less than a half century, the post-collapse cone of Anak Krakatau (Child of Krakatau) was constructed within the 1883 caldera at a point between the former cones of Danan and Perbuwatan. Anak Krakatau has been the site of frequent eruptions since 1927. (GVP)

(THE WATCHERS, December 23, 2018, https://watchers.news/2018/12/23/krakatau-volcano-tsunami-december-2018)

Ινδονησία : Η υπολειτουργία του συστήματος συναγερμού που στάθηκε μοιραία

Την ώρα που πλησίαζε το φονικό τσουνάμι, η Εθνική Υπηρεσία Διαχείρισης Καταστροφών έδινε την διαβεβαίωση ότι «δεν υπάρχει απειλή»

Κυρίαρχο ρόλο στον φονικό χαρακτήρα του τσουνάμι, που ξέσπασε στην Ινδονησία και στοίχισε τη ζωή σε περισσότερους από 280 ανθρώπους, φαίνεται να έπαιξαν οι αστοχίες του συστήματος προειδοποίησης, όπως εξηγούν οι εμπειρογνώμονες και οι Αρχές.

Το φονικό κύμα έπληξε με την καταστροφική του μανία το βράδυ του Σαββάτου τις ακτές και στις δύο πλευρές του στενού που χωρίζει της νήσους Ιάβα και Σουμάτρα, καταλαμβάνοντας εξαπίνης τους κατοίκους, αλλά και το σύστημα παρακολούθησης.

Την ώρα που πλησίαζε το φονικό τσουνάμι, η Εθνική Υπηρεσία Διαχείρισης Καταστροφών έδινε την διαβεβαίωση ότι «δεν υπάρχει απειλή».

«Η απουσία συστήματος έγκαιρου συναγερμού εξηγεί τους λόγους για τους οποίους δεν εντοπίσθηκε το τσουνάμι», παραδέχεται ο εκπρόσωπος της Υπηρεσίας Σουτόπο Πούρβο Νουγκρόχο. «Τα σήματα έλευσης ενός τσουνάμι δεν ανιχνεύθηκαν και οι άνθρωποι δεν είχαν τον χρόνο να απομακρυνθούν.»

Η Ινδονησία είναι η πλέον ευάλωτη στις φυσικές καταστροφές χώρα του κόσμου. Σχηματισμένο από την σύγκλιση τεκτονικών πλακών, το αρχιπέλαγος βρίσκεται στην ζώνη του πυρός του Ειρηνικού, μία περιοχή με υψηλή σεισμική και ηφαιστειακή δραστηριότητα.

Οι σταθμοί μέτρησης της παλίρροιας και η μοντελοποίηση των δεδομένων είναι τα κύρια εργαλεία που χρησιμοποιούνται από τις ινδονησιακές υπηρεσίες για την πρόβλεψη των τσουνάμι, που εκδηλώνονται κυρίως έπειτα από σεισμούς.

Ακόμη και όταν όλοι οι σταθμοί παρακολούθησης βρίσκονται σε λειτουργία, οι αστοχίες του δικτύου είναι πολύ σημαντικές. Οι άνθρωποι συχνά δεν έχουν παρά ελάχιστο χρόνο για να φύγουν. Οι προσπάθειες για την βελτίωση του συστήματος δεν καρποφορούν εξαιτίας πλήθους προβλημάτων, από την έλλειψη εξοπλισμού μέχρι τις γραφειοκρατικές δυσλειτουργίες.

Σύμφωνα με τους εμπειρογνώμονες, η καταστροφή αποτελεί συνέπεια μίας μέτριας ισχύος έκρηξης του ηφαιστείου Ανακ Κρακατόα, που βρίσκεται στο Στενό του Σοντ. Η έκρηξη προκάλεσε υποθαλάσσια κατολίσθηση μέρους του ηφαιστείου και την μετατόπιση τεράστιων ποσοτήτων νερού.

«Δεν υπήρχε χρόνος για να τρέξεις»

«Τέτοια σήματα δεν θα είχαν ανιχνευθεί από το σύστημα έγ-

καιρου συναγερμού της Ινδονησίας, διότι είναι κατασκευασμένο για να ανιχνεύει τσουνάμι που προκαλούνται από σεισμούς», λέει ο Ρίτσαρντ Τιού, του Πανεπιστημίου του Πόρτσμουθ.

«Το γεγονός ότι συνέβη την νύκτα επιδείνωσε το χάος. Υπήρχε ελάχιστη πιθανότητα να δει κανείς το τσουνάμι να έρχεται και να τρέξει να καλυφθεί».

Το ηφαίστειο Ανακ Κρακατόα ήταν ενεργό εδώ και πολλούς μήνες, τόσο που μία σχετικά ασήμαντη έκρηξη σαν αυτή που συνέβη το Σάββατο δεν έπρεπε να προκαλέσει υπέρμετρη ανησυχία στον πληθυσμό.

Μετά το καταστροφικό τσουνάμι του 2004, η Ινδονησία έθεσε σε λειτουργία πολλούς σταθμούς παρακολούθησης για τσουνάμι, αλλά, σύμφωνα με τον επικεφαλής της Εθνικής Υπηρεσία Διαχείρισης Καταστροφών, βρίσκονται εκτός λειτουργίας εδώ και έξι χρόνια.

«Οι βανδαλισμοί, η έλλειψη πόρων, τεχνικά προβλήματα είναι όλα λόγοι για τους οποίους δεν έχουμε σταθμούς συναγερμού για τσουνάμι… Πρέπει να τους ξαναφτιάξουμε για να ενισχύσουμε το σύστημα προειδοποίησης στην Ινδονησία», λέει.

Αυτοί οι σταθμοί συνήθως είναι εγκατεστημένοι στα όρια των υποθαλάσσιων τεκτονικών πλατών και έχουν ως αποστολή την ανίχνευση μάλλον των τσουνάμι που προέρχονται από τους σεισμούς, παρά εκείνων που προκαλούνται από την ηφαιστειακή δραστηριότητα, εξηγεί ο Ντέιβιντ Ρόθερι, του ανοικτού πανεπιστημίου του Ηνωμένου Βασιλείου.

«Ακόμη και αν υπήρχε ένας από τους σταθμούς αυτούς δίπλα στο Ανακ Κρακατόα, το χρονικό περιθώριο του συναγερμού θα ήταν πολύ μικρό σε σχέση με την ταχύτητα των κυμάτων του τσουνάμι.»

(in.gr, 24 Δεκεμβρίου 2018, https://www.in.gr/2018/12/24/world/indonisia-ypoleitourgia-tou-systimatos-synagermou-pou-stathike-moiraia)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Permeable paving lets the rain sink in instead of run off

Little by little, many homeowners and communities are opting for a greener way to live, including switching from using asphalt to using permeable or porous paving options for driveways and other paved surfaces.

When rain falls on our roofs, streets, and parking lots in cities and their suburbs, the water cannot soak into the ground as it should because of the type of infrastructure we now have.

From roads to sidewalks and driveways to parking lots - these areas are paved with asphalt or non-porous concrete. While single-purpose gray stormwater infrastructure—conventional piped drainage and water treatment systems—is designed to move urban storm water away from the built environment, green infrastructure reduces stormwater at its source while delivering environmental, social, and economic benefits.

Margaret Mayfield, an architect in Los Osos, California says the use of permeable paving "is much better for the environment because it helps cut down on storm runoff. Along with green roofs and landscaping, it's one more tool in the tool chest and it can also be more beautiful than traditional asphalt."

Clear resin binder used on walkway. Heat Island Group

To aid in helping the environment and cutting down on storm run off, some interesting technologies have come into play, some low tech while other are considered high tech.

Porous options available today

Permeable or porous paving options come in a variety of styles, some high-tech and some considered old-school. For patios, walkways, and driveways, common permeable options include grass with 18-inch wide tire strips. In dry climates where the weather is mild, this method of creating a driveway has worked perfectly well for years.

Obviously, this works much better than a solid slab of concrete or asphalt. Using loose stone or gravel is another method that allows rainfall to soak into the ground rather than letting it run off and has been used for centuries.

Sweden's Highway E16 has become the first in the world to include a 2.0 mile-long eHighway. Scania Group

Another option is the use of a concrete or plastic grid system. Basically, this is a system that uses concrete or plastic blocks, forming a solid surface, allowing water to flow freely through the spaces in the grids. The grids can be filled with sand, gravel, soil or turf, and are long-lasting and easy to install.

New types of concrete or asphalt

Unlike conventional pavements, porous asphalt pavements are typically built over an uncompacted subgrade to maximize infiltration through the soil. Basically, there are two common uses for porous open-graded asphalt pavements, according to the Environmental Protection Agency (EPA).

An open-graded friction course (OGFC) is a thin, open-graded asphalt mix placed atop a dense-graded pavement. Rainwater drains into the OGFC and then out the side of the pavement.

The solar sidewalk can be easily integrated into the environment. Platio

Porous asphalt pavements use open-graded mixes placed atop a stone reservoir. Rainwater flows down through the open-graded mix layers into the stone reservoir where it can then infiltrate into the subgrade. Using this type of asphalt allows for the paving of streets, parking lots and other driving surfaces.

Instead of using regular concrete, many places are switching to pervious concrete or porous pavement, a material that offers the inherent durability and low life-cycle costs of a typical concrete pavement while retaining stormwater runoff and replenishing local watershed systems.

Like conventional concrete, it's made from a mixture of cement, coarse aggregates, and water. However, it contains little or no sand, which results in a porous open-cell structure

that water passes through readily. It's sort of a Rice Crispy Treat.

This pervious parking lot at Miller Park in Fair Oaks, Calif., is helping to preserve over 23 mature olive trees through natural irrigation. Concrete Network

When this type of concrete is used, it can take in storm water at a rapid rate of 3 to 5 gallons per minute per square foot of surface area, which is the stormwater flow rate needed to prevent runoff in most rain events.

In addition to stormwater control, pervious concrete pavements aid in reducing the urban heat-island effect. Because they are light in color and have an open-cell structure, pervious concrete pavements don't absorb and store heat and then radiate it back into the environment like a typical asphalt surface.

The nice thing about permeable pavements is they are not always pricier than conventional paving. Many communities across the country offer incentives like rebates or reduced stormwater utility fees to those who opt for permeable paving. EPA spokeswoman Enesta Jones also says that the newer permeable pavements are already being used successfully across the U.S. and Canada.

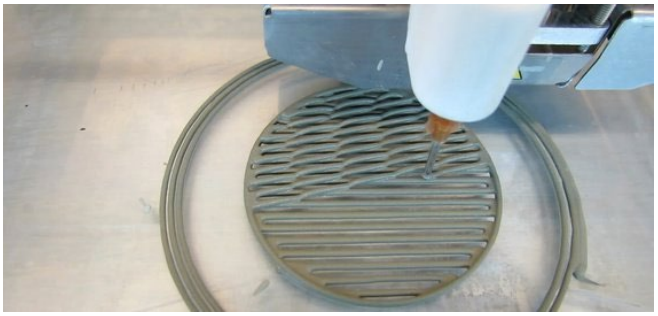
(Karen Graham, Nov 27, 2018 in Technology, http://www.digitaljournal.com/tech-and-science/technology/permeable-paving-lets-the-rain-sink-in-instead-of-run-off/article/537768)

Modern Materials: Memory steel, polymer uses CO2 to self-repair, and more

As the construction industry continues to innovate and explore how different materials can help build buildings and infrastructure in a more sustainable and efficient manner, Construction Dive periodically will round up the latest news and what strides researchers are making in the space.

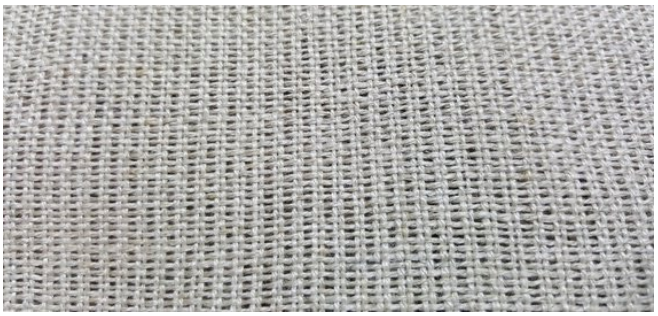
Cracks make this 3D-printed cement stronger

A team at Purdue University's Lyles School of Civil Engineering has created a 3D-printed cement paste that gets stronger as it cracks, according to a statement from the university. The cement paste, inspired by arthropod shells, could help create more disaster-proof, resilient structures, according to the researchers.



The team used layering architectures, such as ones they called "honeycomb," "compliant" and "Bouligand" designs, to create resilient cement structures once the material is hardened. Through various experiments, researchers aimed to understand how weak interfaces could make a material more crack-resistant, such as the Bouligand architecture showing that the cement-based elements behaved like a spring despite being made of brittle material. Micro-CT scans also allowed the team to examine how weak characteristics like pores between the printed layers actually create strength.

Concrete reinforced with natural fibers



Whereas textile-reinforced concrete traditionally has been reinforced with such materials as carbon- or glass-fiber fabrics in lieu of steel, researchers at the Germany-based Fraunhofer Institute for Wood Research have replaced the fabrics with eco-friendly natural fibers such as flax, which can be spun or woven. Adding strands of polymer fiber to the flax creates a hybrid fabric that can be specified to a given component's requirements.

The variable stiffness of the flax-based textile, which is embedded in layers on a component, can be arranged into a desired shape. Specially developed liquid concrete comprising fine aggregate, water, concrete additives and admixtures is poured on the reinforcing flax textile to create components that can bear weight at only a few centimeters thick. Potential applications include bridges, façades and ceilings, as well as curved contours like domes and rounded wall elements.

'Memory steel' can reinforce new and existing concrete structures

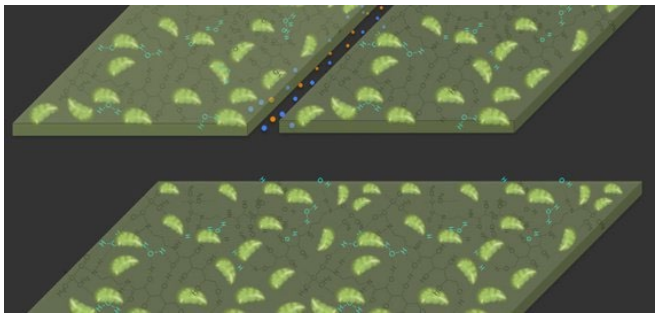
Developed by Swiss firms Empa and re-fer AG, "memory steel" needs to be heated only once for prestressing to occur

automatically. The material, a result of 15 years of research, can reportedly be used to reinforce new and existing concrete structures. The shape memory alloys are based on iron that contracts during heating, thereby permanently prestressing the concrete structure and avoiding hydraulic prestressing, which is how most steel reinforcements are prestressed.

Several pilot projects to reinforce various reinforced concrete slabs already have been successful. Empa says the material will allow crews to more easily reinforce load-bearing structures in old buildings when new windows, doors or lift shafts are installed. It also may have future capacity in manufacturing precast concrete parts with a previously unknown geometry.

Voestalpine Böhler Edelstahl GmbH & Co KG in Austria is manufacturing the ready-to-install memory steel profiles.

Material repairs itself with carbon dioxide from the air



Diagrams illustrate the self-healing properties of the new material. At top, a crack is created in the material, which is composed of a hydrogel (dark green) with plant-derived chloroplasts (light green) embedded in it. At bottom, in the presence of light, the material reacts with carbon dioxide in the air to expand and fill the gap, repairing the damage.

MIT chemical engineers have created a polymer that will grow, strengthen and repair itself by continuously converting the greenhouse gas into a carbon-based material that reinforces itself, according to MIT News. Currently in a synthetic gel-like form, the material performs a chemical process similar to how plants pull CO2 from the air into their growing tissues. Initial experiments used chloroplasts from spinach leaves, which catalyzed the reaction of CO2 to glucose. Those chloroplasts in the polymer eventually will be replaced by nonbiological catalysts.

Although it isn't yet strong enough to be used as a building material, it could work to fill cracks or be a coating, the researchers said. Exposure to sunlight and some indoor lighting could prompt the material to self-heal if it is scratched or cracked. In addition to pulling CO2 out of the air, the material also does not require fossil fuels for its creation, making it a sustainable product.

(Laurie Cowin @lauriethewriter, Nov. 28, 2018)

The Supreme Award for Structural Engineering Excellence

Tamina Canyon Crossing

Structural Designer: Leonhardt, Andrä und Partner

Client Name: Tiefbauamt Kanton St. Gallen

Location: Bad Ragaz, Canton St. Gallen, Switzerland

Principal Contractor: ARGE Taminabrücke c/o Strabag AG, Glattbrugg, J. Erni AG, Films Dorf, Mesierbau AG / Balzers

Architect: Volkhard Angelmaier

PROJECT DESCRIPTION

The bridge crosses the Tamina canyon 200m above the gorge. The arch and the superstructure create a continuous prestressed girder mainly forming the structural system. The 417m long superstructure is connected monolithically to the arch by inclined columns; the total length of the structure is 473m with abutments included.

Judge's comment:

This is undoubtedly an outstanding engineering solution, and the judges were impressed by the elegance, clarity and economy of the design. The judges noted the efficiency of the structural system, as well as the beautiful way that the design integrates with its spectacular surroundings. This is a concrete arch design in the best traditions of Christian Menn and Robert Maillart, and the engineers have produced a world class and graceful design.

The judges liked the way that the open spandrel prop supports are inclined in a radial fan arrangement, and the high degree of transparency that has been achieved, with an attractive rhythm for the spans of the deck girder. This transparency is accentuated by the slenderness of the thin inclined props which is achieved by the use of meticulously detailed concrete hinges.

The two end props, which spring from the ends of the arch, imposing both physical and visual weight at these points to good effect, work as part of an integral framing system with the slightly deeper end spans of the girder. These spans can therefore be longer, thus avoiding the need for additional foundations at the sensitive upper slopes of the valley. So the bridge stands on just four foundations, reducing construction uncertainty and maximising the economy of the scheme.

https://www.istructe.org/structuralawards/winners/supreme-award-for-structural-engineering-excellenc/2018/tamina-canyon-crossing

The biggest dump truck

The world's biggest dump truck, the Belaz 75710, weighs in at an incredible 496t. It was developed by Belaz, a mining manufacturing company from Belarus, in 2013, and sales began in 2014.

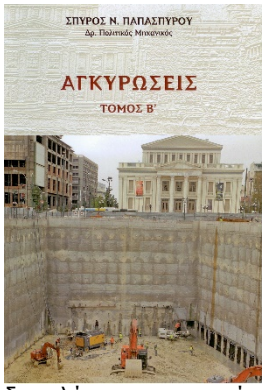
At 20.6m-long, 8.16m-high and 9.87m-wide, the house-sized truck was the first to be able to transport more than 450t. The giant has two pivoted axis to increase its manoeuvrability, two diesel engines and eight wheels.

It has entries in the Guinness World Records as both 'the biggest two-axial dump truck' and 'the biggest body with capacity of 645.4m^3'. Then in 2015, the truck was featured on a stamp in Belarus, highlighting its popularity and public appeal.

In the 75710's first year of operation at Chernigovets coal mine in Russia, it transported 4.6 million tonnes of rock. That's the equivalent of the weight of 1,115 railway locomotives.

https://mine.nridigital.com/mine_yearbook_2018/mining_vehicles_a_ride_through_time

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Αγκυρώσεις, Τόμος Β'

Σπύρος Παπασπύρου

Οι περιοχές αδυναμίας που συναντιούνται τυχαία μέσα στο έδαφος, οι αβεβαιότητες των παραμέτρων του και το γεγονός ότι τα αγκύρια είναι μια θαμμένη κατασκευή που δεν ελέγχεται υποχρεώνουν τον μηχανικό σε ιδιαίτερα προσεκτικούς χειρισμούς. Έχοντας να αντιμετωπίσει ακόμη και ανθρώπινα λάθη οδηγείται αυθόρμητα σε έναν συντηρητικό σχεδιασμό, ο οποίος συχνά καταλήγει σε υπερδιαστασιολόγηση. Χάρις όμως, σ' αυτόν το φόβο οι αστοχίες που έχουν σημειωθεί σε αγκυρωμένες αντιστηρίξεις είναι ελάχιστες. Εν όψει του μεγέθους ης ζημίας μιας κατάρρευσης κανείς δεν διανοείται να αποτολμήσει κάτι αδόκιμο. Εδώ, λοιπόν, αναδεικνύεται ο ρόλος της εμπειρίας, που θα αξιολογήσει τα επιστημονικά δεδομένα με την υπαρκτή πραγματικότητα και θα συνδυάσει την ασφάλεια με την οικονομία.

Στον Α΄ τόμο του βιβλίου ΑΓΚΥΡΩΣΕΙΣ περιγράφονται τα θεωρητικά στοιχεία για τον σχεδιασμό και υπολογισμό του αγκυρίου καθώς και οι τρόποι κατασκευής του. Στις τρεις δεκαετίες που μεσολάβησαν άλλαξαν πολλά από πλευράς κανονισμών, η τεχνολογία προόδευσε και οι οικονομικοί συσχετισμοί μεταξύ υλικών και εργασίας μεταβλήθηκαν. Στη χώρα μας επικράτησε μια ορισμένη τεχνολογία προσαρμοσμένη στις τοπικές συνθήκες.

Ο Β' τόμος έχει σκοπό να εντοπίσει τις αλλαγές αυτές και να περιγράψει την τεχνική που επικράτησε.

Στο 1ο και 2ο κεφάλαιο αναπτύσσεται η κατασκευαστική τεχνολογία των αγκυρίων και των πετασμάτων αντιστήριξης.

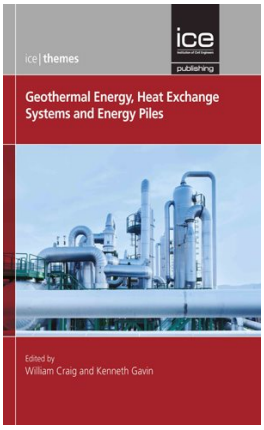
Στο 3ο κεφάλαιο αναφέρονται τα φορτία που ασκούνται σε κατακόρυφο πέτασμα αντιστήριξης με βάση τους ισχύοντες κανονισμούς και τις σύγχρονες αντιλήψεις περί ωθήσεων γαιών.

Το 4ο και 5ο κεφάλαιο περιλαμβάνουν τον τρόπο υπολογισμού του αγκυρίου και του κατακόρυφου πετάσματος. Στους πίνακες βασικών τιμών αντοχής αγκυρίων έγινε προσπάθεια να περιληφθούν δεδομένα από εδάφη του ελληνικού χώρου.

Τέλος στο 6ο κεφάλαιο μελετώνται οι οριζόντιες και κατακόρυφες μετακινήσεις του εδάφους που προκαλούνται από τη εκσκαφή και αντιστήριξη καθώς και τα κατασκευαστικά μέτρα αντιμετώπισης των συνεπειών τους.

Χρησιμοποιήθηκε γενικά η ορολογία και οι συμβολισμοί των ευρωκωδίκων EN1537, EN1997, prEN22477-5 με ελάχιστες μόνο εξαιρέσεις, όπου διατηρήθηκαν οι συμβολισμοί της πρωτότυπης δημοσίευσης, αλλά με τρόπο που να μη δημιουργεί σύγχυση.

(Αθήνα, 2017)



Geothermal Energy, Heat Exchange Systems and Energy Piles (ICE Themes)

William Craig and Kenneth Gavin, Editor

The ICE Themes series showcases cutting edge research and practical guidance in all branches of civil engineering. Each title focuses on a key issue or challenge in civil engineering, and includes research from the industry's finest thinkers and influencers published through the ICE Publishing programme. Themes in the series include climate change resilience, advances in construction management, developments in renewable energy, and innovations in construction materials plus many more.

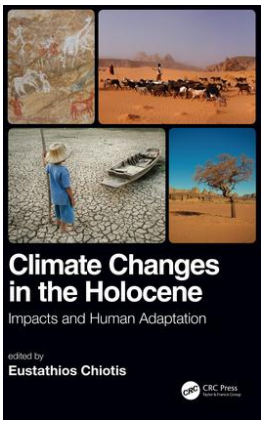
Geothermal Energy, Heat Exchange Systems and Energy Piles (ICE Themes) focuses on topics from high temperature geothermal energy extraction, to lower temperature situations at ground surface and shallow depths. Providing broad international coverage, the chapters encompass field observations on sites in several countries as well as computational and laboratory studies. Ground conditions vary from hard rock to chalk, loess to London Clay.

Key features of this book include:

- international case histories on geothermal energy extraction
- coverage of geothermal resource exploration, characterisation and evaluation
- design and assessment of energy piles.

This book, which has been edited by two leading experts in the field, is an ideal resource for engineers and researchers seeking an overview of the latest research in this exciting area.

(ICE Publishing, 05 July 2018)



Climate Changes in the Holocene:
Impacts and Human Adaptation

1st Edition

Eustathios Chiotis, Editor

This book highlights climate as a complex physical, chemical, biological, and geological system, in perpetual change, under astronomical, predominantly, solar control. It has been shaped to some degree through the past glaciation cycles repeated in the last three million years. The Holocene, the current interglacial epoch which started ca. 11,700 years ago, marks

the transition from the Stone Age to the unprecedented cultural evolution of our civilization.

Significant climate changes have been recorded in natural archives during the Holocene, including the rapid waning of ice sheets, millennial shifting of the monsoonal fringe in the northern hemisphere, and abrupt centennial events. A typical case of severe environmental change is the greening of Sahara in the Early Holocene and the gradual desertification again since the fifth millennium before present.

Climate Changes in the Holocene: Impact, Adaptation, and Resilience investigates the impact of natural climate changes on humans and civilization through case studies from various places, periods, and climates. Earth and human society are approached as a complex system, thereby emphasizing the necessity to improve adaptive capacity in view of the anthropogenic global warming and ecosystem degradation.

Features:

- Written by distinguished experts, the book presents the fundamentals of the climate system, the unparalleled progress achieved in the last decade in the fields of intensified research for improved understanding of the carbon cycle, climate components, and their interaction.

- Presents the application of paleoclimatology and modeling in climate reconstruction.

Examines the new era of satellite-based climate monitoring and the prospects of reduced carbon dioxide emissions.

(https://www.taylorfrancis.com/books/9781351260237
Published 15 December 2018, eBook Published 15 November 2018)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.issmge.org/filemanager/article/587/ISSMGE_BULLETIN_2018_DEC_FINAL.pdf

Κυκλοφόρησε το Τεύχος No. 6 του Τόμου 12 (Δεκεμβρίου 2018) του ISSMGE Bulletin της International Society for Soil Mechanics and Geotechnical Engineering με τα παρακάτω περιεχόμενα:

Message from member society

TC corner

Conference report

- The 8th International Congress on Environmental Geotechnics, China

Hot news

- IS-Glasgow 2019, U.K.
- A meeting of national societies in South America during the conference COBRAMSEG, Brazil

ISSMGE foundation report

Event Diary

Corporate Associates

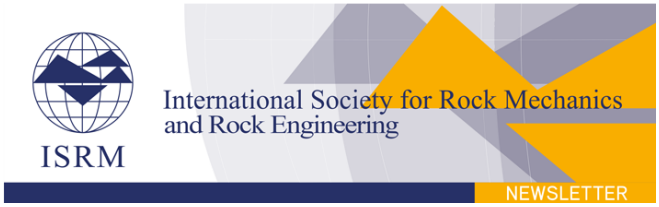
Foundation Donors

www.geoengineer.org/geonews161.html

Κυκλοφόρησε το Τεύχος #161 του **Newsletter** του **Geo-engineer.org** (Νοεμβρίου 2018) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωμηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο.

Ενδεικτικά αναφέρονται:

- Old fort landslide caused by bedrock failure: People return home
- 19 people dead after rock-burst in East China's mining facility
- Have you heard Karl Terzaghi's voice? Listen to Karl Terzaghi's Last Lecture Recording in Harvard!
- Mount Etna is sliding into the Mediterranean sea
- Tremendous earthquake strucks the Greek Island of Zakynthos
- Massive landslides in Palu after Mw 7,5 earthquake in Sulawesi
- Iceland introduces geothermal energy to China
- World's longest bridge ready to operate
- Portageville project winner of ENR Award



https://www.isrm.net/adm/newsletter/ver_html.php?id_newsletter=161

Κυκλοφόρησε το Τεύχος No. 43 (Δεκεμβρίου 2018) του Newsletter της International Society for Rock Mechanics and Rock Engineering με τα παρακάτω περιεχόμενα:

- President's 2019 New Year's Address
- The ISRM held its Council meeting in Singapore, on 30 October
- 24th ISRM online lecture by Prof. Claudio Olalla
- ISRM 14th International Congress on Rock Mechanics, Foz de Iguaçu, Brazil, 13-18 September 2019
- EUROCK 2020 in Trondheim, Norway, the 2020 ISRM International Symposium
- E.T. Brown Colloquium - A celebration of Prof. Ted Brown's 80th anniversary
- ISRM Suggested Method for Determining Basic Friction Angle of Planar Rock Surfaces by Means of Tilt Tests
- Two more languages added to the ISRM technical glossary: Croatian and Macedonian
- Geotechnical challenges in karst, Omis-Split, 11-13 April 2019, an ISRM Specialized Conference
- The 2019 Rock Dynamics Summit in Okinawa, 7-11 May, an ISRM Specialized Conference
- 3rd ICITG, Guimarães, Portugal, 29 Sep. to 2 Oct. 2019 – December Update
- YSRM2019 and REIF2019, Okinawa, Japan, 1-4 December, an ISRM Specialized Conference
- ISRM participated in the 2nd JTC1 Workshop in Hong Kong on 3-5 Dec 2018
- ISRM visit to Hungary and Bulgaria
- ISRM Sponsored meetings

ITA @ news

https://about.ita-aites.org

Κυκλοφόρησε το Τεύχος No. 66 (Δεκεμβρίου 2018) των ITA News της International Tunnelling Association με τα παρακάτω περιεχόμενα:

- Message from Tarcisio Celestino, ITA President
- 2018 ITA Tunnelling Awards: winners announced
- 2018 winner of the major project of the year (over €500M) category: The immersed tunnel of the Hong Kong-Zhuhai-Macao Bridge
- Winner of the project of the year (between €50M & €500M) : The Queershan tunnel on national road 317
- 2018 winner of the project of the year incl. renovation (up to €50M): Zarbalizadeh Shallow Tunnel Construction underneath the operating railways
- Technical project innovation of the year: a mechanized method with large section horseshoe shape epb-tbm first applied in loess mountain tunnel
- Technical product/equipment innovation of the year: Multifunctional energy-storage and luminescent material for sustainable and energy-saving lighting for tunnels
- Safety initiative of the year: ROBY 850 - Semi-automatic drilling robot
- Innovative underground space concept of the year: Norwegian rock blasting museum
- Giuseppe M. Gaspari: Young Tunneller of the year
- Lifetime Achievement Award: Dr. Evert Hoek
- Registration open for the ITA-CET courses at the WTC 2019 in Naples!
- ITA COSUF has supported PIARC first edition in Lyon
- Successful conference on tunnel renovation
- In the press: ITA-CET collaborates with Nepal to train hydro tunnel engineers
- ITACUS participated in ACUUS World Conference 2018 in Hong Kong
- Hashtag campaign #WorldTunnelDay
- Tunnelling the world 2018 video
- Workshop and Training in Kenya

IGS International Geosynthetics Society

Κυκλοφόρησε το IGS Newsletter της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

IGS NEWSLETTER – December 2018

Helping the world understand the appropriate value and use of geosynthetics

A Holiday Message from IGS President, Chungsik Yoo, Ph.D. READ MORE

17th ARCSMGE – Abstract Deadline Extended to 31 January 2019! READ MORE

Mercer Lecture Dates Announced READ MORE

- 15th meeting of ISO/TC 221 "Geosynthetics" and WGs 2, 3, 4, 5 & 6 London 2-4 October 2018 READ MORE
- GIGSA Hosts Successful Education Week READ MORE
- Announcement of GeoAfrica 2021 READ MORE
- GCCETS 2018 Symposium Report READ MORE
- Geosynthetics for Sustainable Development – Italian Translation READ MORE
- Geosynthetics for Sustainable Development – Chinese Translation READ MORE

Calendar of Events

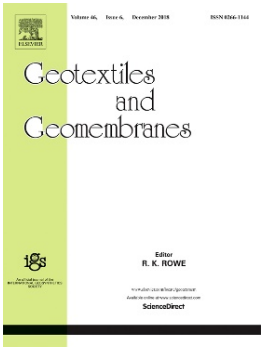
Geosynthetics 2019, Houston, Texas, USA | February 10 – 13, 2019

TRANSOILCOLD 2019, St. Petersburg, Russia | May 20 – 23, 2019

7th ICEGE, Roma, Italy | June 17 – 20, 2019

3rd ICITG, Guimarães, Portugal | Sept. 29 – Oct. 2, 2019

READ MORE AT GEOSYNTHETICSSOCIETY.ORG



www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/46/issue/6

Κυκλοφόρησε το Τεύχος 6 του Τόμου 46 (Δεκεμβρίου 2108) του Geotextiles and Geomembranes της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

Geotextiles and Geomembranes: Best papers in 2017, R. Kerry Rowe

Effect of particle shape on the response of geogrid-reinforced systems: Insights from 3D discrete element analysis, Ge Gao, M.A. Meguid, Pages 685-698

Durability studies of surface-modified coir geotextiles, S. Sumi, N. Unnikrishnan, Lea Mathew, Pages 699-706

Effect of water salinity on the water retention curve of geosynthetic clay liners, Yi Lu, Hossam Abuel-Naga, Eng-Choon Leong, Abdelmalek Bouazza, Peter Lock, Pages 707-714

Dynamic friction and the seismic performance of geosynthetic interfaces, P. Pavanello, P. Carrubba, N. Moraci, Pages 715-725

Influence of wire mesh characteristics on reinforced soil model wall failure mechanisms-physical and numerical modelling, Adis Skejic, Senad Medic, Samir Dolarevic, Pages 726-738

Micro X-ray visualisation of the interaction of geosynthetic clay liner components after partial hydration, Will P. Gates, Gift Dumadah, Abdelmalek Bouazza, Pages 739-747

Shaking table tests on geosynthetic encased columns in soft clay, C. Cengiz, E. Guler, Pages 748-758

Using a geotextile with flocculated filter backwash water and its impact on aluminium concentrations, I. Jahan, M. Wood, C.B. Lake, G.A. Gagnon, Pages 759-769

Insufficient initial hydration of GCLs from some subgrades: Factors and causes, A.S. Acikel, W.P. Gates, R.M. Singh, A. Bouazza, R.K. Rowe, Pages 770-781

Numerical modelling and validation of geosynthetic encased columns in soft soils with installation effect, Sparsha Sinduri Nagula, Duc Michael Nguyen, Jürgen Grabe, Pages 790-800

Experimental and numerical investigation of the uplift capacity of plate anchors in geocell-reinforced sand, M. Rahimi, S.N. Moghaddas Tafreshi, B. Leshchinsky, A.R. Dawson, Pages 801-816

Estimating the bearing capacity of single reinforced granular fill overlying clay, Gizem Misir, Mustafa Laman, Pages 817-829

Three-dimensional numerical analysis of individual geotextile-encased sand columns with surrounding loose sand, Shaymaa T. Kadhim, Robert L. Parsons, Jie Han, Pages 836-847

Experimental and numerical investigations of the behaviour of footing on geosynthetic reinforced fill slope under cyclic loading, Md. Jahid Iftekhar Alam, C.T. Gnanendran, S.R. Lo, Pages 848-859

Required unfactored geosynthetic strength of three-dimensional reinforced soil structures comprised of cohesive backfills, Yanbo Chen, Yufeng Gao, Shangchuan Yang, Fei Zhang, Pages 860-868

Role of soil inherent anisotropy in peak friction and maximum dilation angles of four sand-geosynthetic interfaces, Aliyeh Afzali-Nejad, Ali Lashkari, Benyamin Farhadi, Pages 869-881

Laboratory and numerical investigation of machine foundations reinforced with geogrids and geocells, Hasthi Venkateswarlu, K.N. Ujjawal, A. Hegde, Pages 882-896

A dynamic gradient ratio test apparatus, M.W. Khan, A.R. Dawson, A.M. Marshall, Pages 782-789

The determination of interface friction by means of vibrating table tests, P. Pavanello, P. Carrubba, N. Moraci, Pages 830-835

Laboratory evaluation of a new device for water drainage in roadside slope along railway systems, Yipeng Guo, Wuming Leng, Rusong Nie, Chunyan Zhao, Xiong Zhang, Pages 897-903

An extended data base and recommendations regarding 320 failed geosynthetic reinforced mechanically stabilized earth (MSE) walls, Robert M. Koerner, George R. Koerner, Pages 904-912

Discussion

"Numerical simulation of compaction-induced stress for the analysis of GRS walls under working conditions" by S. H. Mirmoradi and M. Ehrlich, *Geotextiles and Geomembranes*, 46 (2018), pp. 354-365, Jonathan T.H. Wu, Peter Hoffman, Thang Q. Pham, Pages 913-914

"Numerical simulation of compaction-induced stress for the analysis of RS walls under working conditions" by S. H. Mirmoradi and M. Ehrlich, Geotextiles and Geomembranes, 46 (2018), pp. 354-365, S.H. Mirmoradi, M. Ehrlich, Pages 915-916

https://www.icevirtuallibrary.com/toc/jgein/25/6

Κυκλοφόρησε το Τεύχος 6 του Τόμου 25 (Δεκεμβρίου 2108) του Geosynthetics International της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

Geosynthetic-reinforced cushioned piles with controlled rocking for seismic safeguarding, R. Xu, B. Fatahi, pp. 561–581

Transverse shaking table test of a half-scale geosynthetic reinforced soil bridge abutment, Y. Zheng, J. S. McCartney, P. B. Shing, P. J. Fox, pp. 582–598

Interaction of adjacent strip footings on reinforced soil using upper-bound limit analysis, N. Biswas, P. Ghosh, pp. 599–611

Assessing the ultimate uplift capacity of plate anchors in geocell-reinforced sand, M. Rahimi, B. Leshchinsky, S. N. Moghaddas Tafreshi, pp. 612–629

Sidewalls and PVDs below embankments on soft soils – three-dimensional analysis by FEM, J. L. Borges, F. Almeida, pp. 630–643

Large-strain tensile behaviour of geomembranes with defects using 3D digital image correlation, W. J. Cen, H. Wang, D. J. Li, L. S. Wen, pp. 644–655

Evaluation of tensile load model accuracy for PET strap MSE walls, Y. Miyata, R. J. Bathurst, T. M. Allen, pp. 656–671

Announcements

Note of appreciation to paper reviewers, pp. 672

www.icold-cigb.org/userfiles/files/NEWSLETTERS/Icold-newsletter-17-BD.pdf

Κυκλοφόρησε το 17ο Τεύχος, Νοεμβρίου 2018, της International Commision of Large Dams με τα παρακάτω περιεχόμενα:

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2015 – 2018)

Πρόεδρος	:	Γεώργιος ΓΚΑΖΕΤΑΣ, Δρ. Πολιτικός Μηχανικός, Καθηγητής Ε.Μ.Π. president@hssmge.gr, gazetas@central.ntua.gr
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ΕΕΕΕΓΜ
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
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