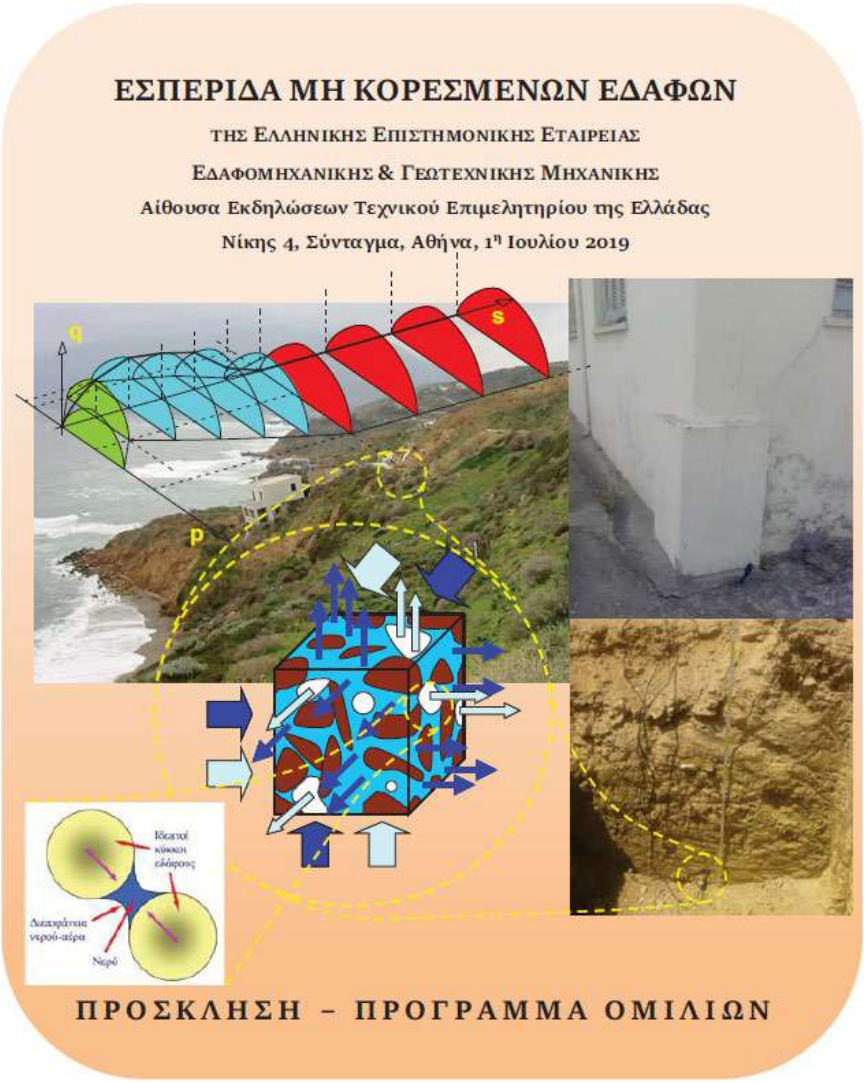
Grundarfjörður, West Iceland

Αρ. 126 – ΜΑΙΟΣ 2019

ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

126



SIMSG ISSMGE

ISRM

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

Northern lights

Some 155 miles north of the Arctic Circle

ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

ΠΡΟΣΚΛΗΣΗ

Με την ευκαιρία της ανάληψης της διοργάνωσης του 8ου Παγκοσμίου Συνεδρίου Μη Κορεσμένων Εδαφών που θα γίνει το 2022 στη Μήλο, η Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ΕΕΕΕΓΜ) διοργανώνει

ΕΣΠΕΡΙΔΑ ΜΗ ΚΟΡΕΣΜΕΝΩΝ ΕΔΑΦΩΝ

στην Αίθουσα Εκδηλώσεων του Τεχνικού Επιμελητηρίου της Ελλάδας στην οδό Νίκης 4, Σύνταγμα, Αθήνα

την Δευτέρα **1η Ιουλίου 2019, ώρα 17:30**.

Επισυνάπτεται το πρόγραμμα της εσπερίδας με τους ομιλητές και τους τίτλους των διαλέξεών τους.

Στο πλαίσιο της εσπερίδας θα υπάρξει ομιλία από τον **καθηγητή Eduardo Alonso** του Πανεπιστημίου UPC της Βαρκελώνης.

Πριν την έναρξη της εκδήλωσης θα παραλαμβάνονται τα πρακτικά με τα άρθρα που αντιστοιχούν στις παρουσιάσεις των ομιλητών.

Ο Πρόεδρος
Καθηγητής Γ. ΓΚΑΖΕΤΑΣ

Ο Γραμματέας
Δρ Μ. ΜΠΑΡΔΑΝΗΣ

ΕΣΠΕΡΙΔΑ ΜΗ ΚΟΡΕΣΜΕΝΩΝ ΕΔΑΦΩΝ

ΤΗΣ ΕΛΛΗΝΙΚΗΣ ΕΠΙΣΤΗΜΟΝΙΚΗΣ ΕΤΑΙΡΕΙΑΣ

ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Αίθουσα Εκδηλώσεων Τεχνικού Επιμελητηρίου της Ελλάδας

Νίκης 4, Σύνταγμα, Αθήνα, 1η Ιουλίου 2019

Προσέλευση, εγγραφές, παραλαβή πρακτικών από 17:00, **Έναρξη Εκδήλωσης 17:30**

17:30	**ΧΑΙΡΕΤΙΣΜΟΙ – ΕΙΣΑΓΩΓΗ** Γ. Γκαζέτας, Γ. Ντουνιάς, Μ. Καββαδάς
17:40	**ΦΥΣΗ, ΜΗΧΑΝΙΚΗ ΣΥΜΠΕΡΙΦΟΡΑ ΚΑΙ ΕΜΦΑΝΙΣΗ ΜΗ ΚΟΡΕΣΜΕΝΩΝ ΕΔΑΦΩΝ** Μ. Μπαρδάνης
18:10	**Η ΧΑΡΑΚΤΗΡΙΣΤΙΚΗ ΚΑΜΠΥΛΗ ΕΔΑΦΟΥΣ-ΝΕΡΟΥ ΚΑΙ Η ΣΗΜΑΣΙΑ ΤΗΣ** Αικ. Τσιαμπούση
18:35	**ΔΙΑΤΜΗΤΙΚΗ ΑΝΤΟΧΗ ΜΗ ΚΟΡΕΣΜΕΝΩΝ ΕΔΑΦΩΝ** Ν. Χατζηγώγος
19:00	**ΔΙΟΓΚΩΣΗ ΕΔΑΦΩΝ ΛΟΓΩ ΜΕΤΑΒΟΛΗΣ ΤΟΥ ΒΑΘΜΟΥ ΚΟΡΕΣΜΟΥ** Δ. Λουκίδης
19:25	**ΚΑΤΑΡΡΕΥΣΗ ΕΔΑΦΩΝ ΛΟΓΩ ΜΕΤΑΒΟΛΗΣ ΤΟΥ ΒΑΘΜΟΥ ΚΟΡΕΣΜΟΥ** Ν. Χατζηγώγος & Μ. Μπαρδάνης
19:45	**ΚΑΤΑΣΤΑΤΙΚΗ ΠΡΟΣΟΜΟΙΩΣΗ ΤΗΣ ΜΗΧΑΝΙΚΗΣ ΣΥΜΠΕΡΙΦΟΡΑΣ ΤΩΝ ΜΗ ΚΟΡΕΣΜΕΝΩΝ ΕΔΑΦΩΝ** Π. Σιταρένιος
20:10	**ΜΑΚΡΟΧΡΟΝΙΕΣ ΜΕΤΡΗΣΕΙΣ ΜΥΖΗΣΗΣ ΣΤΗΝ ΕΛΛΑΔΑ ΚΑΙ ΣΤΗΝ ΚΥΠΡΟ** Μ. Μπαρδάνης & Δ. Λουκίδης
20:25	**SHORT AND LONG TERM DEFORMATION OF COMPACTED MATERIALS. THE CASE OF BELICHE DAM** E. Alonso
20:50	**ΕΡΩΤΗΣΕΙΣ – ΣΥΖΗΤΗΣΗ**

ΑΡΘΡΑ

On the Limitations of Limit Equilibrium Analyses of Slope Stability

Robert Pyke
Individual Consultant and Technical Director at TAGA Engineering Software Ltd

The National Highway No. 3 Landslide, Taiwan, April 25, 2010

The history of slope stability analyses by the method of slices or columns in geotechnical engineering is well documented in the textbook by Duncan, Wright and Brandon (2014) and elsewhere. The procedures used for slope stability analysis started out as hand or graphical methods, but with the introduction of limit equilibrium methods of analysis most calculations became computerized. Many engineers seem to believe that these computer programs automatically give the correct answer, but, in addition to the "garbage in – garbage out" rule still holding, these analyses are simplified and thus approximate at best. There are also specific features of the common methods of analysis that may limit their usefulness in various ways.

To start with, there are two ways that the factor of safety has been defined in the analysis of slope stability using the method of slices or columns.

The first is the simple definition that the factor of safety is the sum of the resisting forces around the failure plane divided by the sum of the driving forces. This was used in early analyses using the method of slices and many geotechnical engineers appear to still believe that this is the way the factor of safety is calculated.

However, most modern computer programs define the factor of safety differently, as a strength reduction factor. The factor of safety is that factor by which the assumed shear strengths must be reduced in order that the sums of the driving and resisting forces are equal.

A common argument in support of this definition is that the shear strengths around the failure plane are the greatest source of uncertainty in the analysis, so that it makes sense to factor the shear strengths. That is questionable. In practice, most geotechnical engineers adopt conservative values for the shear strengths or shear strength parameters, so that the uncertainty in these values is already considered. A better, contrary, argument is that the methods that define the factor of safety this way force the factor of safety to be the same at the base of each slice and obscure the fact that some parts of the potential slip surface may be overstressed, even if the overall factor of safety is above 1.0. That is a good reason for normally requiring an overall factor of safety of 1.5 in practice. If the factor of safety is 1.5 or greater, then the local factors of safety are less likely to fall below 1.0 and the risk of progressive failure should be diminished. Also, as shown in a separate article https://www.linkedin.com/pulse/effect-including-seepage-forces-slope-stability-analyses-robert-pyke, the omission of seepage forces in limit equilibrium methods of analysis can cause the factor of safety to be overestimated by as much as 30 percent, so that is yet another reason for requiring a factor of safety of 1.5. On the other hand, 3D effects, while they can in some cases reduce the factor of safety, normally increase it, sometimes very significantly, see https://www.linkedin.com/pulse/3d-effects-slope-stability-analyses-robert-pyke, so that requiring a 2D factor of safety of 1.5 for those cases may be excessive.

Using the second definition of the factor of safety, the sums of the driving and resisting forces are made equal, therefore the methods of analysis that use it are called "limit equilibrium analyses". Some methods of analysis, such as Bishop's Simplified Method, are limit equilibrium analyses but they do not "fully satisfy equilibrium", meaning that force and moment equilibrium is not satisfied for each slice or column and thus for the potential sliding mass as a whole. Methods which do "fully satisfy equilibrium" such as those of Morgenstern and Price (1965) or Spencer (1967) are now generally preferred by both academics and practitioners.

The principal direct implication of how the factor of safety is defined is that with the first, simple definition one can calculate "local factors of safety" for each slice or column whereas in limit equilibrium analyses, one cannot do that. Equations of equilibrium are set up and then solved for two unknowns – the factor of safety and a second unknown which usually has to do with the assumptions made regarding side forces acting on the slices of columns. In Spencer's Method this unknown is the angle of inclination of the side forces, which is assumed to be constant for all slices or columns. In the Morgenstern and Price method it is a scale factor for the side forces whose varying angles of inclination are specified by the user.

Again, with the second definition of the factor of safety there is only one factor of safety and it applies to each slice or column as well as the overall potential sliding mass. As noted already, this obscures the fact that some segments of the potential slip surface are likely closer to failure than others, but it also forces an at least somewhat artificial distribution of the normal and shear stresses around the potential slip surface. The normal stresses will impact the shear strengths calculated for non-cohesive materials, that is, materials for which the strength is at least in part specified to be a function of the normal stress on the potential slip surface. This is demonstrated subsequently in several examples which show the normal stress distributions obtained using a limit equilibrium analyses and a simple method of analysis which is not a limit equilibrium analysis. It turns out that the difference in the normal stresses is the big contributing factor to any differences in the factor of safety that are computed by the two methods.

Given the previous discussion, one might then ask, "why do people generally prefer methods that fully satisfy equilibrium?" The basic answer to this question seems to be that engineers are taught in undergraduate classes that any analysis of the stresses in a rigid body should "fully satisfy equilibrium", and it certainly looks more elegant or sophisticated to do this. But is it correct for a potential sliding mass that is deformable and can't take tension?

The second definition of the factor of safety and the quest to fully satisfy equilibrium implies that the potential sliding mass acts as a rigid body. Leaving aside for the moment whether this is reasonable or not for real slopes, this forces the factor of safety to be the same for all slices, and, as already noted,

forces an at least somewhat artificial distribution of the normal and shear stresses around the potential slip surface, but it has other implications as well. These implications have to do with the development of tensile interslice forces and the calculated line of thrust, and also whether or not the solution converges and, further, whether or not it converges to the correct solution.

Solutions that "fully satisfy equilibrium" will tend to develop negative interslice forces wherever there is a hump in the potential slip surface and at the upper end of a shallow potential slip surface. The computed factors of safety in these cases may be quite unconservative because the assumed rigid body gets hung up. Thus, the user needs to insert tension cracks as necessary to eliminate any tensile interslice forces, since soil and rock masses generally have no tensile capacity. The user also then has to decide whether a model with perhaps artificially deep tension cracks is real or not.

More attention in the literature has been applied to the line of thrust, that is the locus of the points of application of the interslice forces, and this has generally been the principal recommended test for whether a solution is reasonable or not. Ideally the line of thrust should be located at something like the third point of the slices or columns but it should never travel outside the boundaries of the potential sliding mass, as it commonly does in problems with tensile interslice forces and sometimes does in pseudo-static seismic analyses.

The occurrence of tensile interslice forces and odd lines of thrust is illustrated using the example of a relatively simple embankment dam, but it is also helpful to compare the results using a method that "fully satisfies equilibrium", in this case Spencer's Method, with a method that uses the first, simple definition of the factor of safety, in this case the Ordinary Method of Columns (OMC), a 3D implementation of the Ordinary Method of Slices (OMS). The OMC and some past criticisms of the OMS will be described in more detail in a subsequent article, but for this example, it is sufficient to say that it uses the first definition of the factor of safety and that interslice, or intercolumn, forces are neglected. For non-spherical slip surfaces, it is as if a bunch of square columns coated with Teflon can slide up and down as the overall slope deforms. In 2D the slices slide up and down relative to each other as the potential sliding mass displaces for non-circular slip surfaces. Thus, the OMC implies that the potential sliding mass is deformable, whereas Spencer's method implies that the potential sliding mass is rigid. The program TSLOPE used to construct these examples is available for a free trial at https://tagasoft.com/

Figure 1 shows results for the stability of the downstream slope of a simple dam embankment analysed using both Spencer's Method and the OMC. In Figure 1(a) using Spencer's Method causes the development of tensile interslice forces, indicated by slices coloured red, and causes the line of thrust, shown as a red line, to swing outside the potential sliding mass. Figure 1(b) shows the equivalent solution by the OMC. The black arrows indicate the normal effective stresses on the bases of each slice.

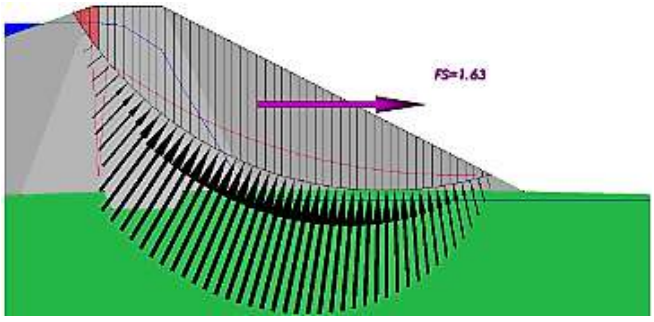


Figure 1(a) – No Tension Crack, Spencer

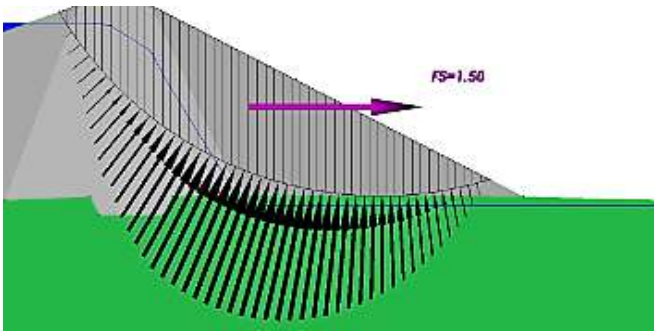


Figure 1(b) – No Tension Crack, OMC

In Figure 1(c), the tensile interslice forces in the solution by Spencer's method have been eliminated by inserting a tension crack, slightly lowering the computed factor of safety. However, instead of the line of thrust going way outside of the potential sliding mass at the top of the slope, it now has a hiccup at the toe. Again, Figure 1(d) shows the equivalent result using the OMC.

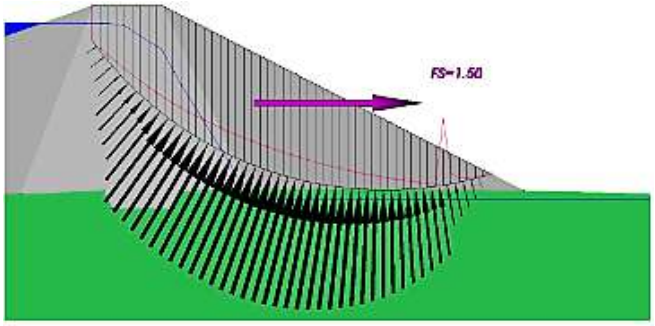


Figure 1(c) – With Tension Crack, Spencer

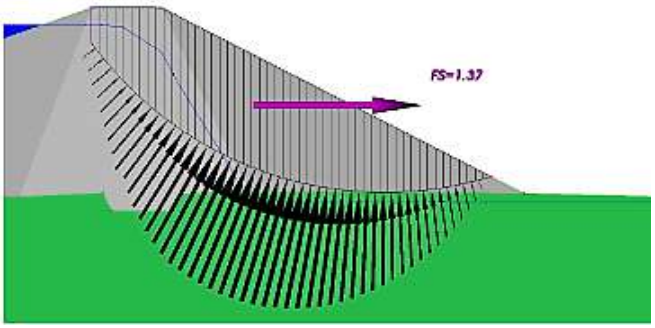


Figure 1(d) – With Tension Crack, OMC

Note that the OMC gives a lower factor of safety than Spencer's method. This is partly because Spencer's method does not account for seepage forces. However, the seepage forces in this problem are not very large relative to the gravity forces and most of the difference results from the difference in the distribution of the normal stresses on the bases of the columns. In this problem both the core and the downstream shell are specified to have shear strengths with both cohesive and non-cohesive components and the non-cohesive component is sensitive to the normal forces. The normal forces in the figures have different scales because the scale is set so that the maximum values have the same length, but the vector sums of the normal forces are equal. However, with Spencer's method more of the load is transferred towards the ends of the slip surface and, overall, this increases the shear strengths and the factor of safety. With the OMC there is no internal load transfer and the normal stress results solely from the weight of the column in question. The truth likely lies somewhere in between these two extremes. If the shear strengths are specified entirely as cohesions and there are no

seepage forces, that is, the water conditions are hydrostatic, the companion article https://www.linkedin.com/pulse/effect-including-seepage-forces-slope-stability-analyses-robert-pyke shows that the OMC and Spencer's method give identical results.

If the engineer is troubled by the line of thrust in Figure 1(c) and wants to spend more time on the problem, it can be eliminated by halving the depth of the tension crack, as shown in Figure 1(e). The resulting factor of safety of 1.57 might be considered the "best answer" by many authorities, but the corresponding value of 1.44 by the OMC is a safer and likely more realistic value, given that the dam embankment is not rigid and must be subject to some seepage forces.

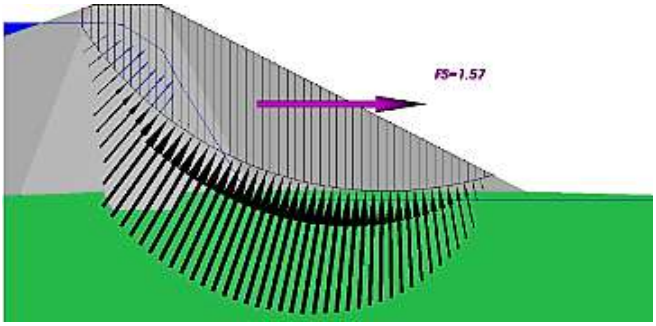


Figure 1(e) – With Shorter Tension Crack, Spencer

The difficulty of obtaining what Morgenstern and Price called a "physically acceptable" solution, without tension and with the line of thrust contained within the potential sliding mass, using Spencer's method illustrates the importance of the user being able to readily see the line of thrust and the occurrence of tension.

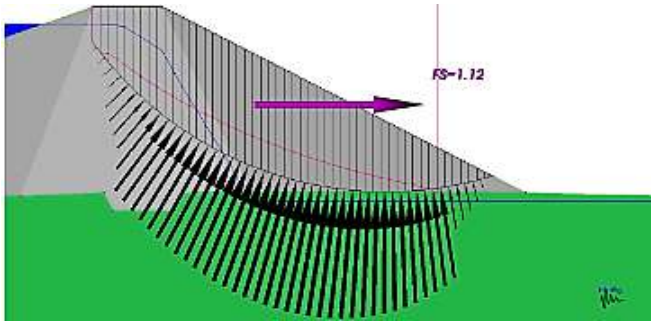


Figure 1(f) – With Tension Crack and Seismic Coefficient, Spencer

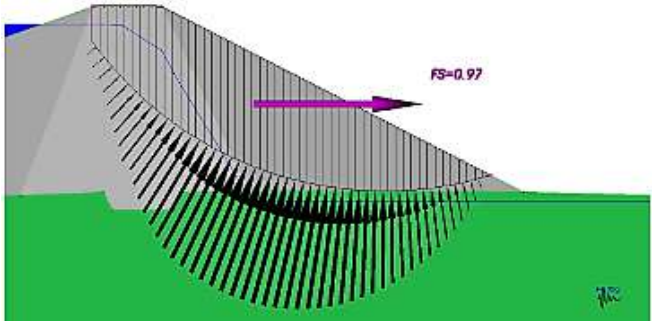


Figure 1(g) – With Tension Crack and Seismic Coefficient, OMC

Figures 1(f) and 1(g) illustrate how these problems can be compounded by the addition of external loads such as pseudo-static seismic forces. In Figure 1(f) the problem with the line of thrust seen in Figure 1(c) is now aggravated. It is not uncommon for the line of thrust in pseudo-static analyses using methods that fully satisfy equilibrium to come out of the slope and the engineer must decide whether he/she can live with that or not. In the corresponding analysis by the OMC, the normal stresses on the bases of the columns are not impacted by the added seismic loads so that a nicer looking distribution of the normal forces are obtained and the same shear strengths apply around the slip surface as were used in the static analysis. But, pseudo-static analyses are approximate anyway and these points are less important than whether standard static strength properties are used or whether adjustments, which might be considerable, are made for different drainage conditions and rates of loading.

The question of the reasonableness of the results of slope stability analyses obtained using the various forms of the method of slices has been repeatedly addressed in the literature but, sadly, it is often ignored in practice. Morgenstern and Price (1965), in their very elegant paper which introduced the concept of a user-specified distribution of the angle of inclination, emphasized that there were multiple possible solutions and that the user should vary the assumed distribution of the angle of inclination so that a reasonable line of thrust was achieved, if possible. Whitman and Bailey (1967), who correctly took Morgenstern and Price to be the gold standard for analyses that fully satisfy equilibrium, said "the use of the Morgenstern-Price approach together with a computer does not free the engineer from making a judgment concerning the reasonableness of a solution." Chin and Fredland (1983) noted some difficulties with methods that fully satisfy equilibrium, including the fact that they sometimes have trouble converging to a solution, and suggest some possible workarounds. Krahn (2003) discussed the limits of limit equilibrium analyses including convergence issues and difficulties with applying external forces. He suggested that the latter can best be addressed using a hybrid finite element - limit equilibrium analysis but that seems unwieldy for routine use.

Wright (2013), in a "must watch" lecture, included several case histories that illustrate various problems with methods that fully satisfy equilibrium. Wright emphasized that there is no absolutely correct solution, and suggested that the engineer should always use at least two computer programs for any critical problem, in part because computer programs may include hidden assumptions and also may not show the intermediate results that are necessary to judge the reasonableness of the final result. Or, as an alternative, the engineer can use one program that offers two good methods of solution and makes all the key data visible.

References

Baligh, M.M., and Azzouz, A.S., "End Effects on Cohesive Slopes", Journal of

Geotechnical Engineering, ASCE, Volume 101, No. 11, 1975

Ching, R.K.H., and Fredlund, D.G., "Some difficulties associated with the limit equilibrium method of slices", Canadian Geotechnical Journal, Vol. 20, pp. 661-672, 1983

Duncan, J.M., Wright, S.G. and Brandon, T.L. "Soil Strength and Slope Stability, 2nd Edition", ISBN: 978-1-118-65165-0, Wiley, September 2014

Hovland, H.J., "Three-dimensional slope stability analysis method", Journal of the Geotechnical Engineering Division of ASCE, Vol. 103, No. 9, 1977

Hungr, O., Salgado, F.M. and Byrne, P.M., "Evaluation of a Three-Dimensional Method of Slope Stability Analysis", Canadian Geotechnical Journal, Vol. 26, pp. 679-686, 1989

King, G.J.W., "Revision of the effective-stress method of slices", Geotechnique, Vol. 39, No. 3, 1988

Krahn, J., "The 2001 R.M. Hardy lecture: The limits of limit equilibrium analysis", Canadian Geotechnical Journal, Vol. 40, pp. 643-660. 2003

Mitchell, J.K., Seed, R.B., and Seed, H.B., "Kettleman Hills Waste Landfill Slope Failure I: Liner System Properties", Journal of Geotechnical Engineering, Volume 116, No.4, pp. 647-668, 1990

Morgenstern, N.R., and Price, V.E., "The Analysis of the Stability of General Slip Surfaces", Geotechnique, Vol. 15, No. 1, pp.79-93, 1965

Pyke, R., "Normal Stresses, Seepage Forces and Pond Pressures in the Method of Slices or Columns", http://rpce.us, April 2017

Seed, H.B., "Nineteenth Rankine Lecture: Considerations in the Earthquake Resistant Design of Earth and Rockfill Dams", Geotechnique, Vol.24, No.3, September 1979

Seed, R.B., Mitchell, J.K., and Seed, H.B., "Kettleman Hills Waste Landfill Slope Failure II: Stability Analyses", Journal of Geotechnical Engineering, Volume 116, No. 4, pp. 669–690, 1990

Spencer, E., "A Method of Analysis of the Stability of Embankments Assuming Parallel Inter-Slice Forces", Geotechnique, Vol. 17, No. 1, pp. 11-26, 1967

Whitman, R.V. and Bailey, W.A., "Use of Computers for Slope Stability Analysis", Journal of Geotechnical Engineering, Vol. 93, No. SM$, July 1967

Wright, S.G., H. Bolton Seed Lecture, 2013 http://www.geo-institute.org/video/2013-seed-lecture-slope-stability-computations-wright/

(June 6, 2017, https://www.linkedin.com/pulse/limitations-limit-equilibrium-analyses-slope-stability-robert-pyke)

Value Engineering in Construction

K. Ilayaraja and MD. Zafar Eqyaabal

Abstract

Value engineering is a methodology used to analyze the function of the goods and services and to obtain the required functions of the user at the lowest total cost without reducing the necessary quality of performance. Many a time, Value Engineering (VE) is confused with cost cutting exercises in construction industry. The essential difference between conventional cost cutting and VE is that it involves reducing the cost by improving the functionality through lesser consumption of energy in terms of manpower, materials and machines. In the initial stages VE was used by production engineers for reducing the cost of manufacture. However, it was found that the benefit of VE is much greater if multidisciplinary teams of engineers were involved which would also influence the design team that is normally the case in construction.

Keywords: Job Plan, Life Cycle Cost, Value Analysis, Value Engineering

1. Introduction

Construction industry is an index of growth of a nation. The real estate sector in India has assumed growing importance with the liberalization of the economy. Today, the construction industry is the second largest employing skilled and semiskilled labor after agriculture and plays an important role in nation's economy. Due to increase in business opportunity and migration of labor, the demand for commercial and housing spaces has also increased. According to the tenth five-year plan, the estimate of shortage in urban housing is accessed to be 8.89 million units. As of now, the housing and construction industry employs 30 million people and about 250 industries are associated with construction industry directly or indirectly. It includes hospitals, schools, townships, offices, houses and other buildings as well as urban infrastructure, highways, roads, ports, railways, airports, dams, power plants etc.

Market globalization has in effect led to increased com-petition, not just between companies, but also on macro level, between individual countries. The need for improvement of organizational activities is thus felt not only in private industry but also increasingly in institutional, governmental or other non-profit organizations whose efficiency and effectiveness determines a countries competitive position in the world.

2. Definition of Value Engineering

2.1 Definition

Value Engineering (VE) is a management technique that seeks the best functional balance between cost, reliability and performance of a product, project, process or service[1].

Value engineering is a powerful problem-solving tool that can reduce costs while maintaining or improving performance and quality requirements. Value engineering can improve decision-making that leads to optimal expenditure of owner funds while meeting required function and quality level[2].

The success of the VE process is due to its ability to identify opportunities to remove unnecessary costs while assuring quality, reliability, performance, and other critical factors that meet or exceed customers expectation[3].

An organized study of functions to satisfy the user's needs with a quality product at the lowest life cycle cost through applied creativity. There are many tools and techniques being applied in a VE in its quest to improve value, these tools include the FAST diagram, creative thinking technique, life cycle costing and weighted scoring techniques and others[4].

2.2 What Value Engineering is Not?

All tables and figures you insert in your document are only to help you gauge the size of your paper, for the convenience of the referees, and to make it easy for you to distribute preprints[5].

3. Objective and Need for the Study

3.1 Objective of the Study

There is always a scope to improve value, in terms of material value or the worth. The main objective is to provide all necessary functions at a lowest cost. The aim of the thesis to conduct a study on value engineering also to understand and identify the areas of poor value in structure and to understand the cost saving attained after conducting VE study with that of conventional one[6]. To remove the ambiguity and a lot of misconceptions about the concept and targets of value engineering. To find the possibility of the application of value engineering by the institutions of the building construction industry and to find out the benefits of application of value engineering in construction projects in terms of;

1. Time;
2. Quality;
3. Efficiency; and
4. Better management.

3.2 Need for the Study

In this work, an attempt has been made to highlight the importance of value engineering in construction industry and how value engineering technique was applied in supervision of construction works for the successful implementation of construction projects[7].

4. Methodology

In general every thesis involves methodology or framework for the proceedings. This gives a clear idea how the project is going to be dealt and in which manner the results are to be obtained[8]. The thesis involves selecting a title. Then the literatures based on the project are collected. Then the work done on the similar projects are understood. Then the study area is defined. Then the methodology is framed how to proceed the project. The methodology involves identifying the value engineering in practice and the performance measures with respect to those methods are framed out. Then a questionnaire survey is prepared. The same will be used to collect data from the project managers and site engineers of various companies in the city. The survey is done to check the awareness of the aspects among the engineers[9]. The questionnaire prepared will be a weighted scale type. Then the data obtained from the survey are analyzed and results are obtained. Based on the obtained result suitable suggestions are made that what should be done to enhance the performance of the engineers.

4.1 Task Involved in Phase I

Task 1: Literature review collection literatures based on the topic are collected[10]. These are used as a base for the project. From the literatures collected various measurement methods are studied.

Task 2: Study of value engineering. The study provides analytical descriptive method which is based on the study of reality or phenomenon described and collected information about them and then studied and analyzed[11]. The study is done in order to get the var-

ious performance measures used in those methods. Then a set of indicators are derived based on the measures identified in the methods and a questionnaire is to be prepared on the basis of the same

5. Value Engineering and Application Phase

Enhancing qualitative projects and services by lifting its value with the improvement and development of total cost reduction without sacrificing the necessary requirements is possible if we apply value engineering curriculum[12]. The optimization of resources is demand increasingly needed day after day because most if not all depletive and demand steadily, and for this value becomes application engineering approach to projects and services and other urgent requirement for survival and development under severe global competition, especially if knew that the application of value engineering in results to reduce costs and development and improvement of ranged between 5% to 15% and amounted to much more than this in certain cases[13].

5.1 Value Engineering

Value analysis and value engineering and value management is the concept of a single administrative approach aimed at finding practical solutions and reduce the useful flying quality in cost. The conventions were agreed to by specialists in the field value.

1. Analysis of value (Value Analysis, VA):

A study applied on projects completed or products currently used other look for improvement of their performance and get rid of the extra costs.

2. Engineering value (Value Engineering, VE):

Or the so-called often value engineering is designed to improve the quality and reduce the cost of construction projects and applied during project idea or after completion of public perception17.

3. Management of value:

Is a comprehensive concept of how to manage programmes and how to setup value studies and follow-up, so that value engineering workshop or value analysis is part of this process. Regardless of these professional titles, we will use in this book all these words and terminology in rotation according to the context, but we will refer more to *"value engineering"* that this is a vernacular name.

5.2 Function (Performance/Functionality)

Functionality or performance value engineering means the specific purpose of existence of the thing or use it whether that element or experiencing good or service or otherwise18. This work describes the performance played the thing makes it a valuable possession. Expresses the function of value engineering studies by two words: name, and verb, needs to be so facilitated compare alternatives and costing variant, for example, post column construction in building is carrying the weight it already shows the activity of a pregnancy either name measurable units of weight14.

5.3 Value

Most people consider that value and the price were synonymous, express one other and this contrary to the right price is one of the criteria value such as performance and timing value are the view does not mean the same thing to everyone every person understood the special value this affected by several factors such as space, time, resources and status of supply and demand factors, is a high value upon someone else for example, the value of a piece of land adjacent to your home and you need it to expand considerably higher than the value of someone else15.

5.4 Price Receivable

Is less expensive, price can be paid for performance or service of a commodity or item, and is desired price from the viewpoint of the customer for this service or that performance you can specify the price receivable by the alternative price leads the same function and achieve the same goal for example, use an electrical lamp for lighting into a specific illumination level (LUX) for a specific period this functionality can be achieved using many types of lights with the lowest price for these alternatives that meet the same level of lighting, the same term is the price receivable for this post16.

6. Time to Apply Value Engineering

We can conduct the studies of value theory in any stage of the emergence and development of the project and even after the operation, but experience and logic indicate that everything started school early whenever economic yield and artwork much higher and proposals and ideas are accepted high proportions to reverse everything late study less those ratios and increasing difficulty of acceptance and the high cost of application19. The best way is to apply foundation on value studies romp in addition to study technical review. Value engineering application phases:

6.1 First Phase: Preparation of the Study

The value must be setup to study well prepared and used in such a study:

1. Team selection and a multi-disciplinary expertise in order to obtain the largest number of ideas and is different for different size
2. Of the project team often consists of five to nine members. Does not require that all members of the team engineers, but it must be the team led by Certified Value Specialist (CVS Certified Value Specialist).
3. Review the project and field of study (Study Scope of Work) in detail and collectively.
4. Initially detailed cost and light determines the project team savings ratio to be achieved.
5. A timetable showing the beginning and end of each stage of the study.
6. Determine the date of completion of the study and the date the results of the study to the beneficiary.
7. Preferably study within the area of work in building the team to easily obtain the required administrative support.

6.2 Phase II: Workshop on Value Engineering

Action plan consists of seven sequential steps, where a logical sequence should be finished completely before starting any step in the next step: -

1. Collect information.
2. Job analysis.
3. Innovation and brainstorm.
4. Evaluation and testing.
5. Research and development.
6. Briefing and presentation of recommendations.

7. Advantages of Value Engineering

Value engineering is characterized by a branch of knowledge and practical methods to solve problems for other quality improvement in the following:

1. Job analysis distinctive way (function analysis).
2. Get appointed a large amount of good ideas that are applicable.
3. The action plan in place which consists of several sequential stages of a logical sequence.

4. Multi-disciplinary team working in the studies of collective values.
5. Ensure coordination between the relevant authorities in the project.

8. Type of Projects That Benefit Most for Value Engineering

There are costs associated with value engineering; therefore, it is probably impractical to use it on every project. However, it is good idea to apply value engineering if any one of the following items is the case on the particular project:

8.1 Costly Project

Since value engineering will usually results in costs saving in the order of 5 to 10%, or in many cases higher percentage, applying value engineering to high cost projects is almost always cost effective.

8.2 Complex Project

A value engineering study affords an opportunity to get expert second opinions. When using value engineering, team members who are independent from the original design team for very technically complex project, getting a second opinion is almost always an excellent idea.

8.3 Repetitive Costs

When an organization is involved with repetitive type construction project those which they tend to build many times in various locations, the utilization of value engineering is usually very cost effective because the cost reduction ideas can be incorporated in each of the latter project of the same type.

8.4 Unique Projects with Few Precedents or with New Technology Elements

This is very simple situation to complex projects. Again the benefit of value engineering is in achieving an expert second opinion when independent team members are included.

8.5 Projects with Very Restricted Construction Budgets

With projects of this type, it is imperative to achieve maximum value for money. Since by definition value engineering seeks to achieve the elimination of unnecessary costs, its application on projects with tight budgets is usually a very good idea.

8.6 Projects with Compressed Design Programs

The old saying 'haste makes waste' is especially true with regard to construction projects. Whilst value engineering is an added requirement which can have a tendency to add to projects programs, this time can be minimized if the value engineering activity is properly coordinated with the design programs.

8.7 High Visibility Projects

This situation applied to the government sponsored or environmentally sensitive construction projects. If errors or problems developed on a project they tend to be seized upon by the media and publish headline news. Again as value engineering provides an opportunity to obtain expert second opinion it is very effective tool for avoiding problems of this nature.

9. Job Plan

It is an organized approach which allows the VE team to analyze a project by quickly identifying high cost to worth areas and selecting alternatives which minimizes cost while maximizing quality. VE team which does not follow a formal VE job plan tends to perform a design or cost cutting review rather than true value engineering studies. It encourages VE team to think in a more thoughtful and creative manner i.e. to look beyond the use of common or standard approaches. It emphasizes total ownership costs (Life cycle costs) for a facility rather than just initial capital cost. It leads the VE team to develop a concise understanding of the purpose and functions of the facility.

A typical job plan consists of the following phases:

1. Information Phase
2. Speculation Phase
3. Evaluation Phase
4. Development Phase
5. Implementation Phase

9.1 The Information Phase

The first step in information gathering is to know the owners/users and understand their needs.

- Who are the owners/users?
- Who or what influences the owner in making critical decisions?
- What do these individuals or organizations want?

9.2 The Speculation Phase

Being creative is difficult for most engineers, because they have a built-in urge to find a quick solution. The job plan controls this tendency and requires the engineer go through all phases of this systematic procedure. Larry Miles discusses the strategy of creativity in value engineering. One important point to remember is to let your mind wander freely with no limitations. Utilize functions as a vehicle to create the widest possible range of ideas. Unit 10 will discuss this approach in detail.

9.3 The Evaluation Phase

After all ideas are listed, a series of screening processes is needed to sort them. Idea comparison, feasibility ranking, and analysis matrix are some of the techniques that will be utilized. These techniques will be discussed in Unit 11. Basically, the system will help you focus on ideas that are closer to the user's concerns, needs and requirements. At the end of this phase, outstanding ideas will emerge for development.

9.4 The Development Phase

Good results are obtained by combining the strengths of various ideas. Development should include the following steps:

1. Research and add information to substantiate your approach.
   (a) Separate ideas that are industry standards.
   (b) Recognize ideas that are not tested.
   (c) Become aware of ideas those are controversial.
2. Recognize ideas that may be unique.
3. Involve specialists to support and perfect your ideas.
4. Prepare cost estimate.
   (a) Consider impact on customer(s).
   (b) Use cost to perform rate of return analysis.
   (c) Consider life cycle cost.
5. Analyze risks and back up your ideas accordingly.

9.5 The Implementation Phase

Be aware of road blocks. Look out for signals that may doom your edrts. The VE job does not end at presentation. It should continue until the ideas or the dreams materialize into reality. Keep in mind that your ideas are only as good as their implementation. It is important that the VE leader should listen, monitor and react to all concerns.

10. Reasons for the Increased Unnecessary Costs and Poor Quality

The study of value, including what it characterized by collective action between the specialist team is an opportunity to bridge the gap that may occur in the usual process design based on the individual work for each specialty on its own. Work is the individual tends to put upper limit of the factors of safety and efficiency and functional reasons for this:

1. Lack of information
2. Temporary conditions
3. Erroneous beliefs
4. False Customs and traditions
5. Few ideas
6. Change in technology
7. Change in the requirements of the beneficiary
8. Follow an old specifications and standards
9. Time constraint
10. Absence of ties or good coordination.

11. The Difference between Value Engineering and Cost Cutting Method

Some confused between governance and value with cost reduction method that there is substantial difference between them. Reducing project costs based on segmentation and eliminating some of these parts while managing value based on analysis of project posts and then subtracting alternatives lead purpose required but less expensive alternatives may be quite different from what is found in the design.

For example if we have a multi-building story of 10 stories and our budget is not enough not to build eight roles only, cost-cutting method may require reducing the size of the building as a cancellation of some parts of the project or roles for example resulting in naturally eliminating some posts for the project while managing value looking for cheaper alternatives to the project systems, such as construction, air-conditioning system, System isolation, electricity system … Etc. Without removing any parts or functions or minimize project.

12. The Measuring of Value

To improve the value of anything you must first find a way and a mechanism to measure this value. From the foregoing we can say that value is based on three key elements are cost and quality and functionality, and get a real measure of value, must take all these elements into account:

1. Functionality the primary purpose or purpose for which the product was found, or project or administrative process.
2. Quality and mean the requirements and the expectations and wishes of the beneficiary.
3. The total cost (Total Cost or Life Cycle Cost): initial cost often attracts the client but this cost is usually between 6 to 30% of the total cost in construction projects.

13. Selection of Team Work Study

Starts with selection of the team to conduct the study value to choose the commander of the study team, which must be a specialist in value engineering and holds a Specialist Engineering Certified Value (CVS) Certified Value Specialist, and that the qualification has the appropriate experience and enjoy the capabilities to manage a team to work efficiently. The rest of the team members by making the efficiency of scientific and practical experience both in the field of specialization, depends how many people component of the working group on the size of the project and the conditions and quality, time and information available to the study, and that the type of specialties determined by the type of project and needs in question, as that of the duties and responsibilities of team leader determine number and disciplines needed by the study and the use of any external expertise in matters of minutes may not be available locally.

14. Required Information for the Value Studies

Correct information and relevant is the core value studies and this information must be available for study and action group have several sources including:

1. Project documentation (studies, charts, specifications ... Etc)
2. Owner/designer
3. Field visits (for websites, the owner, information centers Etc)
4. Data costs and market quotations
5. There should also be a project coordinator for a link between study groups, the parties related to the project.

15. Team Management Values

To study the value depends on collective action for that team selection is a multi-disciplinary expertise, so as to get most amounts of ideas. Team size varies for different size of the project but mostly consists of 5-9 members and consists of the designer and the recipient, structural engineer and the end user the remaining individuals are selected according to selection of the project value engineering study group can be an internal team (design team) and can be external teams and each team has advantages and disadvantages.

15.1 Advantages of using an External Team to Study the Value

External team is specialized in the studies value is contracted to conduct the study in a specific time and specific wage and the use of such a team has advantages as following:

1. Can be selected by a team of various disciplines required the design team while the former component.
2. Objectivity.
3. The team outside of the client confirms that the design done by the design team is good.

15.2 Disadvantages of using an External Team to Study the Value Engineering

When using the external team may note some defects that can be summarized as follows:

1. The design team hard to accept the new team
2. The design team for the absorber design and has experience in both advantages and disadvantages, which could take the time outside of the team for consideration.
3. In some cases, the team may try to cash outside the current design to show his proficiency and his ability to accomplish the design better.
4. Use an external team better.

16. Conclusion

A vast study has been conducted on value engineering and the application phases has been analyzed in the thesis from the study it is noticed that value engineering is a powerful

problem-solving tool that can reduce costs while maintaining or improving performance and quality requirements. Value engineering can improve decision-making that leads to optimal expenditure of owner funds while meeting required function and quality level. The success of the VE process is due to its ability to identify opportunities to remove unnecessary costs while assuring quality, reliability, performance, and other critical factors that meet or exceed customer's expectation.

Further works of the thesis involves preparation of questionnaire based on the various aspects of a project as per mentioned in the methods and a survey will be done in various companies to check the related knowledge of the personnel towards those aspects. Further the data collected will be analysed and suitable suggestions will be framed according to the data.

17. Acknowledgments

Apart from the efforts of me, the success of this project report depends on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people have been instrumental in the successful completion of this project. Author express thanks to

Dr. N. S. ELANGOVAN, Head of the Department, department of Civil Engineering for his understanding and constant efforts in bringing out the project in the stipulated time. And author also thanks Mr S. SELLAPPA, Professor, department of Civil Engineering, Jerusalem College of Engineering for providing the guidance and encouragement for the successful completion of the thesis.

18. References

1. Dutta BN. Estimating and Costing in Civil Engineering – Theory and Practice. New Delhi: UBS Publishers; 2002.
2. Gokharn PR. Value Engineering. National Productivity Council: New Delhi; 1998.
3. Harish BN, Menezes GA. Antimicrobial resistance in typhoidal salmonellae. Indian Journal of Medical Microbiology. 2011; 29(3):223–9. ISSN: 0255-0857.
4. Hassan AS. Application of value engineering in construction industry in Sudan prepared. 2012.
5. Lee MJ, Jong-Kwon L, Hunter G. Performance-based value engineering application to public highway construction. 2009; 14(3):261–71.
6. Seidelw JK, Ware M. Value engineering trends in the construction industry; 2012 May. p. 1–14.
7. Das J, Paul DM, Velusamy P. *Sesbania grandiflora* leaf extract mediated green synthesis of antibacterial silver nanoparticles against selected human pathogens. Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy. 2013; 104:265–70. ISSN: 1386-1425.
8. Olawuyi BJ. An Assessment of Value Engineering Practices Adopted in Nigeria. 2009.
9. David C, Wilson. Value engineering applications in transportation. Transportation Research Board Executive Committee. 2005.
10. Kelly J. Male S. Value Management in Design and Construction. London: E & F.N. Spon; 1993.
11. Caroline ML, Sankar R, Indirani RM, Vasudevan S. Growth, optical, thermal and dielectric studies of an amino acid organic nonlinear optical material: l-Alanine. Materials Chemistry and Physics. 2009; 114(1):490–4. ISSN: 0254-0584.
12. Krishnan P, Saxena KR. Value Engineering in Project Management. Oxford: Oxford IBH Publications; 1994.
13. Sethi A. Case Studies in Value Engineering. Transworld Book Services: New Delhi; 1999.
14. Arumugam S, Ramareddy S. Simulation comparison of class D/ Class E inverter fed induction heating. Journal of Electrical Engineering. 2012; 12(2):71–6. ISSN: 1335-3632.
15. Tuffy HG. Compendium on Value Engineering. Indo-American Society: Bombay; 1998.
16. Ahuja HN, Michael AW. Successful Methods in Cost Engineering. NY: A Wiley Interscience Publication; 2000.
17. Bythaway CW. FAST- An Intuitive Thinking Technique. SAVE Proceedings; New York. 1992.
18. Anbuselvi S, Chellaram C, Jonesh S, Jayanthi L, Edward JKP. Bioactive potential of coral associated gastropod, Trochus tentorium of Gulf of Mannar, Southeastern India. Journal of Medical Sciences. 2009; 9(5):240–4. ISSN: 1682-4474.
19. Kimio T, Natarajan G, Hideki A, Taichi K, Nanao K. Higher involvement of subtelomere regions for chromosome rearrangements in leukemia and lymphoma and in irradiated leukemic cell line. Indian Journal of Science and Technology. 2012 Apr; 5 (1):1801–11.
20. Cunningham CH. A Laboratory Guide in Virology. 6th ed. Minnesota: Burgess Publication Company; 1973.
21. Sathish Kumar E, Varatharajan M. Microbiology of Indian Desert. In: Sen DN, editor. Ecology and Vegetation of Indian Desert. India: Agro Botanical Publication; 1990. p. 83–105.
22. Varatharajan M, Rao BS, Anjaria KB, Unny VKP, Thyagarajan S. Radiotoxicity of Sulfur-35. Proceedings of 10th NSRP; India. 1993. p. 257–8.
23. 01 Jan 2015. Available from: http://www.indjst.org/index.php/vision

Indian Journal of Science and Technology, *Vol 8(32), DOI: 10.17485/ijst/2015/v8i32/87285, November 2015, ISSN (Print) : 0974-6846, ISSN (Online) : 0974-5645.*

ΠΡΟΣΦΟΡΑ ΕΡΓΑΣΙΑΣ

HISTORICAL AND MASONRY STRUCTURES

UMINHO RESEARCH GROUP

Positions available on Masonry Structures, Earthquake Engineering and Seismology (PhD students and postdocs)

The Historical and Masonry Structures (www.hms.civil.uminho.pt) at ISISE, University of Minho, Portugal, will be opening soon two positions PhD students (3 years) and two positions for postdoctoral collaborators (4-5 years) on **Masonry Structures, Earthquake Engineering and Seismology** to join an European Research Council Advanced Grant recently awarded.

If you are interested in any of these positions and have excellent academic / scientific qualifications, please send your résumé to Prof. Paulo B. Lourenço (pbl@civil.uminho.pt) until **June 14**.

The positions will address: (1) Study of the seismic action (signal); (2) Shaking table testing of masonry specimens; (3) Numerical and analytical approaches for out-of-plane masonry behaviour.

Paulo B. Lourenço

miyamoto. ENGINEERS + CONSTRUCTION CONSULTANTS

Miyamoto International NZ Ltd

Ο συνάδελφος και μέλος της ΕΕΕΕΓΜ Ανδρέας Γιαννακογιώργος απέστειλε την παρακάτω αγγελία / προσφορά εργασίας:

Είμαι σε αναζήτηση γεωτεχνικών μηχανικών και θα μου ήταν εξαιρετικά ευχάριστο αν μπορούσα να βρω συναδέλφους από Ελλάδα οι οποίοι θα επιθυμούσαν να εργαστούν στη NZ.

Κυρίως αυτό που με ενδιαφέρει είναι γνώση Εδαφομηχανικής, καθώς και εμπειρία (είτε επαγγελματική είτε από εργασία στο Πανεπιστήμιο σε επίπεδο MSc και πάνω φυσικά) σε Probabilistic / Deterministic Seismic Hazard Assessments, 1D Site Response Analysis και numerical analysis (FLAC ή Abaqus).

Position: **Graduate or Intermediate Geotechnical Engineer**

Location: Auckland, Christchurch, Wellington, Kapiti Coast, New Zealand

Qualifications

BSc, MSc in Geotechnical Engineering (MSc or PhD will be highly preferred)

Specific Skills Required

- Depth of knowledge and understanding of geotechnical engineering (soil mechanics)
- Familiar with NZ and/or International Geotechnical Engineering practice
- Ability to effectively apply well accepted engineering principles and International Standard documents
- Computer skills with working knowledge of geotechnical design software (indicative list of software packages used):
  - DeepSoil
  - Shake2000, D-MOD2000, RspMatch
  - FEM (FLAC, Abaqus, OpeenSees etc)

Experience

- > 2 years of relevant professional experience in geotechnical engineering (proven records would be most welcomed):
  - Numerical analysis and 1D site response analysis (will be highly appreciated)
  - Liquefaction susceptibility and triggering
  - Retaining walls, shallow and deep foundations, slope stability, embankments
  - Geotechnical earthquake engineering and Soil-Foundation-Structure-Interaction (SFSI)
  - Material properties and constitutive models
  - Previous Probabilistic or Deterministic Seismic Hazard Assessment experience will be considered as positive

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

The ISSMGE is pleased to announce the delivery of the first course on unsaturated soils as part of the ISSMGE Virtual University program. This course is delivered by Prof. Delwyn G. Fredlund and is composed of six lectures of total duration 260 minutes.

This course is based on notes presented in the book "Unsaturated Soil Mechanics in Engineering practice" published in 2012 by the speaker. The objective of the course is to introduce unsaturated soil mechanics within the framework of classical soil mechanics by incorporating soil suction.

The **first lecture** introduces unsaturated soils by illustrated practical problems. The link between field and laboratory conditions is established by the "Soil-Water Characterization Curve" (SWCC) also called the soil retention curve.

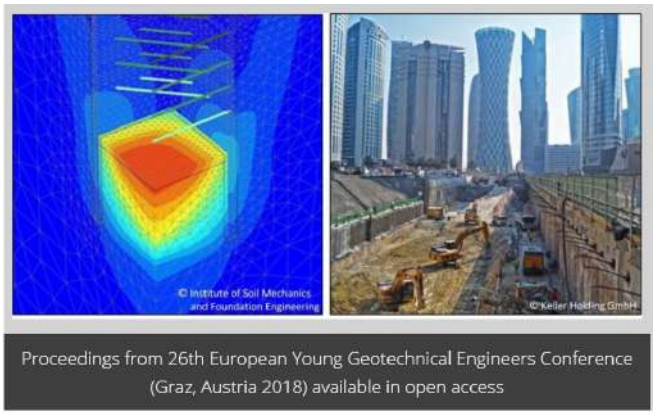
The **second lecture** presents the state variables by which the transition from the saturated soil condition to the unsaturated soil condition can be described, in particular the matric suction as the difference between pore-air and pore-water pressures. The measurement of soil suction helps in linking the state of stresses in field and laboratory conditions.

The **third lecture** details the determination of SWCC in providing information about the amount of water and the energy state in water phase. The experimental measurement of the SWCC is explained and inherent parameters depending on the type of soil are introduced.

The fourth lecture is dedicated to the theory and solution dealing with water flow problems in unsaturated soil. Focus is made on the measurement of unsaturated coefficient of permeability function for design purposes. Steady state and unsteady (transient) state methodologies are explained for the calculation of unsaturated coefficients of permeability. Selected water flow case studies are shown.

Lecture five addresses the determination of shear strength of unsaturated soils. The latter is described by two independent state variables among which soil suction contributes to the cohesive component of soil. Measurement of shear strength of unsaturated soils is conducted by the conventional shear box and triaxial equipment needing modifications to allow air-entry in tested specimens. Using the shear strength parameters of unsaturated soil, current soil mechanics applications: e.g. earth pressures, bearing capacity and slope stability of foundations are formulated.

In the **sixth lecture**, the theory with related solution of stress deformation problems is investigated. The main objective is to establish the relation between stress state variables and deformation strain state variables for unsaturated soils. In this process, the use of SWCC enables the assessment of the behavior of unsaturated soil.



The Innovation and Development Committee of ISSMGE is pleased to announce that through the initiative of Dr. Franz Tschuchnigg and President of Austrian Society for Soil Mechanics and Geotechnical Engineering, Prof. Helmut F. Schweiger, the 51 papers of the 26th European Young Geotechnical Engineers Conference (EYGEC2018) that was held on September 11-14, 2018, in Graz, Austria are available in the online library here:

https://www.issmge.org/publications/online-library

Detailed acknowledgements for the EYGEC2018 can be found at the ISSMGE online library acknowledgements section.

The Innovation and Development Committee of ISSMGE is pleased to announce that through the initiative of Icelandic Geotechnical Society, the 139 papers of the 17th Nordic Geotechnical Meeting (NGM2016) that was held on May 25-28, 2016, in Reykjavik, Iceland are available in the online library here:

https://www.issmge.org/publications/online-library

Detailed acknowledgements for the NGM2016 can be found at the ISSMGE online library acknowledgements section.

Society for Earthquake and Civil Engineering Dynamics

Upcoming event: Lecture

Soil-Structure Interaction and Optimum Seismic Design of Onshore and Offshore Energy Projects

In this presentation, **Dr. Prodromos Psarropoulos** will explore various topics concerning the geotechnical and structural design of onshore or offshore energy facilities with the help of case studies. The first part of the presentation focuses on the impact of local site conditions on the ground surface motion. In the second part emphasis is given on the quantitative assessment of the earthquake-related geohazards and the realistic estimation of the peak ground displacements that will actually determine the soil-structure interaction and the structural demand. Finally, the third part of the presentation is devoted to remote sensing and early-warning systems that are required for the safe operation of the energy projects.

Synopsis

Since society demands increased availability and reliability of energy supply, together with improved environmental standards, the structural design of any onshore or offshore energy project (including its foundation) may be very demanding, depending on the circumstances. It is evident that in the case of long energy projects that traverse remote regions with extreme terrains and/or seabeds, such as a gas pipeline or a cable, the design may be more challenging due to the variety of geotechnical conditions and the potential geohazards along the routing. Nevertheless, in areas that are characterized by moderate or high seismicity the design of energy projects may be more complicated due to the various types of seismic loading. The seismic loading may be either dynamic due to the inertial forces developed on the mass of the structure(s) and/or quasi-static due to the permanent ground deformations (PGDs) caused by various earthquake-related geohazards, such as active-fault ruptures, slope instabilities, and soil liquefaction phenomena. The current presentation tries through case studies to shed some light on these interesting issues of geotechnical earthquake engineering from a structural and a geotechnical perspective. The first part of the presentation focuses on the impact of local site conditions (i.e. soil stratigraphy, bedrock geomorphology, and/or surface topography) on the ground surface motion that will dominate the dynamic structural response. In the second part emphasis is given on the quantitative assessment of the earthquake-related geohazards and the realistic estimation of the PGDs that will actually determine the soil-structure interaction and the structural response / distress. Finally, the third part of the presentation is devoted to remote sensing and early-warning systems that are required for the safe operation of the energy projects.

About the speaker

Dr. Prodromos Psarropoulos is a Structural and Geotechnical Engineer with a balanced scientific and professional experience in the analysis and design of various structures and geostructures for almost 25 years. After his Ph.D. on Geotechnical Earthquake Engineering from National Technical University of Athens (NTUA), he conducted advance research in various institutes in Greece and Italy, while he has been an adjunct Associate Professor of Geophysics and Earthquake Engineering in the Department of Infrastructure Engineering of the Hellenic Air-Force Academy. In parallel, he has been involved in the design and construction of various challenging engineering projects in Greece and abroad. His expertise is on Geotechnics, Soil Dynamics and Earthquake Engineering, including mainly: (a) problems of static and dynamic soil-structure interaction (such as foundations, retaining structures, pipelines, etc.), (b) static and seismic stability assessment of dams, slopes and embankments, and (c) numerical simulation of dynamic soil response (i.e. local site effects and microzonation studies). Currently, he is teaching courses of geotechnical engineering and offshore engineering in the School of Rural and Surveying Engineering of NTUA, while he has been a lead member of the team of experts for the quantitative geohazard assessment and the seismic design of the upgrade of the main oil-refinery in Greece and two major high-pressure gas pipelines in south-east Europe (IGI-Poseidon and TAP).

Further information

This evening meeting is organised by SECED and chaired by Stavroula Kontoe (Imperial College London). Non-members of the society are welcome to attend. Attendance at this meeting is free. Seats are allocated on a first come, first served basis. Tea, coffee and biscuits will be served from 5.30pm - 6pm. For further information, please contact Shelly-Ann Russell (tel. 020 7665 2147, email societyevents@ice.org.uk).

Institution of Civil Engineers

Free to read

Themed *Geotechnical Research* issue on in-situ tests on geotechnical engineering

The latest issue of our Gold Open Access journal *Geotechnical Research* is now availble to read online. This issue offers a facinating insight into various issues in the area including stress measurements for rockburst prevision and determination of pile capacity by dynamic methods.

Read *Geotechnical Research* now https://www.icevirtual-library.com/toc/jgere/6/1

More free issues from ICE Publishing

Selected issues of *International Journal of Physical Modelling in Geotechnics* and *Environmental Geotechnics* are now available online and free for the next month. *International Journal of Physical Modelling in Geotechnics*, themed issue Eurofuge 2016 and features findings from the conference including centrifuge modelling of a helical anchor and using tactile pressure sensors to measure dynamic earth pressures around dual-row walls. This month's issue of *Environmental Geotechnics* features content on landfill liners and the plasticity of Nigerian lateritic soil admixed with selected admixtures.

Stephan Jefferis announced as 2020 Rankine speaker

The British Geotechnical Association have announced Professor Stephan Jefferis as the 2020 speaker for the Rankine Lecture. Professor Jefferies is a visiting professor in Oxford Universitys department of engineering science and is also co-author of Polymer Support Fluids in Civil Engineering which we published in 2017.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

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

Construction in Historical Cities: Problems and Solutions, 6-7 June 2019, Saint Petersburg, Russia, http://tc207ssi.org

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

7th International Conference on Bituminous Mixtures and Pavements, 12-14 June 2019, Thessaloniki, Greece http://iconfbmp.civil.auth.gr

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 - 29 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

International conference on clay science and technology, 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), 1 – 5 July 2019, Paris, France, https://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

Μία πρόγευση Ισλανδίας για τους τυχερούς που θα συμμετάσχουν στο συνέδριο και για να ζηλέψουν αυτοί που δεν θα πάνε.

Fjaðrárgljúfur Canyon, Southern Iceland

Skaftafell, Southeast Iceland

Hveradalir, Central Iceland

Hraunfossar, Western Iceland

Öxi Pass, Eastern Iceland

Námafjall, Northeast Iceland

Grjotagja, North Iceland

Gullfoss, Southwest Iceland

Krossanesfjall, Southeast Iceland

Arnarstapi, Western Iceland

Klifatindur, Southeast Iceland

Dyrfjöll, Eastern Iceland

Hveradalir, Iceland

Stokksness Mountain, Iceland

NORDIC GROUTING SYMPOSIUM 2019, September 2-3, 2019, Helsinki, Finland, https://www.ril.fi/en/events/nordic-grouting-symposium-2019.html

4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής & Τεχνικής Σεισμολογίας, Αθήνα, 5 – 7 Σεπτεμβρίου 2019, https://conv.eltam.org

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

XVIII Technical Dam Control International Conference
Hydraulic Structures Monitoring and Safety
10-13 September 2019, Warsaw, Poland
www.tkz.ibs.pw.edu.pl

The conference is recommended for theoreticians and practitioners dealing with designing, construction and exploitation of hydraulic structures.

CONFERENCE TOPICS

1. Dam safety
2. Exploitation, maintenance and repair of hydraulic structures
3. Tailings ponds
4. Water-power engineering
5. Environmental issues in hydraulic structures
6. Hydraulic structures on waterways

Address of the Organizing Committee
Division of Hydro-Engineering and Hydraulics
Faculty of Building Services, Hydro and Environmental Engineering
Warsaw University of Technology
00-653 Warsaw, Nowowiejska St., 20,
Poland
ph.: +48 22 234 74 53
fax: +48 22 825 29 92
e-mail: tkz.ibs@pw.edu.pl
www.tkz.ibs.pw.edu.pl

International Symposium on SPH and other particle-based continuum methods and their applications in geomechanics, 11-13 September 2019, Vienna, Austria, https://sph-vienna.com

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

ISGHS 2019 International Symposium on Geotechnical aspects of Heritage Structures, September 16-18, 2019, IIT Madras, Chennai, India, www.igschennai.in/ISGHS2019

12th Asian Regional Conference of IAEG, 23 ~ 27 September 2019, Jeju Island, Republic of Korea (South Korea), www.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, www.arc2019.org

2019 AYGE 7th African Young Geotechnical Engineers Conference, 6 October 2019, Cape Town, South Africa, www.arc2019.org/ayge-landing

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, 14 - 18 October 2019, Taipei, China, www.16arc.org

Developing Resilient Cities of the Future through the Integration of Tunneling and Underground Space Use
15-17 October 2019, Nigeria
events@tunnellingnigeria.org

11ème Édition des Journées Africaines de la Géotechnique
21-24 Octobre 2019, Niamey, Niger
http://ctgaafrique.org/niamey-niger-ville-hote-de-11eme-edition-journees-africaines-de-geotechnique

Conformément aux résolutions prises lors de l'Assemblée Générale du 24 octobre 2018 à Abidjan en Côte d'Ivoire, le Niger abritera cette année la 11ème édition des Journées Africaines de la Géotechnique (JAG 2019), co-organisée par la Comité Transnational de Géotechniciens d'Afrique (CTGA) et l'Association des Laboratoires du Bâtiment et des Travaux Publics (ALBTP) sous le thème : ***"Géotechnique et efficience économique des stratégies de développement en Afrique inter-tropicale".***

Email: emk2cm@Yahoo.fr

4th Regional Symposium on Landslides in the Adriatic-Balkan Region – ReSyLAB 2019 - 9th Scientific and Expert Conference GEO-EXPO 2019 23rd to 25th of October 2019, Sarajevo, Bosnia and Herzegovina, www.geotehnika.ba/ReSyLAB_&_GEO-EXPO_2019.html

8ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής, 6 – 8 Νοεμβρίου 2019, Αθήνα, Ελλάς, www.8hcge2019.gr

2019 GEOMEAST International Congress & Exhibition, 10 -14 November 2019, Cairo, Egypt, www.geomeast2019.org

The 8th International Symposium on Roller Compacted Concrete (RCC) Dams, Nov. 11th – 12th, 2019, Kunming, China, chincold-en@vip.126.com, http://www.chincold.org.cn

8th International Geotechnical Symposium, 13-15 November 2019, Istanbul, Turkey, www.geoteknik2019.org/en/

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

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

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.ecpro.co.jp/ysrm2019/index.html

ICGU 4th 2019 4th International Conference on Ground Improvement and Ground Control (ICGI2019): Infrastructure Development and Natural Hazards Mitigation, 1-3 December 2019, Luxor, Egypt, https://icgi2019-ets.org/page/p/Welcome-ICGI

ETS Conference and Exhibition 2019, 4-5 December 2019, Luxor – Egypt, https://icgi2019-ets.org/page/p/Welcome-ETS

ISOG 2019 First Indian Symposium on Offshore Geotechnics, December 5-6, 2019, IIT Bhubaneswar, Odisha, India, https://sites.google.com/iitbbs.ac.in/isog2019/home

15th International Conference on Geotechnical Engineering, and 9th Asian Young Geotechnical Engineers Conference, 05 ÷ 07-12-2019, Lahore, Pakistan, http://www.pges-pak.org

GeoSS International Conference on Case Histories & Soil Properties, 5-6 December 2019, Singapore, www.iccs2019.org

ISSPDS-Edinburgh 2020

2nd International Symposium on Seismic Performance and Design of Slopes

January 18–22, 2020, Edinburgh, UK

www.isspds.eng.ed.ac.uk

In recent decades, earthquake-induced landslides have occurred and been reported worldwide. The landslides can be catastrophic and pose immediate threats to people and properties, leading to large socio-economic losses in the affected areas. Therefore, the research on design of slope against seismic activities to effectively mitigate risks and reduce losses due to earthquake-induced landslides, has attracted more and more international attention.

In order to bring together academic scientists, leading engineers, and students to exchange and share their experiences and research results, the International Symposium on Seismic Performance and Design of Slopes (ISSPDS) is organized. The ISSPDS began in 2018 in Shanghai China. The second ISSPDS will be held in the world-famous city of Edinburgh.

Conference Themes

The subjects of interest relevant to seismic performance and design of slopes, include but are not limited to the following:

- **Uncertainty sources of seismic design of slopes**
  Uncertainty of seismic ground motions
  Uncertainty of geotechnical parameters
  Uncertainty of seismic design models, etc.
- **Dynamic behaviors of slope subjected to earthquake**
  Macroscopic and microcosmic behaviors of slope
  Experimental study on the dynamic behaviors of slope
  Numerical study on the dynamic behaviors of slope, etc.
- **Performance-based seismic design method of slopes**
  Theory of performance-based seismic design method
  Principle of selecting seismic performance index
  Methods to determine seismic performance standard, etc.
- **Prospect to the seismic design of slopes in future**
  Development strategy of seismic design method in future
  Core concept of seismic design method in the future
  Challenge of seismic design method in the future
- **Practice of seismic design in major slope project**

Contact Information

Chongqiang Zhu, Ph.D.
Institute for Infrastructure and Environment, School of Engineering, the University of Edinburgh
Thomas Bayes Road, Edinburgh EH9 3FG, UK
Tel: (44) 131-6505588
E-mail: v1czhu3@ed.ac.uk

www.geoamericas2020.com

After been held in Mexico in 2008, Peru in 2012 and the USA in 2016, GeoAmericas comes to Brazil in its 4th edition, which will be held in April 2020 in Rio de Janeiro. In addition to a rich technical program focused on the most relevant topics for the technical community of geosynthetics today, several social events and a wide area available for technical exhibits for the geosynthetic industry will be offered. English is the official language, but activities in Spanish and Portuguese will also compose the event's program. We anticipate over 1,000 participants from more than 30 countries, which ensures both broad representativeness and a plurality of cultures and markets.

Geosynthetics Solutions for a Fast-Changing World

This will be the motto of GeoAmericas 2020. In the 4th edition of the Pan American Geosynthetics Conference, we intend to establish a forum to discuss how geosynthetics can contribute to modern society in the face of its challenges and demands.

Some topics should guide the themes of technical sessions and the other activities in the event program:

- *Case Histories*
- *Design Approaches and Numerical Solutions*
- *Drainage and Filtration*
- *Durability and Long Term Performance*
- *Geosynthetics in Environmental Applications*
- *Geosynthetics in Dynamic Applications*
- *Geosynthetics in Hydraulic Applications*
- *Geosynthetics in Mining Applications*
- *Geosynthetics in Highways and Railways*
- *Geosynthetics Properties*
- *Geosynthetics Solutions for Natural Disasters*
- *Innovative Uses and Solutions*
- *New Geosynthetic Products*
- *Reinforced Walls and Slopes*
- *Reinforcement of Embankments and Unpaved Roads*
- *Seismic Analysis and Applications of Geosynthetics Solutions*
- *Soil-Geosynthetic Interaction*
- *Sustainability of Earth Works with Geosynthetics*

We also intend to promote a discussion about IGS role in disseminating knowledge and in broad education about the correct use of geosynthetics.

CONTACT US

geoamericas2020@geoamericas2020.com

WTC 2020 ITA-AITES World Tunnel Conference, 15-21 May 2020, Kuala Lumpur, Malaysia, www.wtc2020.my

14th Baltic Sea Geotechnical Conference 2020
25 ÷ 27 May 2020, Helsinki, Finland
www.ril.fi/en/events/bsgc-2020.html

Organiser: Finnish Geotechnical Society
Contact person: Leena Korkiala-Tanttu
Email: leena.korkiala-tanttu@aalto.fi
Email: ville.raassakka@ril.fi

Nordic Geotechnical Meeting
25-27 May 2020, Helsinki, Finland
www.ril.fi/en/events/ngm-2020.html

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, 13-19 June 2020, Trondheim, Norway, www.eurock2020.com

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

XIII International Symposium on Landslides - Landslides and Sustainable Development, June 15th – 19th 2020, Cartagena, Colombia, www.scg.org.co/xiii-isl

GEE2020 International Conference on Geotechnical Engineering Education 2020, June 24-25, 2020, Athens, Greece, www.erasmus.gr/microsites/1168

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

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

Contact person: Symposium srl
Address: via Gozzano 14
Phone: +390119211467
Email: info@symposium.it, marco.barla@polito.it

4th International Symposium on Frontiers in Offshore Geotechnics
16 – 19 August 2020, Austin, United States
www.isfog2020.org

The University of Texas is pleased to invite participation in the 4th International Symposium on Frontiers in Offshore Geotechnics (ISFOG) to be held in Austin, Texas, on 16-19 August 2020. ISFOG is now in its fourth event and third location following the most recent (2015) symposium in Oslo, Norway and the first two symposia in Perth, Australia in 2010 and 2005.

The fourth ISFOG event will be managed by the Geo-Institute of the American Society of Civil Engineers and the Deep Foundations Institute, held under the auspices of the ISSMGE Technical Committee 209 on Offshore Geotechnics, and will host the fifth McClelland Lecture. It will strive to continue providing a specialist forum for practitioners and academics to share solutions and new ideas that address the dynamic challenges of working in offshore design and installation. ISFOG 2020 will highlight emerging technologies related to data science and also emphasize the recent surge in offshore renewables development, both domestically in the United States and globally. Other growing areas of interest include performance-based design and addressing the challenges of an ageing offshore infrastructure, whether it be extending the operating life of these structures or solving the challenges and opportunities related to their decommissioning.

Themes

- **Site Characterization:** geotechnical testing and modelling, integrated studies, geohazards, sediment mobility and scour
- **Offshore Oil, Gas and Wind Energy Facilities:** foundations, monopiles, jack-ups, moorings, anchors, pipelines, risers, wells, cables, subsea systems, numerical modelling, case studies, cyclic loading
- **Alternative Energy and Other Ocean and Marine Resources:** wind, wave, tidal, current, thermal, gas hydrate, seafloor mining, aquaculture
- **Life Extension and Decommissioning:** fitness for service, foundation extraction, rigs to reefs, asset integrity, repurposing and reuse
- **Disruptive Technologies:** sensing, monitoring, intelligent systems, artificial intelligence, and machine learning
- **Design Methodologies:** performance-based/ whole-life/risk-based design and reliability
- **Rules, Standards and Regulations:** updates to existing design codes, development of new guidan

Contact

Customer Service
Phone: +1 (703) 295-6300 (International) or 1 (800) 548-2723
Fax: 1 (866) 902-5593
Email: registrations@asce.org

G-I Staff
Brad Keelor, Director | bkeelor@asce.org

Lucy King, Senior Manager | lking@asce.org

ASCE Mailing Address
American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, VA 20191-4382

August 30 - September 2, 2020, Chicago, Illinois, USA
http://conferences.illinois.edu/ICTG2020

Welcome to the 4th International Conference on Transportation Geotechnics (4th ICTG), which will be held in Chicago, Illinois, on August 30–September 2, 2020. This is the main conference event of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee (TC) 202 on Transportation Geotechnics and it is organized every four years. The primary focus of TC202 is to apply broad engineering to bridge the gap between Pavement /Railway Engineering and Geotechnical Engineering. The ISSMGE TC202 website: www.issmge.org/committees/technical-committees/applications/transportation-

The Transportation Geotechnics International Conference series began under the auspices of ISSMGE Technical Committee (TC) 3 and was initiated in 2008 at the University of Nottingham, UK, as an international event designed to address the growing requirements of infrastructure for societies. The 2nd International Conference on Transportation Geotechnics (ICTG) took place in Sapporo, Japan in 2012 under the ISSMGE-TC202 that followed the TC3 activities for the period 2009-2013, and the 3rd ICTG was organized in Guimarães, Portugal in September 2016. Following this 3rd successful conference, the 4th ICTG in 2020 will continue to promote co-operation and exchange of information and knowledge about the geotechnical aspects and address challenges in design, construction, maintenance, monitoring and upgrading of roads, railways, airfields and harbor facilities and other ground transportation infrastructure with the goal of providing safe, economic, environmental, reliable and sustainable infrastructures.

The 4th ICTG will include 3rd Proctor lecture, ASCE's Carl Monismith Lecture, meeting of Young Transportation Geotechnics Engineers (YTGE), several pre-conference workshops, plenary, keynote and breakout sessions as well as a technical exhibition for better disseminations of findings and best practices. Peer reviewed conference papers will be fully citation indexed and published in a Springer proceedings book.

Conference Themes

- Mechanistic-empirical design (road, railways, airfields and harbor facilities)
- Optimized geomaterial (including hydraulically bound materials and asphalt mixtures) use, reuse and recycling in road embankments and structural layers
- Sustainability in transportation geotechnics
- Rail track substructures, including transition zones, and transportation geodynamics
- Stabilization and reinforcement of geomaterials and its implications in pavement and rail track design
- Geosynthetics in transportation applications
- Subsurface sensing for transportation infrastructure
- Smart and connected transportation infrastructure, inluding Macro and Nanotechnology applied to transportation geotechnics
- Intelligent construction in earthworks technology and management
- Climatic effects on geomaterial behavior related to mechanics of unsaturated transportation foundations
- Slope stability, stabilization, and asset management
- Effect of climate change
- Harbor geotechnics
- Case histories

Pre-Conference Workshops

The main focus of the specialty workshops will be on IC technologies in earthworks, geosynthetics in transportation geotechnics, sustainability in mechanistic based designs of highway and airfield pavements, rail track substructure challenges, including transition zones, and transportation geodynamics.

Conference Secretariat

Erol Tutumluer
4th ICTG Chairman and Chair of ISSMGE TC 202
Department of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign
1205 Newmark CEE Laboratory, MC-250
205 N. Mathews, Urbana, Illinois 61801, USA
Phone: +1 (217) 333-8637
E-mail: CITL-ICTG2020@illinois.edu

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

37th General Assembly
of the European Seismological Commission

6 to 11 September 2020, Corfu, Greece
www.esc-web.org

6th International Conference on Geotechnical and Geophysical Site Characterization "Toward synergy at site characterisation", 7 ÷ 11 September, Budapest, Hungary, www.isc6-budapest.com

ICEGT-2020

2nd International Conference on Energy Geotechnics

September 20-23, 2020, La Jolla, California, USA
https://icegt-2020.eng.ucsd.edu/home

With ever increasing energy demand and related climate change implications, the development of sustainable energy systems based on integrated schemes of energy production, transport, transfer, and storage is an important challenge to society. The broad and emerging area of Energy Geotechnics has the potential to address this challenge from multiple perspectives. Energy Geotechnics integrates concepts from geotechnical engineering and geomechanics with cross-disciplinary collaborations with geology, hydrology, geophysics, geochemistry, petroleum engineering, and energy policy.

Building upon the 1st International Conference on Energy Geotechnics held in Kiel, Germany, this conference will provide a platform for interaction, communication, and technology transfer for academic and non-academic parties, including researchers and practitioners, in the broad areas within Energy Geotechnics.

CONFERENCE THEMES

- Energy Geo-Storage & Geo-structures
- Urban Planning for Energy Geo-Systems
- Numerical Methods in Energy Geotechnics
- Experimental Studies in Energy Geotechnics
- THMC Behavior of Geomaterials
- Unsaturated Soil Mechanics in Energy Geotechnics
- Geoenvironmental Aspects of Energy Geotechnics
- Geochemistry in Energy Geotechnics
- Material Design in Energy Geotechnics
- Geosynthetics in Energy Applications
- Carbon Sequestration
- Gas Hydrate Sediments
- Shallow & Deep Subsurface Geothermal Systems
- Natural & Hydraulic Fractured Reservoirs
- Enhanced Oil Recovery
- Nuclear Waste Repository Design and Evaluation
- Geotechnical Challenges for Energy Infrastructure
- Oil Sediments / Tailings
- Intersections between Geology, Hydrology, Geophysics, and Energy Geotechnics
- Energy Policy Issues in Energy Geotechnics

Contact Us:

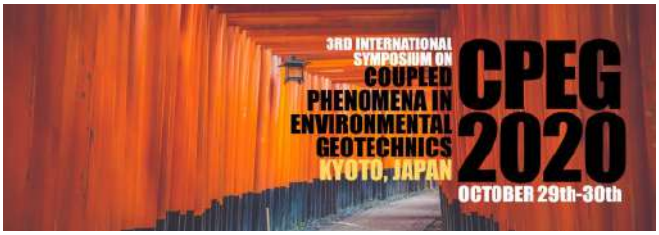
2nd International Conference on Energy Geotechnics
ICEGT-2020 Secretariat
9500 Gilman Dr., La Jolla CA 92093-0085
Phone: +1-858-822-5212
Fax: +1-858-822-2260
Email: secretariat@icegt-2020.com
Website: www.ICEGT-2020.org

21-25th September 2020, Lisbon, Portugal

The Organising Committee of the **Fourth International DAM WORLD Conference** has the pleasure of inviting you to take part of the fourth edition of the **DAM WORLD** conference.

By now, we would like to ask you to SAVE THE DATE in your calendar: **LISBON, Portugal, 21-25th September 2020**.

Eliane Portela
COMITÉ ORGANIZADOR
4ª CONFERÊNCIA INTERNACIONAL DAM WORLD
LNEC - LISBOA - PORTUGAL - 21 a 25 de setembro de 2020
damworld@lnec.pt dw2020.lnec.pt



3rd International Symposium on Coupled Phenomena in Environmental Geotechnics
October 29th – 30th, 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
1-6 June 2021, Torino, Italy

3rd EUROPEAN CONFERENCE ON EARTHQUAKE ENGINEERING &SEISMOLOGY

19 – 24 June 2022, Bucharest, Romania
https://3ecees.ro

The Romanian Association for Earthquake Engineering, with the support of Technical University of Civil Engineering of Bucharest (UTCB) and National Institute for Earth Physics (INFP), will organize with commitment and motivation the Third European Conference on Earthquake Engineering and Seismology (3ECEES), in 2022 in Bucharest, Romania.

Through Bucharest 3ECEES, we are fully motivated and committed to promote the values of earthquake engineering and seismology for the benefit of human kind, to boost the European cooperation in these fields, to push the frontiers of knowledge and to equip the decision makers and building officials with the roadmap for the years to come aiming at seismic risk reduction and enhanced societal resilience.

We, hereby, declare that we will do our best to make sure that the 3ECEES will be properly organized in 2022 by Romania and will be an outstanding scientific event fully adhering to the highest standards of quality set up by both EAEE and ESC.

Topics

The Third European Conference on Earthquake Engineering and Seismology (3ECEES) is aiming at providing a creative and stimulating environment for sharing and tackling the most challenging topics of global importance and interest in Earthquake Engineering and Seismology, such as (the list is neither exhaustive, nor restrictive):

- Physics of earthquakes and Seismic Sources
- Seismicity Analysis
- Induced and Triggered Seismicity
- Engineering Seismology and Strong Ground Motion
- Big Data and Large Research Infrastructures
- Geotechnical Earthquake Engineering
- Seismic Hazard
- Site Effects and Microzonation Studies
- Seismic Analysis and Design of Buildings and Structure
- Seismic Evaluation and Rehabilitation of Buildings and Structure
- Performance Based Design of Buildings and Structures
- Seismic Design Codes
- Lifeline Earthquake Engineering
- Structural Health Monitoring
- Seismic Exposure, Fragility and Risk
- Seismic Resilience
- Lessons from recent earthquakes

Contact Info

Telephone: +40 740 769 306
Email: contact@3ecees.ro

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

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Ground Instabilities

Landslides, rockfalls, mudslides, dam failures, and avalanches, are definitely the most difficult problems for geotechnical engineers.

https://www.facebook.com/EpochTimesAsean/videos/718503211885364/

(από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Γιάννη Μεταξά).

Ναύπακτος- γκάλοπ: Πόσο καιρό θα αντέξει ο τοίχος??

https://www.facebook.com/groups/episkeues.enisxuseis/2174723702839910/?comment_id=2174838282828452&notif_id=1556723781165252&notif_t=group_highlights)

(από Γαρυφαλιά Μαύρου μέσω Γιάννη Μεταξά).

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

A Massive 'Blob' of Rock Stretching Under Asia Might Be Triggering Hundreds of Earthquakes

The Hindu Kush mountain range — which stretches about 500 miles (800 kilometers) along the border of Afghanistan and Pakistan — shudders with more than 100 earthquakes at a magnitude of 4.0 or greater every year. The area is one of the most seismically active spots in the world, especially for intermediate-depth quakes (tremors forming between 45 and 190 miles, or 70 and 300 km, below the planet's surface). And yet, scientists aren't sure why.

The mountains don't sit on a major fault line, where high earthquake activity is expected, and the region is many miles away from the slow-motion crash zone where the Eurasian and Indian tectonic plates are steadily colliding. So, what's the deal with this mountain earthquake epidemic?

A new study published April 17 in the journal Tectonics may have an answer to the mystery quakes of the Hindu Kush — and, like all great geologic mysteries, it involves blobs.

According to the study, the Hindu Kush mountains may owe their incredible seismic reputation to a long "blob" of rock slowly dripping away from the range's subterranean underbelly and into the hot, viscous mantle below. Like a lone water droplet pulling away from the edge of a faucet, the 100-mile-deep (150 km) blob of mountain may be pulling away from the continental crust at a rate as fast as 4 inches (10 centimeters) per year — and this subterranean stress could be triggering earthquakes, the authors of the new study wrote.

The researchers discovered the troublesome blob after collecting several years' worth of earthquake observations near the Hindu Kush mountains. They saw that the quakes formed in a pattern, creating what looked like a "round patch" of seismic activity on the planet's surface, study co-author Rebecca Bendick, a geophysicist at the University of Montana in Missoula, told the website Eos.org. Those quakes also formed along a clear vertical axis, beginning between 100 and 140 miles (160 and 230 km) below the continent, and were most common deeper down, where the solid continental crust meets the hot, viscous upper mantle. Here, the researchers wrote, is where the slowly-stretching blob is strained the most.

All of these observations were consistent with a blob of solid rock slowly dripping into the gooey underworld below — a hypothesis that has previously been used to explain similar seismic activity underneath the Carpathian Mountains in central Europe. According to the researchers, the Hindu Kush blob likely began dripping no earlier than 10 million years ago, and continues to stretch downward nearly 10 times faster than the surface of the mountains move, as the Indian and Eurasian plates collide.

If accurate, these results may be more evidence that geophysical forces beyond just the subduction of tectonic plates can send earthquakes rattling through the planet. As it was best put in 1958: Beware of the blob.

(Brandon Specktor, Senior Writer / LIVESCIENCE, May 15, 2019, https://www.livescience.com/65482-hindu-kush-earthquake-blob.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190516-ls)

Oceanic plate next to Portugal seems to be peeling apart, creating a new supercontinent

A new study suggests that the oceanic plate next to Portugal could be peeling apart in a process that may result in the disappearance of the Atlantic Ocean and the creation of a new supercontinent.

On November 1, 1755, a giant 8.7 magnitude earthquake struck off the coast of Portugal, destroying the city of Lisbon. The seismic event and the following tsunami triggered the interest of philosophers and contributed to the development of modern seismology.

In 1969, a 7.9 magnitude earthquake struck in the same region. This was the time when the theory of plate tectonics was developed, and several scientists came to study this margin.

Since then, many studies have been dedicated to the Atlantic southwest passive margin of Portugal and several scientists proposed that this region was a case of subduction initiation, marine geologist Joao C. Duarte from the University of Lisboa's Instituto Dom Luiz (IDL) notes.

Intriguingly, the epicenter of the 1969 earthquake occurred in a relatively flat abyssal region, far from any known tectonic faults with significant length and surface expression. Previous studies showed the existence of a seismicity cluster precisely in this area at lithospheric mantle depths of ~50 km (31 miles), in a section of old oceanic (Jurassic?) lithosphere.

According to the studies made by Duarte and his scientist's team, this seismicity is located below a seismically silent layer, interpreted as a serpentinization front propagating down through the lithospheric upper mantle.

Several tomographic models have consistently imaged a fast-velocity anomaly extending up to a depth of 250 km (155 miles), right below this seismicity cluster.

The team interpreted the anomaly as a lithospheric drip caused by the delamination of oceanic lithosphere.

If this is the case, it is the first time that delamination of oceanic lithosphere is identified.

"We propose that the reactivation of the margin and the hypothetical process of subduction initiation may have been aided by a process of delamination of oceanic lithosphere," Duarte said.

According to the data presented on computer simulations at the European Geosciences Union meeting, the development of these events could provide 'the necessary spark for one plate to start grinding under another in what's known as a subduction zone,' Duarte pointed.

Oceans are born and then they spread, before eventually closing up to form a new supercontinent, in what is known as the super-continental cycle, Duarte said. "The Atlantic, for example, was formed from the breakup of the supercontinent Pangea, then 'spread' to assume its current form."

The team made an assumption that Atlantic is now closing in a process which will, in about 200 million years, end up creating a new supercontinent.

Fabio Crameri, a scientist from the University of Oslo (who hasn't been a part of the study), said Duarte presented some strong arguments, adding that the model needs further testing, which is not an easy feat when your data comes from a natural process that works at the speed at which fingernails grow.

(Andrea Romero / THE WATCHERS, May 11, 2019, https://watchers.news/2019/05/11/oceanic-plate-next-to-the-portugal-coast-seems-to-be-peeling-apart-creating-a-new-supercontinent/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+adorraeli%2FtsEq+%28The+Watchers+-+watching+the+world+evolve+and+transform%29)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

7 Ways the Earth Changes in the Blink of an Eye

Intro

From islands popping out of the ocean during earthquakes to glaciers calving icebergs every hour, the Earth can undergo dramatic changes right before your eyes.

These seven rapid geological transformations have fascinated scientists and struck fear in the hearts of everyone else for ages.

A new coast

Earthquakes not only rattle the Earth, but they radically change the landscape. The Chilean earthquake that struck on Feb. 27 changed the country's landscape by raising the ground by more than 8 feet (2.5 meters) near the coast and sinking land farther inward, a recent study found.

The massive quake caused marine platforms to rise out of the ocean, thereby shifting the coastline in some places 1,640 feet (500 m) closer to the ocean.

Ice conveyor belt

Glaciers huge rivers of ice formed when snow and ice accumulate over hundreds and thousands of years act like a big conveyor belt that pushes ice into the sea. These icy rivers move slowly over time, some eventually dumping ice chunks into the sea, a process known as calving a leading source of additional water for the world's oceans.

Some kinds of glaciers, however, calve as often as once an hour. These kinds of glaciers are called "grounded," meaning they rest on the ocean floor; others float on top of the ocean waters as they run into the sea. Scientists recently observed Alaska's Columbia Glacier undergoing a transition from grounded to floating, which dramatically slowed its calving.

Volcano collapse

Massive volcanic eruptions unleash ash and pumice into the sky and can be heard thousands of miles away and even seen from space. But volcanoes can change the landscape in the blink of an eye in a way other than blowing off their tops by triggering huge landslides.

Thousands of years ago, a large collapse of the edifice of the Soufriere Hills volcano on the island of Montserrat in the Lesser Antilles sent landslides into the ocean. Some of these landslides involved nearly 1.2 cubic miles (5 cubic kilometers) of material that travelled underwater for miles.

Volcanic dome collapses occur when dome-shaped lava mounds on top of a volcano break apart due to a gas pressure build-up. Soufriere Hills' eruptions have produced some of the largest volcanic dome collapses ever recorded.

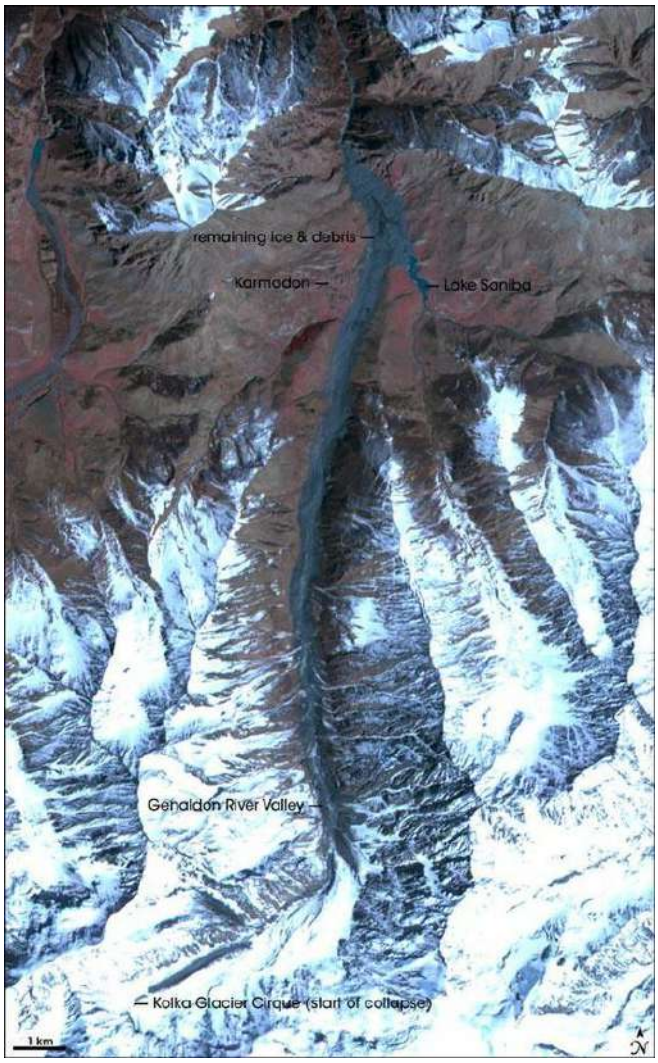
Landslides

Landslides can wipe away villages in the blink of an eye even when volcanoes aren't involved. Heavy rains triggered landslides on the slopes of Mount Elgon in Uganda, on March 1, 2010.

Landslides are common in the region, but these recent landslides are much larger than previous ones. The landslides buried three villages, leaving 83 dead and more than 300 missing as of March 8, reported the United Nations Office for the Coordination of Humanitarian Affairs. The Ugandan government has also stated that deforestation may have played a role in the landslides.

Avalanches

When mountaintop glaciers collapse, they can trigger an avalanche of ice and debris down the mountain. Such was the case for Mt. Kazbeck in Southern Russia when the Kolka Glacier collapsed on Sept. 20, 2002.



In the above image, the dark grey streak shows the gorge that was overrun by ice, rock, water and other debris from the avalanche. The avalanche plowed down the Genaldon River Valley at speeds up to 112 mph (180 kph) and buried parts of a village with a layer of ice and rock 427 feet (130 meters) thick.

Avalanches, along with other deadly natural disasters such as heat waves and floods, could become more common in mountainous regions thanks to climate change, according to a recent study. In the Alps, where temperatures have increased twice as much as the global average temperature since the late 19th century and are predicted to rise by an average of 0.54 to 0.9 degrees Fahrenheit (0.3 to 0.5 Celsius) per decade in the next century, these threats are a real concern.

Rapid megafloods

Some of the most spectacular canyons on Earth (and Mars) were probably formed in the geologic blink of an eye, suggests a recent study that found clues to their formation deep in the heart of Texas.

As anyone living in Comal County, Texas can attest, they can form even faster. Lake Canyon Gorge, a 23-feet- deep (7 meters) canyon was carved in just three days by a flood in 2002. The flood scoured a swath of greenery in this Texas town, leaving sand-colored bedrock rubble in its wake.

A single catastrophic flood capable of cutting into bedrock is extremely rare, but the Comal flood gave scientists a front-row ticket to an event similar to those from the planet's distant past, geologists said.

Rapid megafloods may have formed other canyons in the distant past as glacial ice dams released trapped water. Large floods may be responsible for the formation of some Martian canyons as well, said geologists.

Meteor impact

Many meteors headed for Earth burn up in the planet's atmosphere. Those big enough to make it through leave quite an impression on the landscape.

The Earth's wind, water and vegetation will eventually erase most craters. With few exceptions, even the largest craters are eventually destroyed by the processes of plate tectonics.

The Barringer Crater, also known as Meteor Crater, is a 0.8-mile- (1,300-meter-) diameter, 570-foot- (174-m-) deep hole in the flat-lying desert sandstones that lies 18.6 miles (30 kilometers) west of Winslow, Ariz.

(Brett Israel / LIVESCIENCE, August 6, 2010, https://www.livescience.com/29625-seven-ways-the-earth-changes-in-the-blink-of-an-eye-100809html.html)

Nothing Green About Concrete

Concrete is the second most used material on the planet after water. If you convert the social and environmental costs of the material into externalities, as is the ubiquitous practice in business, the stuff becomes relatively cheap. If concrete were a country, it would be the third largest emitter of carbon dioxide behind the U.S. and China.

But we're entering an era where externalities can no longer be considered external and, in the case of concrete, there are a lot of costs to be accounted for that requires an entirely new look at the way it has been used and whether it should be used in the future.

This article breaks down the role of concrete in global infrastructure and what the future of the material might look like.

Concrete's Carbon Footprint

Most recent estimates cite concrete production as responsible for up to 8 percent of global carbon dioxide emissions. To understand where these emissions come from, it's necessary to understand how concrete is made.

Roughly half of the emissions stem from the chemical process to produce cement, called calcination. When limestone is heated at temperatures of over 825°C (1,517°F) for about 10 hours, it breaks down into calcium oxide (lime) and carbon dioxide that is released into the atmosphere. The energy used to heat the kiln for calcination accounts for about 40 percent of the material's total emissions.

In the case of the world's most common cement, Portland cement, the lime is combined chemically with silicates and oxides—belite, alite, tricalcium aluminate and brownmillerite—to form a hardened substance known as "clinker." The clinker is ground into dust so that once combined with water, it becomes liquid cement. Concrete, then, is a mixture of cement, water and aggregate, a mix of gravel and sand.

The final 5 to 10 percent of concrete's emissions are the result of mixing and transporting the material. In this way, concrete actually has a lower embodied energy than any other construction material besides wood because the water and aggregate are available local to the build site.

With this in mind, we can determine that roughly 40 percent of concrete's carbon footprint can be dropped down to zero if the production process is performed with 100 percent renewable technologies, such as wind and solar—though there may be ethics issues to contend with regarding the sourcing of materials for those technologies as well.

To address the 50 percent associated with calcination, there is the possibility of improving the recycling standards for concrete, discussed further below. Otherwise, researchers and companies are exploring technologies that will have a less negative or even positive impact on carbon dioxide emissions. These include the development of concrete that absorbs carbon dioxide during the curing process or once hardened. These technologies, however, are still very much in their nascent stages, and their overall efficacy has not yet been proven.

Other techniques for reducing the amount of cement in concrete mixtures involve incorporating a large percentage of fly ash, cinders produced in coal fire plants, or even plant matter, such as carrots, beets and bamboo.

Water Usage

In 2012, concrete production represented about 9 percent of industrial water usage worldwide. It is anticipated that by 2050, 75 percent of water demand for making concrete will occur in regions experiencing water stress due to climate change.

There may be ways to reduce some of this usage by relying on recycled water, though there are limitations with respect to the clarity of the water that can be used in order to ensure the production of quality concrete. It is also possible that more efficient processing of raw materials could cut some of the water used. There are concrete manufacturers that claim their products use significantly less water than traditional Portland cement does.

Stormwater Runoff

While the impacts of limestone mining may be gleaned from the general effects of mining—damaging fertile topsoil and local habitats, as well as possibly contaminating local water supplies—the way that concrete structures shape the surrounding environment may be more surprising.

The resistant nature of concrete is both a strength and disadvantage. While concrete sea walls can protect cities amidst rising sea levels, it also deflects stormwater, exacerbating runoff problems in urban environments. Instead of absorbing rainwater, as natural vegetation does, concrete deflects water, allowing it to pick up gasoline, heavy metals, trash, motor oil and other contaminants associated with urbanized living. According to the United States National Research Council, due to impervious surfaces like pavement and roofing, a typical city block "generates more than five times more runoff than a woodland area of the same size."

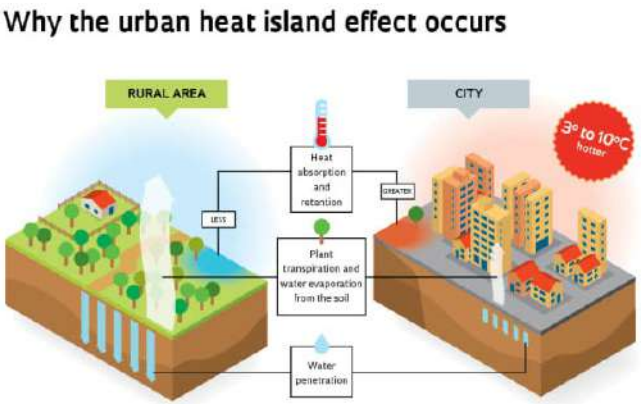
This issue can be mitigated in part by using pervious concrete—porous concrete made using large rather than fine aggregates—in light traffic areas, such as residential streets, sidewalks and parking areas. Pervious concrete simultaneously addresses two problems, both giving stormwater somewhere to go, as well as replenishing groundwater, another issue escalating with climate change. Moreover, when designed properly, it can be used to filter contaminants.

Pervious concrete allows water to run through it to replenish groundwater sources and reduce runoff.

New resident roadways and sidewalks can be designed with pervious concrete, but that still leaves an issue with large-scale concrete buildings where pores would impact the structural integrity of the building.

Urban Heat Island

The expansion of urban environments has seen cities pave over natural vegetation with concrete and asphalt, leading to greater heat absorption. Due to the fact that most U.S. cities are covered in 30 to 40 percent pavement, this urban heat island (UHI) effect sees cities becoming between 2°C to 12°C (4°F to 22°F) hotter than surrounding rural areas. On hot summer days, surface temperatures can reach up to 60°C (140°F).



A diagram of UHI effect.

The resulting temperature increase can lead to greater smog formation, more demand for water and energy usage, lower ability to work, and illness or death in sensitive populations.

The best proven strategy for addressing the UHI effect is adding more vegetation to urban environments, including more parks and wooded areas, as well as incorporating plants into traditional urban structures like roadways, parking lots and roofs. Further gains can be made through the use of high-albedo building materials, such as white or reflective pavement.

Dust

According to a 2015 report, air pollution at the 19 largest construction sites in Delhi exceeded safe levels by at least three times, and the dust from stocks and mixtures represented 10 percent of the particulate matter in the city. Building demolition and natural disasters can worsen the problem significantly, as a study of the Great Hanshin-Awaji Earthquake revealed.

The dust from construction has its largest impact on construction workers themselves. While lime causes irritation, silica can lead to asthma, tuberculosis, obstructive pulmonary disorder, kidney disease, silicosis and even lung cancer.

Waste

Waste from construction and demolition (C&D) represents about 25 percent of the solid waste annually in the U.S. In 2015, about 70 percent of that C&D waste was made up of concrete.

Construction companies are coming to increasingly value recycled concrete. Recycling rates vary around the world, with just 1 percent in Brazil, 10 percent in China and 90 percent in Japan. In most cases, the material is downcycled as filler for road repair and other low-value applications.

To use recycled waste as a replacement for new concrete, it's necessary to separate the aggregate from the cement and metal rebar. A precise method for doing this is currently in the research phase. One method being explored by the Concrete Technology Group in Germany is the application of electricity to concrete blocks to break them into their constituent parts.

Less arduous is performing construction with recycling in mind. Unfortunately, pre-used concrete doesn't come with very detailed supply chain information, making it difficult to determine the composition of the material, including what the aggregate is made from and the exact proportion of ingredients. To ensure that recycled concrete is acceptable for structural projects, better supply chain tracking will need to be put into place.

Once this and other issues are addressed, a more sustainable method for concrete use can be established. Dutch think tank Metabolic has proposed a circular economy for cities like Charlotte, N.C., in which unused concrete and demolition concrete are taken to a local recycler that can crush the material and validate its use for subsequent construction projects. Builders would need be active members of the circular economy and accept the reusable material for future construction use.

Concrete Solutions

Replacing concrete would be a difficult task. The material is strong, comparatively cheap, moldable in liquid form and quick to set. Aggregate ingredients are in plentiful supply worldwide.

One potential alternative may be cross-laminated timber (CLT), a treated form of wood that addresses the anisotropic properties of traditional timber. With CLT, stacks of wood are glued together, each layer perpendicular to the next so that it becomes as strong as concrete but without the same environmental drawbacks.

Because wood is generally thought of as a renewable resource, timber can be harvested without the same emissions as concrete, and CLT can be made without relying on fossil fuels. The Nordic countries are leaders in the CLT space, and Stora Enso, Europe's largest supplier, plants two to three trees for every tree used. While Sweden has doubled its rate of forest cover in the past 100 years through these types of forestry practices, it must be mentioned that new managed forests, such as those created by Stora Enso, do not serve the same ecological functions that old-growth forests do.

CLT floors and walls can be prefabricated, potentially saving time and money, while also ensuring accuracy in that that

prefab components can be placed under tighter quality control than items made on-site. The material is also very light. Foundations made from CLT do not need to be as large, and the machines required for on-site construction are smaller than with concrete structures. The weight and modularity of CLT also allows for quicker, easier installation than concrete poured onsite.

A diagram describing the orientation of wood panels in CLT.

The disadvantages lie in the fact that CLT is a relatively new material, with CLT construction only really taking off in the early 2000s and large-scale projects beginning even more recently. This means that the cost of CLT is still greater than concrete. One estimate finds that CLT is approximately 16 to 29 percent more than cast-in-place reinforced concrete. Additionally, the track record of the material is still being established, though much technical research has been performed.

An illustration of the W350 building in Japan, which is set to be about 10 percent steel and 90 percent wood.

Up until now, CLT has been limited to buildings up to 10-stories tall, but new technology has enabled construction companies to push this limit. In Norway, the Mjøstårnet building is aiming for 18 stories. In Japan, the W350 building is planned to reach 70 stories.

While a number of solutions and mitigation strategies have been discussed here, actually driving society to make changes is a different story altogether. In its massive series on concrete, *The Guardian* has published opinion pieces on how to incentivize business to address its concrete usage through a concrete tax and how individuals can influence the materials used in their built environment using such tactics as divestment.

(Michael Molitch-Hou / engineering.com, April 26, 2019, https://www.engineering.com/BIM/ArticleID/19019/Much-Ado-About-Concrete.aspx)

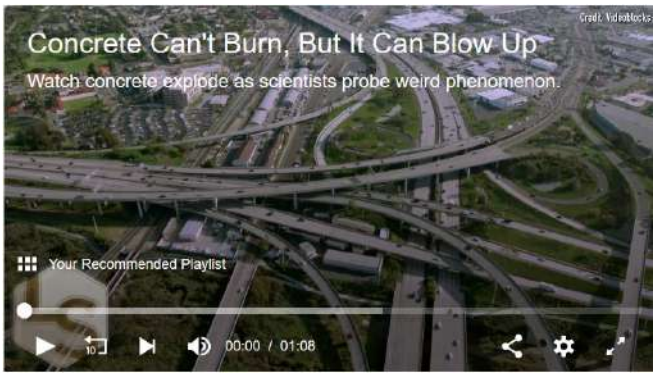
ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Watch Concrete Explode As Scientists Probe Weird Phenomenon

Little known fact: Concrete can explode. And now scientists know why.

In a new study, researchers from Empa, the Swiss Federal Laboratories for Materials Science and Technology, heated concrete up to 600 degrees Celsius (1,112 degrees Fahrenheit) and watched it go kaboom. The reason for the explosions, the researchers found, was the way tiny amounts of moisture locked inside the concrete vaporized and moved when heated.

Concrete explosions can be particularly dangerous results of fires that affect bridges or tunnels, according to a statement. In March 2017, a bridge on Interstate 85 in Atlanta partially collapsed after a fire in a storage unit under the bridge damaged the structure's concrete and steel. In 2003, a fire caused the collapse of a reinforced-concrete building in Hengyang, China, and the incident killed 20 firefighters.



Going boom

Concrete, in its simplest form, is made of cement, sand and water. But major construction projects such as bridges, tunnels and skyscrapers use high-performance concretes, which have additional ingredients or use special drying methods to improve their durability and strength.

But heat them to over 392 F (200 C), and high-performance concretes become vulnerable. They can even explode, sending chunks of concrete shooting away from the main block.

To find out why, Empa researchers joined scientists at the University of Grenoble in France and the Laue-Langevin Institute in Grenoble to watch concrete get hot. The researchers tracked the interior of the heated concrete in real time using neutron tomography, which relies on the absorption of neutrons to create a 3D image.

Under pressure

The images revealed that high-performance concrete explodes because of the same properties that make it strong: It has very few pores, and those pores are tiny. When heated, water locked up in the concrete moves away from the source of heat and vaporizes. Because the concrete is so dense and impermeable, the water and steam get stuck. With no way to vent the buildup of pressure, parts of the block blow off.

Even when the source of heat is removed, the researchers found, the explosions can still occur until the internal pressure falls. In one experiment, a chunk of concrete flew toward the scientists' recording equipment after the heat was turned off, knocking over an innocent timer.

The results should help scientists understand how moisture moves during catastrophic fires, the researchers wrote last year in the journal Cement and Concrete Research.

(Stephanie Pappas, Live Science Contributor / LIVESCIENCE, May 6, 2019, https://www.livescience.com/65398-concrete-explodes-in-weird-video.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190506-ls)

Smart City: Πόσο έξυπνες πόλεις θέλουμε;

Ψηφιακές υποδομές, αυτοματοποιημένες συγκοινωνίες, κτίρια υψηλής ενεργειακής απόδοσης: οι πόλεις του μέλλοντος θα είναι τελείως διαφορετικές από τις σημερινές και αναμφίβολα πιο έξυπνες.

Το smart city έχει γίνει πλέον βασική έννοια της σύγχρονης πολεοδομίας.

Το smart city έχει γίνει πλέον βασική έννοια της σύγχρονης πολεοδομίας. Σε πολλές γερμανικές πόλεις υλοποιούνται ήδη διάφορα, πιλοτικά κυρίως, πρότζεκτ.

Στην Klimastraße της Κολωνίας, για παράδειγμα, ο δήμος πειραματίζεται σε διαδρομή περίπου τεσσάρων χλμ. και σε συνεργασία με τον ενεργειακό όμιλο RheinEnergie με νέες τεχνολογίες για δικτυωμένη πόλη. «Το ονομάζουμε Living Lab. Εδώ επιτρέπονται οι αποτυχίες», επισημαίνει ο υπεύθυνος του πρότζεκτ Κρίστιαν Ριμάκλι.

Παρόμοια πιλοτικά προγράμματα «τρέχουν» και στο Ντόρτμουντ. «Για εμάς το Smart City είναι μια έξυπνη, δικτυωμένη πόλη που βελτιώνει την ποιότητα ζωής», εξηγεί ο Σεμπάστιαν Βίνκλερ από την Allianz Smart City του Ντόρτμουντ, πόλη που επενδύει περισσότερο στην ηλεκτροκίνηση.

Διαχωρισμός σκουπιδιών με αισθητήρες

Στην Ασία και στον αραβικό χώρο δημιουργήθηκαν τα τελευταία χρόνια δεκάδες νέες «συνθετικές» πόλεις. Σε μέρη όπου παλαιότερα δεν υπήρχε απολύτως τίποτα, υφίστανται πλέον υπερσύγχρονες έξυπνες πόλεις.

Ενα από τα γνωστότερα παραδείγματα είναι η νοτιοκορεατική Σονγκντό, απόλυτα δικτυωμένη πόλη που δημιουργήθηκε προ ετών κοντά στην πρωτεύουσα Σεούλ.

Εκεί, ο διαχωρισμός σκουπιδιών γίνεται με αισθητήρες και οι κάτοικοι μπορούν να επικοινωνούν με τις υπηρεσίες του δήμου μέσω της τηλεόρασής τους.

Πρόκειται για μοντέλο που δεν μπορεί να λειτουργήσει στην Ευρώπη, εκτιμά η καθηγήτρια Γεωγραφίας Ζιμπίλε Μπάουριντλ. «Στο Σονγκντό, η πρωτοβουλία ανήκε σε εταιρία Πληροφορικής που ήθελε να πειραματιστεί εκεί για τα νέα της προϊόντα. Οι πόλεις μας στην Ευρώπη εξελίχθηκαν σε βάθος αιώνων. Οι ψηφιακές υποδομές έρχονται λοιπόν να προστεθούν και να ενσωματωθούν εκ των υστέρων στις πόλεις μας».

Οι διαδικασίες αυτές δεν είναι μόνον πολύ δαπανηρές αλλά και ιδιαίτερα χρονοβόρες. Πριν στηθούν, για παράδειγμα, κάμερες, με τη βοήθεια των οποίων οι οδηγοί θα κατευθύνονται σε ελεύθερες θέσεις στάθμευσης, θα πρέπει να λυθούν και ζητήματα προστασίας προσωπικών δεδομένων. Τι θα καταγράφουν οι κάμερες, για πόσο χρόνο θα αποθηκεύεται το υλικό κ.λπ.

Προβληματική η συνεργασία με μεγάλες εταιρίες;

Ακόμη πιο σύνθετα γίνονται τα θέματα όταν οι δήμοι συνεργάζονται με μεγάλες επιχειρήσεις νέων τεχνολογιών. Στο Ντουίσμπουργκ, για παράδειγμα, ο δήμος συνεργάζεται με τη Microsoft με στόχο την κατασκευή Έξυπνων Σπιτιών για ηλικιωμένους.

Οι πληροφορίες που θα συλλέγονται θα δείχνουν εάν έχει συμβεί ατύχημα μέσα στο σπίτι, εάν έχει ξεχαστεί το μάτι της κουζίνας αναμμένο κ.ά. «Τα δεδομένα αυτά θα 'εγκαταλείπουν' το σπίτι μόνον εάν το επιθυμεί ο ιδιοκτήτης ή οι συγγενείς», εξηγεί η υπεύθυνη του πρότζεκτ Μπετίνα Χόρστερ.

Η καθηγήτρια Γεωγραφίας Ζιμπίλε Μπάουριντλ αντιτείνει: «Κάθε πόλη θα πρέπει να σκεφτεί το εξής: θέλει να συνεργαστεί με αυτές τις μεγάλες επιχειρήσεις; Διότι έτσι δημιουργείται ένα μονοπωλιακό καθεστώς το οποίο με τη σειρά του προκαλεί εξαρτήσεις».

Τα οφέλη μιας έξυπνης, δικτυωμένης πόλης είναι σίγουρα πολλαπλά για τους πολίτες της αλλά και για το περιβάλλον. Η επιτυχία ή αποτυχία της όμως εξαρτάται εν τέλει εν πολλοίς από τον βαθμό ανταπόκρισης των ίδιων των πολιτών.

Στην Klimastraße της Κολωνίας, οι υπεύθυνοι του πρότζεκτ είχαν προτείνει σε όλα τα καταστήματα του δρόμου την οικονομική μετάβαση σε λαμπτήρες LED. Μόλις 21 ιδιοκτήτες ανταποκρίθηκαν. Στο Σονγκντό της Νότιας Κορέας οι νέες τεχνολογίες χρησιμοποιούνται ανεξαιρέτως απ' όλους.

(in.gr, 17 Μαΐου 2019,
https://www.in.gr/2019/05/17/world/deutsche-welle/smart-city-poso-eksypnes-poleis-theloume/)

Το παραδοσιακό κιλό «πέθανε», ζήτω το νέο... άυλο κιλό

Από τις 20 Μαΐου (Διεθνή Ημέρα Μετρολογίας) το κιλό έπαψε και επίσημα να ορίζεται με βάση ένα χειροπιαστό υλικό πράγμα, αλλά θεωρείται πια κάτι αφηρημένο που έχει να κάνει με το φως και την ενέργεια.

Οι φυσικοί αντικατέστησαν πλέον το παλιό κιλό (ένα κύλινδρο από πλατίνα και ιρίδιο που ζύγιζε ένα κιλό, φυλασσόταν στη Γαλλία και από το 1889 αποτελούσε το σημείο αναφοράς του κιλού) με μια «ασώματη» μέτρηση που βασίζεται στα φωτόνια και στη σταθερά του Πλανκ.

Με το νέο ορισμό, που είχε αποφασιστεί ομόφωνα πέρυσι το Νοέμβριο από τη διεθνή Γενική Διάσκεψη Μέτρων και Σταθμών στις Βερσαλλίες, το κιλό θα είναι πια αμετάβλητο και δεν θα μεταβάλλεται έστω και αδιόρατα με το πέρασμα του χρόνου, όπως συνέβαινε με τον κύλινδρο, ο οποίος έχανε άτομα κατά καιρούς (τα τελευταία 130 χρόνια είχε συνολικά χάσει περίπου 50 μικρογραμμάρια).

Το κιλό είναι πια μια αφηρημένη ιδέα, που έχει την ίδια ισχύ οπουδήποτε στο σύμπαν και όχι ένας κύλινδρος που θα ζύγιζε λιγότερο στη Σελήνη από ό,τι στη Γη, λόγω της διαφοράς βαρύτητας.

Το νέο κιλό βασίζεται στη θεμελιώδη σχέση μεταξύ μάζας-ενέργειας (το διάσημο $E=mc^2$ του Αϊνστάιν) και στην κβαντική σταθερά του Πλανκ που είναι αμετάβλητη στο σύμπαν. Η μάζα του νέου κιλού αντιστοιχεί στην ενέργεια $1,4755214 \times 10^{40}$ φωτονίων με τη συχνότητα ενός ατομικού ρολογιού καισίου.

Από πρακτική άποψη πάντως, δεν θα αλλάξει κάτι, αφού π.χ. όσο ζύγιζε ένας άνθρωπος με το παλιό κιλό, θα συνεχίσει να ζυγίζει και με το νέο κιλό. Η διαφορά θα φανεί περισσότερο σε κάποιες επιστημονικές εφαρμογές που απαιτούν μετρήσεις υψίστης ακριβείας.

Εκτός από το κιλό, στις 20 Μαΐου τέθηκαν σε ισχύ και οι νέοι ορισμοί τριών ακόμη μονάδων: του κέλβιν, του αμπέρ και του γραμμομόριου.

Έτσι, και οι επτά θεμελιώδεις μονάδες του Διεθνούς Συστήματος Μονάδων (γνωστού και ως μετρικού συστήματος) ορίζονται πλέον με βάση θεμελιώδεις και αμετάβλητες σταθερές της φύσης. Το αμπέρ με βάση το φορτίο του ηλεκτρονίου, το γραμμομόριο (μολ) με βάση τη σταθερά Αβογκάντρο και το κέλβιν με βάση τη σταθερά Μπόλτσμαν.

Οι άλλες τρεις μονάδες (δευτερόλεπτο, μέτρο και καντέλα ή κηρίο) είχαν ήδη ορισθεί στο παρελθόν με βάση κάποια φυσική σταθερά. Για παράδειγμα, από το 1983 το μέτρο ορίζεται με βάση την ταχύτητα του φωτός, ως η απόσταση την οποία ταξιδεύει το φως στο κενό σε χρόνο 1/299.792.458 δευτερολέπτων.

Πηγή: ΑΠΕ-ΜΠΕ

(Η ΚΑΘΗΜΕΡΙΝΗ, 21.05.2019, http://www.kathimerini.gr/1024991/article/epikairothta/episthmh/to-paradosiako-kilo-pe8ane-zhtw-to-neo-aylo-kilo)

A Photo Visit to Mount Fanjing
(Τα Μετέωρα της Κινας)

Mount Fanjing, or Fanjingshan, is part of the Wuling mountain range in southwestern China's Guizhou province. Named as a UNESCO World Heritage Site last year, the mountain is home to a conservation area, a nature reserve, and a number of Buddhist temples—it has been considered a sacred site for centuries. Two of these temples sit atop a lonely spire called the New Golden Summit, or Red Clouds Golden Summit, which rises more than 330 feet (100 meters) above the surrounding mountaintop. The Temple of the Buddha and Maitreya Temple are separated by a narrow gorge that visitors can cross via a short bridge.

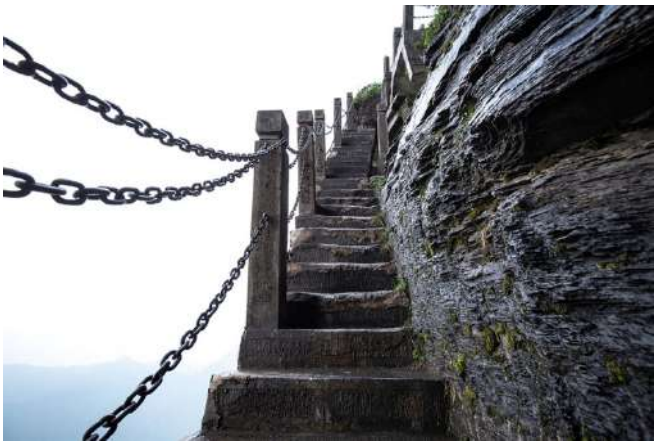
The Temple of the Buddha and Maitreya Temple, photographed from above, atop the New Golden Summit on Mount Fanjing, in May 2018

A sea of clouds, photographed at sunset in Mount Fanjing Nature Reserve

An aerial view of the short bridge connecting the temples atop the New Golden Summit

A view of the New Golden Summit, looking west

A rainbow appears above Buddhist temples on Mount Fanjing.



Stairs lead up to a temple on Mount Fanjing.

A view to the south

Climbing up through the gorge of the New Golden Summit

A closer look at the peak

Mount Fanjing is considered one of Chinese Buddhism's sacred mountains—the fifth most important one in China.

Unique geological landforms, including the "Mushroom Stone" at right

Clouds roll past the New Golden Summit on Mount Fanjing.

(Alan Taylor / The Atlantic, Apr 10, 2019, https://www.theatlantic.com/photo/2019/04/a-photo-visit-to-mount-fanjing/586879)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

Geophysical Ahead Investigation Methods / Seismic Methods

ITAtech AG INVESTIGATION

Using underground space more and more implies improvements to the economic feasibility of underground construction. Common practice nowadays is a geotechnical site investigation that is carried out in order to enable a geotechnical and environmental assessment of the ground conditions. Geological and hydro-geological conditions are key factors during the planning of and budgeting for a project and its subsequent viability.

There is a strategy for site investigation at various stages of a project. This phased strategy consists of investigations for feasibility studies and the preliminary and detailed design and of investigations during the construction phase. Among other purposes, these investigations are carried out to determine the 3-dimensional geotechnical and hydrogeological model during the design studies and validate using face mapping, investigations ahead of the tunnel face (e.g. probe drilling, geophysics), TBM performance data, etc.

Today, machine driven tunnelling has to provide high performance, normally to justify the high initial investment costs. However, geological anomalies and risks can massively reduce tunnelling rates over weeks or months, and sometimes bring a project to a complete stop. Conventional methods, such as probe drilling, generally cover a range of 30 to 40 metres ahead of the tunnel face. They are useful but its execution can reduce the daily advance performance of a TBM because excavation must stop during these periods. In addition, exploratory drilling only provides a selective record of the ground conditions unless multidirectional probing is adopted ahead of the face creating further time delays.

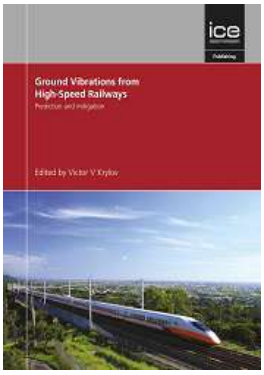
From its origin in oil and mineral resources exploration, investigations ahead of the tunnel face by means of geophysical methods entered into the field of tunneling in Europe in the early 1990s followed by many applications on Japanese tunneling sites throughout the 1990s. Since then, commercial systems became available on the market and the number of applications of geophysical methods increased. In addition, a systematic use of such systems began in some regions of the world (Japan and China) where intense tunnelling activities were going on. Hence, geophysical methods increasingly became an essential part of the risk management process over the last 20 years. The tunnelling industry has already identified the potential of these usually non-destructive methods that valuably contributes to the assessment of the ground conditions and to the provision of interpretative reporting.

This guideline gives an overview of existing geophysical methods and technologies ahead of the tunnel face. In its present version, it focuses on seismic methods and describes technical features and case studies of these methods. It further suggests requirements to be included in tender specifications for the described investigation systems for tunnelling projects.

Seismic reflection imaging is the most effective prediction method because of its large prediction range, high resolution and ease of application on a tunnel construction site. In particular, when using the information of the full seismic wave field propagating through the ground, seismic properties such as seismic velocities and their derived elastical parameters like Poisson's ratio or stiffness present valuable information to characterise the ground. However, geophysics deals with more methods than just seismics. There are electro-magnetical, electrical and gravimetrical methods, which are being used more and more in tunnelling. Certainly all of them can contribute by providing further information on the ground conditions.

This guideline has been written to orientate tunnel designers, contractors and owners towards understanding the benefits and limitations of the currently available technology for seismic investigations during tunnelling that is already used and has a proven record.

(ITAtech Publications, 2018, https://about.ita-aites.org/wg-committees/itatech/publications/1683/geophysical-ahead-investigation-methods-seismic-methods)



Ground Vibrations from High-Speed Railways: Prediction and mitigation

Victor V Krylov

Ground Vibrations from High-Speed Railways brings together leading international research on prediction and remediation of railway-induced ground vibration. It provides a unique general reference source which will help the reader to study the problem from different points of view, and provide answers to numerous theoretical and practical questions.

Focusing specifically on the significant amplification of ground vibrations that can occur above critical speeds, the book provides a detailed guide to recent and ongoing developments in this area. Coverage includes

- fundamental problems of dynamics of track-ground systems under the impact of high-speed trains
- effects of vehicle-track interaction and associated stability problems
- railway-generated ground vibrations, including their impact on nearby buildings, effects of tunnels and layered soils
- modelling approaches, including 2.5D approaches, analytical and semi-analytical approaches, numerical approaches, hybrid models, and scoping assessment, and
- mitigation strategies, including soil replacement strategies, pile-supported embankments, and use of stochastically rough surfaces.

Ground Vibrations from High-Speed Railways provides in one volume the views of leading international experts on the problem of railway-induced vibration from high-speed trains and ways of reducing its environmental impact. It will be essential reading for all scientists and engineers working on prediction and mitigation of railway-induced vibrations.

(ICE Publishing, 23 May 2019)

Underground Spaces Unveiled: Planning and creating the cities of the future

Han Admiraal and Antonia Cornaro

Underground Spaces Unveiled is a broad overview of the concept of underground space development investigating the issues that are associated with the sustainable development of urban underground space.

This book shows the benefits, the possibilities and world-class examples of underground space development and how that translates into sustainable urbanisation.

Underground Spaces Unveiled:

- approaches all aspects of urban underground space and brings together both past and present insights
- includes worldwide case studies from the perspectives or a civil engineer and an urban planner, offering a multi-faceted approach to the considerations of underground space use
- places urban underground space within the context of climate change, city resilience and rapid urbanization
- discusses the various claims to the subsurface including the use for space versus the use for energy

Written by an engineer and an urban planner ensuring a balanced view and wide appeal, the book is intended for civil engineers, urban planners, urban designers and architects as well as anyone involved with the future of urban development.

(ICE Publishing, 28 February 2018)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.geoengineer.org/news

Στα **News** του **Geoengineer.org** θα βρείτε πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωμηχανικής. Υπενθυμίζεται ότι η διαχείριση του ιστοτόπου **Geoengineer.org** γίνεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο.

GeoWorld

We are pleased to announce the publication of the 7th issue of the Geo-Trends Review Magazine! The first crowdsourcing-based content magazine in Geotechnical Engineering!

https://www.mygeoworld.com/announcement/geotrends-review-magazine-issue-7-is-here/ba27286b6533db933478560a9a768b34

International Geosynthetics Society

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

IGS NEWSLETTER – May 2019

Helping the world understand the appropriate value and use of geosynthetics

- **Introducing the Zornberg Lecture** READ MORE
- **Student Award Paper Spotlight: FE Study of Failure Mechanisms of Modular Block Geosynthetic Reinforced Soil Retaining Wall – From Centrifuge Tests to Numerical Analysis** READ MORE
- **IGS Young Members: Down to Earth – An Interview with Preston Kendall** READ MORE
- **IGS Greek Chapter General Assembly** READ MORE
- **IGS Chile Chapter Relaunch** READ MORE
- **Tunisia Geosynthetics Event** READ MORE
- **In Memoriam Gert den Hoedt** READ MORE
- **Calendar of Events**
  - 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
  - 17th ARCSMGE, Cape Town, South Africa | October 7 – 9, 2019
  - GeoAmericas 2020, Rio de Janeiro, Brazil | April 26 – 29, 2020
  - EuroGeo 7, Warsaw, Poland | September 6 – 9, 2020

READ MORE AT GEOSYNTHETICSSOCIETY.ORG

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2015 – 2018)

Πρόεδρος	:	Γεώργιος ΓΚΑΖΕΤΑΣ, Δρ. Πολιτικός Μηχανικός, Καθηγητής Ε.Μ.Π. gazetas@central.ntua.gr, gazetas50@gmail.com
Α' Αντιπρόεδρος	:	Παναγιώτης ΒΕΤΤΑΣ, Πολιτικός Μηχανικός, ΟΜΙΛΟΣ ΤΕΧΝΙΚΩΝ ΜΕΛΕΤΩΝ Α.Ε. otmate@otenet.gr
Β' Αντιπρόεδρος	:	Μιχάλης ΠΑΧΑΚΗΣ, Πολιτικός Μηχανικός mpax46@otenet.gr
Γενικός Γραμματέας	:	Μιχάλης ΜΠΑΡΔΑΝΗΣ, Πολιτικός Μηχανικός, ΕΔΑΦΟΣ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Α.Ε. mbardanis@edafos.gr, lab@edafos.gr
Ταμίας	:	Γιώργος ΝΤΟΥΛΗΣ, Πολιτικός Μηχανικός, ΕΔΑΦΟΜΗΧΑΝΙΚΗ Α.Ε.- ΓΕΩΤΕΧΝΙΚΕΣ ΜΕΛΕΤΕΣ Α.Ε. gdoulis@edafomichaniki.gr
Έφορος	:	Γιώργος ΜΠΕΛΟΚΑΣ, Δρ. Πολιτικός Μηχανικός, Επίκουρος Καθηγητής ΤΕΙ Αθήνας gbelokas@teiath.gr, gbelokas@gmail.com
Μέλη	:	Ανδρέας ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ, Δρ. Πολιτικός Μηχανικός, Ομότιμος Καθηγητής ΕΜΠ aanagn@central.ntua.gr
		Βάλια ΞΕΝΑΚΗ, Δρ. Πολιτικός Μηχανικός, ΕΔΑΦΟΜΗΧΑΝΙΚΗ Α.Ε. vxenaki@edafomichaniki.gr
		Μαρίνα ΠΑΝΤΑΖΙΔΟΥ, Δρ. Πολιτικός Μηχανικός, Αναπληρώτρια Καθηγήτρια Ε.Μ.Π. mpanta@central.ntua.gr
Αναπληρωματικό Μέλος	:	Κωνσταντίνος ΙΩΑΝΝΙΔΗΣ, Πολιτικός Μηχανικός, ΕΔΑΦΟΜΗΧΑΝΙΚΗ Α.Ε. kioannidis@edafomichaniki.gr
Εκδότης	:	Χρήστος ΤΣΑΤΣΑΝΙΦΟΣ, Δρ. Πολιτικός Μηχανικός, ΠΑΝΓΑΙΑ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Ε.Π.Ε. editor@hssmge.gr, ctsatsanifos@pangaea.gr

ΕΕΕΕΓΜ
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
Πολυτεχνειούπολη Ζωγράφου
15780 ΖΩΓΡΑΦΟΥ

Τηλ. 210.7723434
Τοτ. 210.7723428
Ηλ-Δι. secretariat@hssmge.gr ,
geotech@central.ntua.gr
Ιστοσελίδα www.hssmge.org (υπό κατασκευή)

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» Εκδότης: Χρήστος Τσατσανίφος, τηλ. 210.6929484, τοτ. 210.6928137, ηλ-δι. ctsatsanifos@pangaea.gr, editor@hssmge.gr, info@pangaea.gr

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» «αναρτώνται» και στην ιστοσελίδα www.hssmge.gr