



ΕΛΛΗΝΙΚΗ  
ΕΠΙΣΤΗΜΟΝΙΚΗ  
ΕΤΑΙΡΕΙΑ  
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ  
& ΓΕΩΤΕΧΝΙΚΗΣ  
ΜΗΧΑΝΙΚΗΣ

# Τα Νέα της Ε Ε Ε Ε Γ Μ

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ΟΡΓΑΝΩΣΗ:



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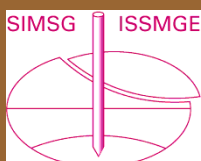
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ΣΥΝΕΔΡΙΟ  
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Συνεδριακό Κέντρο  
του Πανεπιστημίου  
Δυτικής Αττικής στην  
Πανεπιστημιούπολη  
Αρχαίου Ελαιώνα  
Αιγάλεω, Αθήνα

4-6 Οκτωβρίου 2023

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την 20η Ιουνίου

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## ΠΕΡΙΕΧΟΜΕΝΑ

Άρθρα	3
- How to prevent building where it isn't safe	3
- How Should Geotechnical Engineers Charge?	5
Νέα από τις Ελληνικές και Διεθνείς Γεωτεχνικές Ενώσεις	6
- International Society for Soil Mechanics and Geotechnical Engineering	6
Technical Workshop on Landslide Warning and Prediction using IoT and Machine Learning	7
- International Society for Rock Mechanics and Rock Engineering	7
News	7
41st ISRM Online Lecture by Professor Norikazu Shimizu from Japan	7
A quick report on the M7.8 and M7.6 Pazarcik and Ekinözü earthquakes in Türkiye, on 6 February 2023	7
- International Tunnelling Association	7
Webinar on "Immersed, Submerged & Floating Tunnels	7
ITACET Lunchtime Lecture Series #24	7
Scooped by ITA-AITES #86, 14 February 2023	7
Scooped by ITA-AITES #87, 28 February 2023	7
- British Tunnelling Society	7
Joint BTS/MinSouth meeting - Kidston Pumped Storage Project, Queensland, Australia	8
BTSYM Lecture - Vacuum waterproofing membrane system, the Rolls-Royce of application and quality control: Advantages, Features and Case studies	8
BTSYM / ENGINEERS IRELAND GEOTECHNICAL Joint Meeting - Transferrable Lessons in Tunnelling and Geotechnical Engineering	8
- International Geosynthetic Society	9
News	9
Προσεχείς Γεωτεχνικές Εκδηλώσεις:	10
CREST-2023 2 <sup>nd</sup> Construction Resources for Environmentally Sustainable Technologies	11
IS Landslides 2024 International Symposium on Landslides "Landslides across the scales: from the fundamentals to engineering applications" & IS Rock Slope Stability 2024	12
Ενδιαφέροντα Γεωτεχνικά Νέα	14
- State Boundary Surface of the MCC Model	14
- First images of landslides from the 6 February 2023 Turkey-Syria earthquakes	14
- Kandersteg: a massive rock slope failure in Switzerland caught on video	15
Ενδιαφέροντα - Σεισμοί & Αντισεισμική Μηχανική	17
- Emerging information about landslide from the 6 February 2023 Turkey-Syria earthquakes	17
- Thousands displaced by flooding in northern Syria after earthquakes trigger dam breach	18
- Earthquake's sheer power turned a Turkish olive grove into a huge canyon	19
- How ultralow frictional healing could help predict large earthquakes	20

- Ultralow frictional healing explains recurring slow slip events	20
- February 2, 2023 – Hydroelectric power plant and Co-seismic Landslides near Erkenet (Malatya)	21
Ενδιαφέροντα - Γεωλογία	22
- Stanislav Grand Canyon in Kherson Mountains	22
Ενδιαφέροντα - Λοιπά	23
- Ancient Megaliths That Completely Defy Logic	23
- Ισημερινός: Τούβλα από κοκαΐνη ως... δομικό υλικό	25
- Coal miners coming up in a coal mine elevator after a day of work in Belgium 1920's	26
Νέες Εκδόσεις στις Γεωτεχνικές Επιστήμες	27
Ηλεκτρονικά Περιοδικά	29



Φωτογραφία εξωφύλλου: **Recumbent fold, Bahrain**

A [#recumbent](#) fold has an essentially horizontal axial plane.

[Geographical Features](#)

<https://www.facebook.com/Geography007/photos/a.1045716505571605/2405958946214014>

## How to prevent building where it isn't safe

**Martin Brook**

Opinion: there is any good to come out of the storms this year it is that it will encourage local and central government planners to ensure building consent means well-informed consent, says Martin Brook.



Rainfall-triggered landslides are a feature of New Zealand's landscape erosion, and Auckland's in particular. Photo: New Zealand Herald

The landslides in Muriwai in Tāmaki Makaurau have had devastating and cruel consequences and draw attention to very site-specific idiosyncrasies and vulnerabilities of the land beneath our feet.

Muriwai is an exceptionally beautiful and striking beach on the west coast of Auckland, and also susceptible to rainfall-induced landslides. There were two landslides in Muriwai in August 1965 after substantial rain (220mm of rain recorded at Whenuapai). Landslides occurred on consecutive days as "debris avalanches", which means they were highly mobile; one eyewitness described a "a fantastic wave of mud" travelling at 90kph. The landslides formed above Domain Crescent, and flowed 250m downslope, destroying two houses. Those landslides killed two of four people holidaying in two baches.

According to an article in the New Zealand Geographer in 1966, heavy rain played a critical role in the landslides, but the tragic event was dependent on other factors, too: the slope angle, near surface geology (weak, 'young' sands overlying more competent, less permeable older bedrock), groundwater flow, and possibly interference with surface drainage. Of course, the location of the buildings on the slope was important in exposure to the landslide hazard. There are now several houses on a site that failed in 1965, suggesting that planning and zoning in Muriwai is not quite what it should be.

Rainfall-triggered landslides are a feature of New Zealand's landscape erosion, and Auckland's in particular, where the number of landslides that have been triggered by the recent rainfall probably numbers in the 1000s. However, the interplay between rainstorm events, the preceding ('antecedent') rainfall in the days and weeks leading up to a storm event, as well as soil and bedrock properties, is complicated.

Auckland's varied geology and geomorphology is fundamentally important to land instability. Auckland typically has

weak soils formed by the weathering and erosion of underlying (often) weak rocks. It also has a lot of steep slopes. Even in their natural state, these slopes can be prone to failing if the soils become saturated enough. Some slopes are modified, becoming steepened for road cuttings.

Some areas also have layers of volcanic ash within the surface soils, from eruptions that happened a million years ago, that when wet is the texture of petroleum jelly.

A basic region-wide approach to determining landslide hazard is landslide susceptibility mapping. This is often based on LiDAR mapping (airborne laser scanning of the land surface) which provides a high-resolution digital elevation model (DEM), revealing the geomorphology, and whether landslides have occurred previously. A range of other factors are "layered" on top of this model, and statistically analysed, and relate to slope angle, soil and rock properties, and land cover parameters. The output, a landslide susceptibility map, can in theory then be used to inform any future planning decision-making.

Auckland's clay-rich soils show high "shrink and swell" properties, meaning there is a natural annual cycle of wetting (swelling) and drying (shrinking), which can cause a progressive weakening of the soils over years and decades, called "strain-softening".

Some areas also have layers of volcanic ash within the surface soils, from eruptions that happened a million years ago, that when wet is the texture of petroleum jelly. The ash layer creates an impermeable barrier, what geologists call a 'perched water table', which stops water from readily draining away. This makes the soil above the ash layer even more saturated, and more vulnerable to failure under persistent rain. Other west coast areas of Auckland are underlain by weak sandy soils, which are porous and highly erodible from surface water flow. So, permeability of soils and rocks ('hydrogeology') at a site is important too.

Overseas, the insurance industry understands the importance of setback distances and acts on this. There are many examples of the insurance industry refusing to insure homes in the UK where it's clear that in coming years or even a couple of decades, the house will be damaged by land sliding.

Further factors to consider relate to geomorphology. Although a slope may not have failed since European settlement, it may have failed in the recent prehistoric past. Such landslides may reactivate during either heavy rainfall, land disturbance activities and/or earthquakes. Because the surface soils and rocks have failed in the past, they may be at a lower residual strength, rather than at a (stronger) peak strength.

Irrespective of variations in the local geology and geomorphology, much of Auckland's housing stock is built above, on, or below slopes, which, given our changing weather, are likely to be at risk. Auckland Council knows this and has recently commissioned an assessment of the areas of coastline that are susceptible to instability and erosion. This will provide the council with useful coastal information for future zoning in response to anticipated housing intensification. Moreover, the council's proposed Plan Change 78 (publicly notified 22 August 2022) limits development within the coastal hazard areas to avoid increasing the risk of adverse effects on people and property. However, this does not include hazardous unstable slopes inland from the coastal strip.

How the concept of managed retreat could be applied to hundreds or thousands of multi-million-dollar homes at risk of landslides in Auckland is problematic, as determining risk is an inexact science

An important way of mitigating rainfall-induced landslides in Auckland is the use of setback distances, the horizontal distance (on a plan) a dwelling is from the edge of a cliff or the top of a steep slope. The concept of setback distance is that it (in theory) lowers the risk of landslide hazard because it controls and limits where dwellings are located.

There are different methods for calculating setback distances, which are used widely overseas, and often specified in national building codes. Gravity, for instance, is fundamental to the driving force of a landslide so engineers can, using the slope height, estimate the area of land that might be at risk of landslide. Setback distances are used in New Zealand, although the exact method of calculation can vary, and I suspect may depend on the engineer doing the calculation. Many may use an off-the-shelf method of calculating such distances from a building code or standard, which doesn't account for the myriad and often site-specific factors that put a property at risk of landslides. However, setback distance from the bottom of slopes is also important. This is because houses can be affected by 'runout' of saturated material mobilised from slopes above their houses, as we have seen in recent weeks.

Overseas, the insurance industry understands the importance of setback distances and acts on this. There are many examples of the insurance industry refusing to insure homes in the UK where it's clear that in coming years or even a couple of decades, the house will be damaged by land sliding.

Without insurance, people are unable to get mortgages from banks to buy such houses. This means the houses are deemed uninsurable by the insurance industry, either purchased cheaply by cash buyers (who should realise the risk, but often don't), or the houses are simply removed by local authorities after owners have vacated.

How do we plan to build to make houses more resilient to extreme weather events or indeed, earthquakes? Many may be becoming more familiar with the concept of "managed retreat", which in New Zealand has typically applied to houses in low-lying areas on floodplains. The largest managed retreat programme in New Zealand was from the "Red Zone" after the Christchurch earthquakes. Through voluntary buy-outs, the Crown acquired and demolished or removed more than 8,000 properties around the Avon River.

Internationally, managed retreat has also included elevated, landslide-prone zones, although usually limited to what we might call affordable housing. How the concept of managed retreat could be applied to hundreds or thousands of multi-million-dollar homes at risk of landslides in Auckland is problematic, as determining risk is an inexact science because of the many site-specific factors outlined above.

But if there is any good to come out of the storms this year it is that it will encourage local and central government planners to develop processes that ensure building consent means well-informed consent, that is based on site-specific calculations, not generalised basic slope geometry. This should take account of the ongoing effects of climate change, the geotechnical properties of the near surface materials and geomorphic history of the site.

That would lead to the development of more watertight policies and processes that prevent people from building where it isn't safe to, that is compatible with the 100-year planning timeframe of, for example, the New Zealand Coastal Policy Statement. Even if that means getting in the way of some people's views.

Associate Professor Martin Brook is a chartered geologist and director of the Master of Engineering Geology degree, School of Environment, Faculty of Science, University of Auckland.

*This article reflects the opinion of the author and not necessarily the views of Waipapa Taumata Rau University of Auckland.*

This article was first published on Newsroom, [How to prevent building where it isn't safe to](#), 16 February 2022.

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<https://www.auckland.ac.nz/en/news/2023/02/16/how-to-prevent-building-where-it-isnt-safe.html>



## **How Should Geotechnical Engineers Charge?**

### **Should geotechnical engineers charge by the hour or by the value of what they bring?**

I recently had what can be perceived as a heated discussion on LinkedIn with an engineer that insists that his company charges clients by the hour. My approach has always been that for geotechnical engineers (and not only), to charge by the value of what we bring on the table and by the risks that we assume.

As a young engineer in New York, I would see all the financial consultants that were getting paid some much more hourly than us meager entry level geotechnical engineers. I said to myself "there must be a better way". That way is for us to be more effective in what we do and explore ways for bringing more value to our clients while minimizing risks. In my view, that part involved creating our deep excavation software to help reducing the calculation times. If we could do what took 40 hours in two hours, then the value of this analysis is still 40 hours with old standards. If we can explore more alternatives and find a more optimal solution within the originally allocated hours then we drive more value for our client.

Most of us are aware of ChatGPT writing essays and passing bar exams. In some time from now there will be a GeoReportGPT. If all our work is cookie cutter then all the program would need would be just the boring logs and map locations. The report writing would take 2 minutes. Would you still charge for only 2 minutes of work? I guess not.

My point is that changing times demand that we change as a profession on how we charge for our work. Otherwise geoprofessionals risk becoming a commodity. We at Deep Excavation are here to help you whether you choose to charge by the hour or whether you choose to charge by the value of your work.

**Truly yours,**

**Dimitrios Konstantakos**

**CEO, Deep Excavation LLC**

(15/2/2023, <https://www.deepexcavation.com/en/re-sources/professional-issues/how-should-geotechnical-engineers-charge>)

# ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ



**International Society for Soil Mechanics and  
Geotechnical Engineering**

## **ISSMGE News & Information Circular February 2023**

[www.issmge.org/news/issmge-news-and-information-circular-February-2023](http://www.issmge.org/news/issmge-news-and-information-circular-February-2023)

### **Communiqué about the Earthquake in Turkey:**

Our dear geoengineers in Turkey and Syria, as president of the International Society for Soil Mechanics and Geotechnical Engineering, on behalf of the ISSMGE Board and geotechnical engineers around the globe, I like to express our sincere condolences and sympathy to the victims, their families, and your people suffering amid this devastating tragedy.

This disaster shows how far we still are from providing a safe environment in earthquake zones and understanding nature. I like to assure you that you are part of the geotechnical family; and to Dr. Rasin Duzceer and Dr. Talal Awad, presidents of the national geotechnical societies of Turkey and Syria, respectively, I am expressing our collegial solidarity and readiness to dispatch experts from member countries should you require any assistance in the technical reconnaissance covering this vast geographic zone affected by the quake.

For now, all our wishes go to the search and rescue teams in their mission of saving lives, with all our blessings and gratitude.

Sincerely  
Dr. Marc Ballouz  
President ISSMGE

### **1. ISSMGE INTERACTIVE TECHNICAL TALKS AVAILABLE FROM THE ISSMGE WEBSITE**

[ISSMGE Interactive Technical Talk Episode 1: Tailings and Mine Waste \(TC221\)](#)

[ISSMGE Interactive Technical Talk Episode 2: Geomechanics and Geotechnical Engineering for Nuclear Waste Disposal \(TC308\)](#)

[ISSMGE Interactive Technical Talk Episode 3: Energy Geotechnical Structures & Storage of Thermal Energy in the Ground \(TC308\)](#)

### **2. ISSMGE BULLETIN**

The latest edition of the ISSMGE Bulletin (Volume 16, Issue

6, December 2022) is available from the [website](#).

### **3. 6<sup>th</sup> McClelland Lecture**

Prof. Richard Jardine will be presenting the 6th ISSMGE McClelland Lecture **Time-dependent vertical bearing behaviour of shallow foundations and driven piles** in Imperial Colleges Great Hall on Tuesday 12th September 2023 at 1800hrs, as part of the [9th International SUT OSIG Conference Innovative Geotechnologies for Energy Transition](#) (12-14 September 2023)

### **4. ISSMGE FOUNDATION**

The next deadline for receipt of applications for awards from the ISSMGE Foundation is the 31<sup>st</sup> May 2023. Click [here](#) for further information on the ISSMGE Foundation.

### **5. CONFERENCES**

For a listing of all ISSMGE and ISSMGE supported conferences, and full information on all events, including deadlines, please go to the Events page at <https://www.issmge.org/events>. For updated information please refer to that specific event's website.

The following have been added or amended since the previous Circular:

### **ISSMGE EVENTS**

**PRAGUE GEOTECHNICAL DAYS ON "CYCLIC LOADING OF GEOTECHNICAL STRUCTURES" 22-05-2023 - 23-05-2023** AVR, Narodní 3, Prague 1, Czech Republic (22nd May); Charles University, Albertov 6, Prague 2 (23rd May), Czech Republic, Language: English; Organiser: Czech and Slovak Society for Soil Mechanics and Geotechnical Engineering, Charles University, SG Geotechnika a.s.; Contact person: David Masin; Address: Albertov 6; Phone: +420602384793; Email: [masin@natur.cuni.cz](mailto:masin@natur.cuni.cz); Website: <http://www.issmge.cz/PGD.htm>;

**11TH INTERNATIONAL SYMPOSIUM OF GEOTECHNICAL ASPECTS OF UNDERGROUND CONSTRUCTION IN SOFT GROUND (IS-MACAU 2024) - 14-06-2024 - 17-06-2024** Macao SAR, Language: English; Organiser: State Key Laboratory of IoT for Smart City (IoTSC), Department of Civil and Environmental Engineering (University of Macau) and TC204 of the ISSMGE; Contact person: ZHENG GUAN; Address: Faculty of Science and Technology University of Macau, E11 Avenida da Universidade, Taipa, Macau, China; Phone: +85388229153; Fax: (853) 8822-2426; Email: [ismacau2024@um.edu.mo](mailto:ismacau2024@um.edu.mo); Website: <https://is-macau2024.sklotsk.um.edu.mo>; Email: [ismacau2024@um.edu.mo](mailto:ismacau2024@um.edu.mo)

### **NON-ISSMGE EVENTS**

**INTERNATIONAL FOUNDATION CONGRESS AND EQUIPMENT EXPO - 07-05-2024 - 10-05-2024** Hyatt Regency Dallas, TX, United States; Language: English; Organiser: DFI, ADSC, GeoInstitute of ASCE, PDCA; Contact person: Peggy Hagerty-Duffy; Address: PO Box 93583; Phone: (469) 359-6000; Email: [phd@adsc-iafd.com](mailto:phd@adsc-iafd.com); Website: <http://ifcee2024.com>; Email: [adsc@adsc-iafd.com](mailto:adsc@adsc-iafd.com)

**DFI 49TH ANNUAL CONFERENCE ON DEEP FOUNDATIONS - 07-10-2024 - 10-10-2024** Gaylord Rockies Resort & Convention Center, Aurora, Colorado, United States; Language: English; Organiser: Deep Foundations Institute (DFI); Contact person: Angie Gible; Address: 326 Lafayette Avenue; Phone: 1-973-423-4030; Email: [agible@dfi.org](mailto:agible@dfi.org); Website: <http://www.dfi.org/annual2024>; Email: [events@dfi.org](mailto:events@dfi.org)

## Technical Workshop on Landslide Warning and Prediction using IoT and Machine Learning

Zhongqiang Liu / [TC309](#) / 15-02-2023

Joint Technical Workshop (WG8 LandAware & ISSMGE TC309) on Landslide Warning and Prediction using IoT and Machine Learning

**February 23, 2023 09:00-12:00 CET**

Teams Meeting ID: 331 710 067 783, Passcode: V6tSh9

Technical Program ([download](#))



### News

<https://www.isrm.net>

#### 41st ISRM Online Lecture by Professor Norikazu Shimizu from Japan 2023-02-17

The 41st ISRM online lecture will be delivered by Professor Norikazu Shimizu, from Japan. The title of the lecture is "Monitoring rock displacements using satellite technology". It will be broadcasted on 23 March 2023, 10 A.M. GMT at <https://isrm.net/page/show/1666>

#### A quick report on the M7.8 and M7.6 Pazarcik and Ekinözü earthquakes in Türkiye, on 6 February 2023 2023-02-20

This report is dedicated to the people who lost their lives and were injured.

It was prepared by Ömer AYDAN and Reşat ULUSAY on 15 February 2023, with the sole purpose to provide an overview of various aspects of the inter/intraplate type earthquakes for researchers.

[Click here to read the report.](#)



### NEWS - ITA ACTIVITIES

<https://about.ita-aites.org/news>

#### Webinar on "Immersed, Submerged & Floating Tunnels"

06 February 2023

Join us for the ITA Working Group 11 free webinar on "Immersed, Submerged & Floating Tunnels" taking place Tuesday 28th of February 2023 at 12:00pm CET.

This seminar will feature three lectures:

- Çanakkale bridges caisson installation - Peter van Westendorp, Director Strukton Immersion projects
- Main Key Technologies of the Widest SCS Immersed Tunnel under Construction in the World - Jian Liu, Vice Animator WG 11 - Director of the chief engineer office at Shenzhen-Zhongshan fixed link
- Preview of the Owner's Guide to SFT's - WG 11 - Xu Xiang, Complex Structures, Construction Division Norwegian Public Roads Administration (Statens vegvesen)

### ITACET Lunchtime Lecture Series #24

23 February 2023

The 24th instalment of the Lunchtime Lecture Series will focus on 'Risk Management'.

This episode will feature 3 lectures and finish with a Q&A session:

- Introduction on risk management issues in tunnelling; Quantitative methods for risk assessment - Philip Sanders
- Application on a tunnelling project - Daniel Weinberger
- Case study: Risk management in the Lyon-Turin international tunnel - Emmanuel Humbert

### Scooped by ITA-AITES #86, 14 February 2023

[Taj city metro rail project to be ready 6 months before targeted date | India](#)

[Along underwater highway, workers fix Channel tunnel at night | France - UK](#)

[\\$120M Hydro One tunnel construction years in the making | Canada](#)

[Bangladesh enters the world of high-tech underground mass transit](#)

[HS2 works update as tunnelling machines dig through Chiltern Hills | UK](#)

[Snowy 2.0 advancing despite TBM pause | Australia](#)

[Brisbane Metro project commences tunnel under Adelaide Street, linking busways | Australia](#)

[Work on Hampton Roads Bridge-Tunnel Expansion Project continues to progress | United States of America](#)

[Tunnelling contracts awarded for Toulouse's new £2.4bn Metro line | France](#)

[Mumbai-Ahmedabad bullet train: Tender for project's under-sea tunnel to open on Feb 9 | India](#)

### Scooped by ITA-AITES #87, 28 February 2023

[Seoul City mulls moving 3 major roads in Gangnam district underground | South Korea](#)

[West Gate Tunnel boring machine completes 2.8 kilometre journey | Australia](#)

[PILA Project will use Underground Tunnel to compete with Panama Canal | Colombia](#)

['We can't stop tunnelling': AWU calls for safety reforms amid silicosis crisis | Australia](#)

[Tunnelling begins at Chennai's Greenways road metro | India](#)

[Lyon-Turin base tunnel spoil to be reused on £167M above ground works | France-Italy](#)

[First bore of Silvertown Tunnel finished - but work slips further behind schedule | UK](#)

[Amtrak and partners to kick off B&P Tunnel replacement | United States of America](#)

[Underground water-transfer tunnel under construction in central China](#)

[Chesapeake Bay Bridge Tunnel adding new tunnel - what we know so far | United States of America](#)



### **Joint BTS/MinSouth meeting Kidston Pumped Storage Project Queensland, Australia**

**Speaker: Clare Onal**

Thursday 9th February 2023 at 18.00 hrs (GMT)



Kidston will be the world's first conversion of a gold mine into a hydroelectric pumped storage facility – setting a benchmark for similar conversions globally. The Kidston pumped storage project will be the first pumped hydro plant to be built in Australia since 1984.

This transformative project by renewable energy and storage company Genex Power will be the cornerstone of a renewable energy zone (REZ) that will provide clean, cheap and firm

power to the area. The existing site comprises two gold mine pits with more than 100 years of operations. These pits will be converted into the top and bottom reservoirs for the Kidston pumped storage project. Significant underground infrastructure, including a large powerhouse cavern, waterway shafts and tunnels to allow the transfer of water between the reservoirs will need to be engineered.

**This is an in-person lecture** but will also be streamed live at: <https://youtu.be/qlUWm5ApV1E>



### **BTSYM Lecture Vacuum waterproofing membrane system, the Rolls-Royce of application and quality control: Advantages, Features and Case studies**

**Speaker: Enrico Pavese**

Thursday 16th February 2023 at 18:00 to 19:00 hrs



The lecture will also be steamed live at <https://youtu.be/mw5Sf4fU8Ho>



### **Transferrable Lessons in Tunnelling and Geotechnical Engineering**

**Guest speakers: Si Shen, Arabel Vilas Serín, Phil Astle, Eoin Murphy, George Doulikas, Benjamin Lafarga, Ronan Royston**

On Wednesday, 22nd February 2023, the British Tunnelling Society YM and Engineer Ireland are holding an In-Person (Hybrid) joint seminar in Ireland. The seminar will bring together transferable geotechnical engineering knowledge from



projects in UK & Ireland.

<https://www.engineersireland.ie/Events/event/8765>



### News

[www.geosyntheticssociety.org/news/page](http://www.geosyntheticssociety.org/news/page)

[Did You Know?... Geosynthetic Nets Help Remove Plastic Waste From Water](#) February 1, 2023

An estimated 23 million metric tons (Mt) of waste plastic enters our rivers, lakes and oceans every year. This could grow to 90 Mt by ... [Read More »](#)

[IGS Technical Committee Champions Geomembranes In ICID Newsletter](#) February 7, 2023

An article exploring the benefits of geomembrane use over concrete in reservoir, canal, and dam applications features in the latest issue of ICID News. Author ... [Read More »](#)

[4th GeoAfrica Conference Schedule Revealed](#) February 12, 2023

A speaker-rich programme of events has been announced for the upcoming 4th African Regional Conference on Geosynthetics (4th GeoAfrica). Organisers IGS Egypt released an exciting schedule ... [Read More »](#)

['Impactful' GeoAfrica4 Puts Sustainability Center Stage](#) February 28, 2023

Nearly 400 delegates from around the world gathered in Cairo to discover more about the current projects and future potential of geosynthetics in Africa. The ... [Read More »](#)

# ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

International Conference on Advances in Structural and Geotechnical Engineering (ICASGE'23), 6 - 9 March 2023, Hurgada, Egypt, <https://icasge.conferences.ekb.eg>

ASIA 2023, 14 - 16 March 2023, Kuala Lumpur, Malaysia, [www.hydropower-dams.com/asia-2023](http://www.hydropower-dams.com/asia-2023)

3rd International Conference TMM\_CH "Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage: Recapturing the World in Conflict through Culture, promoting mutual understanding and Peace", 20-23 March 2023, Athens, Greece, [www.tmm-ch.com](http://www.tmm-ch.com)

Conference on Foundation Decarbonization and Re-use, March 21-23, 2023, Amsterdam, Netherlands, [www.dfi.org/2023-conference-on-foundation-decarbonization-reuse](http://www.dfi.org/2023-conference-on-foundation-decarbonization-reuse)

88<sup>th</sup> ICOLD Annual Meeting & Symposium on Sustainable Development of Dams and River Basins, April 2023, New Delhi, India, <https://www.icold2020.org>

Rocscience International Conference 2023 Synergy in Geotechnical Engineering, April 24-26, 2023, Toronto, Canada, [www.rocscience.com/events/rocscience-international-conference-2023](http://www.rocscience.com/events/rocscience-international-conference-2023)

UNSAT 2023 - 8<sup>th</sup> International Conference on Unsaturated Soils, 2-5 May 2023, Milos island, Greece, [www.unsat2023.org](http://www.unsat2023.org)

World Tunnel Congress 2023 Expanding Underground Knowledge & Passion to Make a Positive Impact on the World, 12 - 18 May 2023, Athens, Greece, <https://wtc2023.gr>

2<sup>nd</sup> International Workshop on Complex Formations, 9<sup>th</sup> May 2023, Torino, Italy, [agi@associazionegeotecnica.it](mailto:agi@associazionegeotecnica.it)

NROCK2022 - The IV Nordic Symposium on Rock Mechanics and Rock Engineering, 24 - 25 May 2023, Reykjavic, Iceland, [www.nrock2023.com](http://www.nrock2023.com)

Underground Construction Prague 2023, May 29 - 31, 2023, Prague, Czech Republic, [www.ucprague.com](http://www.ucprague.com)

UYAK 2023 5<sup>th</sup> International Underground Excavations Symposium and Exhibition Cities of the Future, Urban Tunnelling and Underground Excavations, 5-6-7 June 2023, Istanbul, Turkey, <https://uyak.org.tr>

17DECGE Danube - European Conference on Geotechnical Engineering, 7-9 June 2023, Bucharest, Romania, <https://17decge.ro>

SuperPile'23 Piling Design & Construction Conference, June 7-9, 2023, Atlanta, USA, [www.dfi.org/superpile2023](http://www.dfi.org/superpile2023)

3rd JTC1 Workshop on "Impact of global changes on landslide risk", 7 - 10 June 2023, Oslo, Norway, <https://jtc1-2023.com>

RETC2023 Rapid Excavation and Tunneling Conference, June 11-14, 2023, Boston, USA, [www.retc.org/index.cfm](http://www.retc.org/index.cfm)

ICOLD Annual Meeting 2023, 12<sup>th</sup> to 15<sup>th</sup> June 2023 Gothenburg, Sweden, <https://icold-ciqb2023.se>

9th International Congress on Environmental Geotechnics Highlighting the role of Environmental Geotechnics in Addressing Global Grand Challenges, 25-28 June 2023, Chania, Crete island, Greece, [www.iceq2022.org](http://www.iceq2022.org)

DFHM8 TORINO 2023 8th International Conference on Debris Flow Hazard Mitigation, 26-29 June 2023, Torino, Italy, <http://dfhm8.polito.it>

NUMGE 2023 - Numerical Methods in Geotechnical Engineering 2023, 26 - 28 June 2023 Imperial College London, UK, [www.imperial.ac.uk/numerical-methods-in-geotechnical-engineering](http://www.imperial.ac.uk/numerical-methods-in-geotechnical-engineering)

AFRICA 2023 - The Fourth International Conference and Exhibition on Water Storage and Hydropower Development for Africa, 10-12 July 2023, Lake Victoria, Uganda, [www.hydropower-dams.com](http://www.hydropower-dams.com)

S3: Slopes, Support and Stabilization Conference, August 8-10, 2023, Boston, USA, [www.dfi.org/s32023](http://www.dfi.org/s32023)

17ARC 17th Asian Regional Geotechnical Engineering Conference, 14-18 August 2023, Nur-Sultan, Kazakhstan, <https://17arc.org>

ISMLG 2023 - 4<sup>th</sup> International Symposium on Machine Learning & Big Data in Geoscience, 29 August - 1 September 2023, University College Cork, Ireland, [www.ismlq2023.com](http://www.ismlq2023.com)

IS-PORTO 2023 8th International Symposium on Deformation Characteristics of Geomaterials, 3rd - 6th September 2023, Porto, Portugal, [www.fe.up.pt/is-porto2023](http://www.fe.up.pt/is-porto2023)

12th ICOLD European Club Symposium "Role of dams and reservoirs in a successful energy transition", 5 to 8 September 2023, Interlakes, Switzerland, [www.ecsymposium2023.ch](http://www.ecsymposium2023.ch)

NGS 2023 10<sup>th</sup> Nordic Grouting Symposium, 11 - 13 September, 2023, Stockholm, Sweden [www.ngs2023.se](http://www.ngs2023.se)

SUT OSIG 9<sup>th</sup> International Conference "Innovative Geotechnologies for Energy Transition", 12-14 September 2023, London, UK, [www.osig2023.com](http://www.osig2023.com), [www.sut.org](http://www.sut.org)

SAHC 2023 13<sup>th</sup> International Conference on Structural Analysis of Historical Constructions "Heritage conservation across boundaries", 12-15 September 2023, Kyoto, Japan, <https://sahc2023.org/>

XII ICG - 12th International Conference on Geosynthetics, September 17 - 21, 2023, Rome, Italy, [www.12icg-roma.org](http://www.12icg-roma.org)

GROUND ENGINEERING SUSTAINABILITY, 21 September 2023, London, U.K., <https://sustainability.geplus.co.uk/sustainability/en/page/home>

Charles-Augustin COULOMB : A geotechnical tribute, 25 - 26 September 2023, Paris, France, [www.cfms-sols.org/organisees-par-le-cfms/charles-augustin-coulomb-geotechnical-tribute](http://www.cfms-sols.org/organisees-par-le-cfms/charles-augustin-coulomb-geotechnical-tribute)



**28th European Young Geotechnical Engineers  
Conference and Geogames  
04 – 07 October 2023, Moscow, Russia**

Organiser: Russian Society for Soil Mechanics, Geotechnics and Foundation Engineering

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GROUND ENGINEERING BASEMENTS AND UNDERGROUND STRUCTURES, 5 October 2023, London, U.K., <https://basements.geplus.co.uk/basements2023/en/page/home>

GROUND ENGINEERING SMART GEOTECHNICS, 5 October 2023, London, U.K., <https://smartgeotechnics.geplus.co.uk/smartgeotechnics2023/en/page/home>

2023 15<sup>th</sup> ISRM Congress, International Congress in Rock Mechanics Challenges in Rock Mechanics and Rock Engineering, 9÷14 October 2023, Salzburg, Austria, <https://www.isrm2023.info/en/>

HYDRO 2023 New Ideas for Proven Resources, 16-18 October 2023, Edinburgh, Scotland, [www.hydropower-dams.com/hydro-2023](http://www.hydropower-dams.com/hydro-2023)

ACUUS SINGAPORE 2023 18<sup>th</sup> Conference of the Associated Research Centers for the Urban Underground Space "Underground Space – the Next Frontier", 1 - 4 Nov 2023, Singapore, [www.acuus2023.com](http://www.acuus2023.com)

ATC 2023 18th Australasian Tunnelling Conference: Trends and Transitions in Tunnelling, 5-8 November, 2023, Auckland, Aotearoa New Zealand <https://atc2023.com>

6th World Landslide Forum "Landslides Science for sustainable development", 14 to 17 November 2023, Florence, Italy, <https://wlf6.org>

CREST 2023 – 2<sup>nd</sup> Construction Resources for Environmentally Sustainable Technologies, November 20-22, 2023, Fukuoka, Japan, <https://www.ic-crest.com>



## CREST-2023

**2<sup>nd</sup> Construction Resources for Environmentally  
Sustainable Technologies  
November 20-23, 2023, Fukuoka, Japan  
[www.ic-crest.com](http://www.ic-crest.com)**

The aim of CREST 2023 (2<sup>nd</sup> International Conference on Construction Resources for Environmentally Sustainable Technologies) is to disseminate information and exchange ideas on issues related to natural disasters and disasters associated with anthropogenic activities, as well as to provide solutions through the use of alternative resources, disruptive technologies and soft type disaster mitigation measures for building a sustainable and resilient society from the perspective of geoenvironmental engineering.

The first symposium of the CREST series, CREST 2020, could be successfully organized during March 9-11, 2021, at Kyushu University, Fukuoka, Japan in online format due to Covid-19 pandemic. The overwhelming support that we have received towards CREST 2020 from the academia, industry, and government organizations, was a matter of great encouragement for the organizing committee. It has therefore, been decided to hold the second conference of the CREST series as CREST 2023 in a face-to-face format.

The themes of CREST 2023 conference cover broad range of interdisciplinary areas affirming to The Sendai Framework for Disaster Risk Reduction that has set specific priorities for action to prevent new and reduce existing disaster risks. One of the key priority is for enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction. And this includes integrating disaster risk reduction into development measures, thereby making nations and communities resilient to future disasters.

Moreover, in the face of increasing trend of climate change induced natural disasters, governments around the world have adopted more stringent environmental policies to reduce emissions and carbon footprints. Therefore, as engineers, researchers and policy makers, who are working with the resource-intensive construction industry, it is also our duty to contribute towards a sustainable and disaster resilient society.

### Conference Themes

#### Theme 1 : Natural Geo-Disasters and Resiliency

1. Climate change related natural disasters
2. Climate change independent natural disasters
3. Disasters associated with anthropogenic activities
4. Economic aspects of disaster risk assessment and modeling

#### Theme 2 : Climate Change Adaptation and Innovation from the Perspective of Geoenvironmental Engineering

1. Innovative techniques towards low carbon footprint
2. Innovative case studies for sustainable design and construction
3. Socio-economic and environmental aspects in sustainable construction
4. Geological and hydrological aspects

### Theme 3 : Geo-Sustainnovation through Disruptive Technologies

1. Information based (AI, IoT, VR, etc.) measures for natural disaster mitigation
2. Application of DX and i-Construction
3. Physical and numerical modelling of disasters and disaster mitigation techniques
4. Smart energy harvesting techniques

### Theme 4 : Use of Recycled and Waste Material in Geo-engineering

1. Advancement in low cost and low carbon construction techniques
2. Recycled materials (alternative geomaterials) in geotechnical constructions
3. Mechanical and constitutive properties of recycled materials
4. Management and utilization of disaster wastes

### Theme 5 : Policies and Implementation for Resilient Society

1. Disaster and environment
2. Community outreach through soft type disaster mitigation measures
3. Education for sustainable development goals
4. Measures for achieving Society 5.0 goals

#### Correspondence

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1st SLRMES Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialized Conference, Colombo, Sri Lanka, December 2 -7, 2023, [www.slrmes.org](http://www.slrmes.org)

GEOTEC HANOI 2023 The 5<sup>th</sup> International Conference on Geotechnics for Sustainable Infrastructure Development, December 14-15, 2023 - Hanoi, Vietnam, <https://geotechn.vn>

9th International Symposium on RCC Dams and CMDs December, 2023, Guangzhou, China, [www.chinacold-smart.com/meetings/rcc2023](http://www.chinacold-smart.com/meetings/rcc2023)

World Tunnel Congress 2024 19 to 25, April, 2024, Shenzhen China, [www.wtc2024.cn](http://www.wtc2024.cn)

8th International Conference on Earthquake Geotechnical Engineering (8ICEGE), 7-10 May, 2024 Osaka, Japan, <https://confit.atlas.jp/guide/event/icege8/top?lang=en>

GEO AMERICAS 2023 5th Pan-American Conference on Geosynthetics Connecting State of the Art to State of Practice, April 29 - May 1, 2024, Toronto, Canada, [www.geoamericas2024.org](http://www.geoamericas2024.org)



## IS Landslides 2024

International Symposium on Landslides  
"Landslides across the scales: from the fundamentals to engineering applications"

## IS Rock Slope Stability 2024

July 7-12<sup>th</sup>, 2024, Chambéry, France

[www.isl2024.com](http://www.isl2024.com)

After Kyoto 1972, Tokyo 1977, New Delhi 1980, Toronto 1984, Lausanne 1988, Christchurch 1993, Trondheim 1996, Cardiff 2000, Rio de Janeiro 2004, Xi'an 2008, Banff 2012, Napoli 2016, Cartagena 2021, ... **Chambéry (Savoie, France) – July 7-12<sup>th</sup>, 2024!**

The topic of IS Landslides 2024 is proposed to be: **"Landslides across the scales: from the fundamentals to engineering applications"**

This topic will be addressed through the following items:

- Multiscale constitutive modeling for soils and rocks
- Weathering effects on soils and rocks destabilization
- Permafrost and ground stability
- Survey techniques
- Modeling of soil and rock hazards
- Recent progress in numerical tools for landslide modeling
- Risk analysis and mitigation
- Modeling and design of protective structures
- Artificial intelligence and machine learning techniques applied to slope engineering
- Make researchers, authorities and companies working together and involve inhabitants
- Case studies

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<http://www.insight-outside.fr>



EUROCK 2024 ISRM European Rock Mechanics Symposium  
New challenges in rock mechanics and rock engineering  
July 15-19, 2024, Alicante, Spain, [www.eurock2024.com](http://www.eurock2024.com)

ECSMGE 24 XVIII European Conference on Soil Mechanics and Geotechnical Engineering, 26-30 August 2024, Lisbon, Portugal, [www.ecsmge-2024.com](http://www.ecsmge-2024.com)





**2024 ISRM International Symposium**  
**24-28 September, New Delhi, India**

Contact Person Name

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PANAMGEO CHILE 2024 17<sup>th</sup> Pan-American Conference on  
Soil Mechanics and Geotechnical Engineering, 12-17 November  
2024, La Serena, Chile, <https://panamge-ochile2024.cl>



**Eurock 2025**  
**ISRM European Rock Mechanics Symposium**  
**Expanding the underground space -**  
**future development of the subsurface**  
**- an ISRM Regional Symposium**  
**16-20 June 2025, Trondheim, Norway**

Contact Person Name

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Norway



**21st International Conference on**  
**Soil Mechanics and Geotechnical Engineering**  
**14 – 19 June 2026, Vienna, Austria**

Organisers:

Austrian Geotechnical Society and Austrian Society for Geomechanics

Contact person: Prof. Helmut F. Schweiger

Email: [helmut.schweiger@tugraz.at](mailto:helmut.schweiger@tugraz.at)



**16th International Congress on Rock Mechanics**  
**Rock Mechanics and Rock Engineering**  
**Across the Borders**  
**17-23 October 2027, Seoul, Korea**

**Scope**

The scope of the Congress will cover both conventional and emerging topics in broadly-defined rock mechanics and rock engineering. The themes of the Congress include but not be limited to the following areas:

- Fundamental rock mechanics
- Laboratory and field testing and physical modeling of rock mass
- Analytical and numerical methods in rock mechanics and rock engineering
- Underground excavations in civil and mining engineering
- Slope stability for rock engineering
- Rock mechanics for environmental impact
- Sustainable development for energy and mineral resources
- Petroleum geomechanics
- Rock dynamics
- Coupled processes in rock mass
- Underground storage for petroleum, gas, CO<sub>2</sub> and radioactive waste
- Rock mechanics for renewable energy resources
- Geomechanics for sustainable development of energy and mineral resources
- New frontiers & innovations of rock mechanics
- Artificial Intelligence, IoT, Big data and Mobile (AICBM) applications in rock mechanics
- Smart Mining and Digital Oil field for rock mechanics
- Rock Engineering as an appropriate technology
- Geomechanics and Rock Engineering for Official Development Assistance (ODA) program
- Rock mechanics as an interdisciplinary science and engineering
- Future of rock mechanics and geomechanics

Our motto for the congress is "Rock Mechanics and Rock Engineering Across the Borders". This logo embodies the interdisciplinary nature of rock mechanics and challenges of ISRM across all countries and generations.

Website <http://eng.ksrm.or.kr/html/>

## State Boundary Surface of the MCC Model

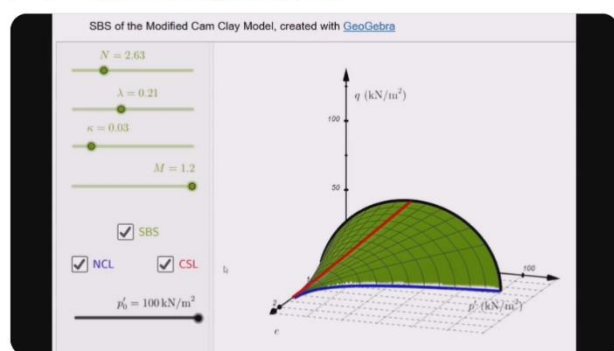
This is the State Boundary Surface of the MCC Model. You can use sliders, vary the value for the  $p'_0$  and display the corresponding yield surface:

[https://soilmodels.com/wp-content/uploads/2020/12/sbs\\_MCC.wgl...](https://soilmodels.com/wp-content/uploads/2020/12/sbs_MCC.wgl...)

← Tweet

[soilmodels.com/wp-content/upi...](https://soilmodels.com/wp-content/upi...)

The figure is created using @GeoGebra within the project #AnimatingSoilModels



12:07 PM · Feb 11, 2022 · Twitter for Android

[https://twitter.com/IGT\\_Medicus/status/1492077749309251584](https://twitter.com/IGT_Medicus/status/1492077749309251584)

SBS of the Modified Cam Clay Model, created with [GeoGebra](#) by Gertraud Medicus within the project: [SoilModels.com/soil-anim](https://soilmodels.com/soil-anim), [SBS of the MCC model \(soilmodels.com\)](https://soilmodels.com)



## First images of landslides from the 6 February 2023 Turkey-Syria earthquakes

The true horror of the major [Turkey-Syria earthquakes](#) yesterday is beginning to unfold. With over 4,300 people now known to have died, but many more likely to be missing, this has been a very serious event. Most of the footage continues to feature collapses in the urban areas, with very little from the more rural areas. The picture in the more remote parts of the epicentral zone is likely to be desperate.

Meanwhile, as expected, images are starting to emerge of landslides triggered by the event. In common with other events, at the moment these focus on the roads, probably because the slides themselves are a barrier to reaching the upland zones.

On Twitter, Sokagin Sesi Gazetesi has tweeted a short video of a large failure on a riverbank; the text suggests that this is on the road between Adana and Gaziantep:-



The image below is a still from the video:-



The lateral flow landslide on the road between Adana and Gaziantep following the 6 February 2023 Turkey-Syria earthquakes. [Image from a video tweeted by Sokagin Sesi Gazetesi.](#)

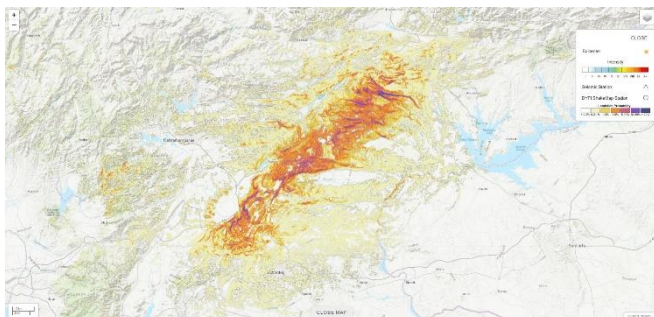
This appears to be a lateral spread failure on a very large scale. The road bed could be full?

Meanwhile, [Erk Acarer has tweeted an image of another large failure on a road](#):-



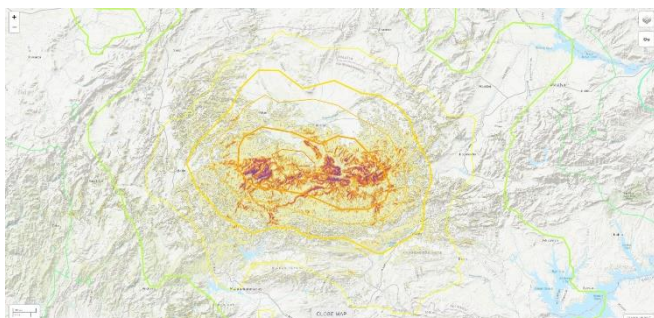
The location of this failure is not clear, but once again this could well be a lateral spread.

Meanwhile, the USGS has continued to update its model of the landslide probability for the Turkey-Syria earthquakes. This is the map for the Mw=7.8 event:-



[USGS landslide probability map for the 6 February 2023 Mw=7.8 Turkey-Syria earthquake.](#)

And this is the one for the Mw=7.5 event that occurred a few hours later:-



[USGS landslide probability map for the 6 February 2023 Mw=7.5 Turkey-Syria earthquake.](#)

Unfortunately, the epicentral area was cloudy yesterday, so there is no visible satellite imagery as yet of the earthquake-affected areas. The forecast today is better, and tomorrow is good, so images should start to become available. Note though that the forecast night time temperature in Gaziantep is -6° C tonight, and will be lower in the upland areas. These temperatures are likely to be magnifying the human the impact of the Turkey-Syria earthquakes.

(Dave Petley / THE LANDSLIDE BLOG, 7 February 2023, <https://blogs.agu.org/landslideblog/2023/02/07/turkey-syria-earthquakes>)



### **Kandersteg: a massive rock slope failure in Switzerland caught on video**

On 23 February 2023 a large rock slope failure occurred in Kandersteg in the Bernese Oberland in Switzerland. The failure, which had a volume in the range of 15,000 to 20,000 cubic metres, was from the Allmenalp. The rock slope collapse had been anticipated, so that no loss of life occurred, and there was no damage to buildings.

The event was captured on several videos, of which [this is probably the best](#):-



<https://www.youtube.com/watch?v=-jU30W6vkq&t=1s>

[SRF News has a good article about the event](#), in German, which notes that the block was being monitored using radar, allowing a warning to be issued. The article includes a short archive film about the use of monitoring in the area.

The location of the rockfall is about [46.491, 7.658]. This image shows the aftermath of the rockfall:-



The site of the 23 February 2023 rockfall at Kandersteg in Switzerland. [Image via RTS.](#)

This is an area of frequent rock slope failures. Previous events have occurred from Allmenalp in 2008 and in 2018, for example. On the other side of the valley is the Spitzer Stein area above Lake Oeschinen, in which active rock slope deformation is occurring. This is a much larger volume – about 20 million cubic metres. [Geotest has a nice article about its work monitoring the site](#), whilst [Swissinfo has a short video showing the scale of the hazard at this location](#).

(Dave Petley / THE LANDSLIDE BLOG, 27 February 2023, <https://blogs.agu.org/landslideblog/2023/02/27/kander-steg-1>)



# ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ & ΑΝΤΙΣΕΙΣΜΙΚΗ ΜΗΧΑΝΙΚΗ

## Emerging information about landslide from the 6 February 2023 Turkey–Syria earthquakes

The loss of life from the dreadful [6 February 2023 Turkey–Syria earthquakes](#) has now reached a horrifying 33,000 people, with further increases possible. Media interest is starting to wane as the rescue operation winds down. It is worth noting that whilst a small number of remarkable rescues continue to occur, providing for the millions displaced and the thousands who have been injured is likely to be the biggest challenge, and needs to be the focus of attention. This will last for years, long after the cameras have disappeared. The plight of those left in refugee camps is often very poor, especially for women and girls.

In this context, writing about landslides feels trivial, but of course in their own right they cause major challenges. Amongst the many tweets about the fault are some that show landslides and other types of ground failure. For example, [@Sabah has tweeted a remarkable video of the aftermath of a catastrophic lateral spread in a road embankment](#):-



The translation states that:-

*"The collapse of the road to the village of Koseli, which passes over the Adıyaman-Sanlıurfa-Gaziantep Highway, and the huge cracks that formed once again showed the magnitude of the earthquake."*

This is a still from the video:-



An extraordinary lateral spread in an embankment, triggered by the 2023 Turkey-Syria earthquakes. [Image from a video posted to Twitter by @Sabah.](#)

This would make an interesting case study for further analysis. I find it interesting that the highest part of the embankment, in the distance in the image, did not fail, and that there are signs of deformation in the ground beyond the ditch on the left side of the image. I am not an expert in lateral spreads, but I wonder if this involved failure in the ground below the embankment? The failure is quite reminiscent of the [event triggered by the 30 November 2018 Alaska earthquake](#).

Meanwhile, another very large failure has attracted considerable attention. On social media there has been some confusion between a landslide and the fault scarp over this event, but [Dr Judith Hubbard at Cornell has provided clarity](#):-





It is worth reading the full thread – I agree with her analysis that this is a large slope failure. She has tracked down the location to 36.159, 36.223.

Finally (for now?), [Nahel Belgherze has identified another large slope failure from satellite imagery](#):-

A large landslide, around 200 meters wide, discovered through satellite imagery not far from Islahiye, Gaziantep Province, as a result of the Mw 7.8 earthquake in Turkey.

Credit: [@Maxar pic.twitter.com/sCnz6WbsJm](#)

— Nahel Belgherze (@WxNB\_) [February 11, 2023](#)

The location is 37.003, 36.592. Note the damage to the road at the foot of the slope.

I suspect that more landslides will become evident in the coming days, but clearly (and rightly) this has not been the priority so date.

(Dave Petley / THE LANDSLIDE BLOG, 13 February 2023, <https://blogs.agu.org/landslideblog/2023/02/13/turkey-syria-earthquakes-2>)



## Thousands displaced by flooding in northern Syria after earthquakes trigger dam breach

**Northern Syria is facing a dual humanitarian crisis after a series of devastating earthquakes in Turkey caused a dam breach along the Orontes river, resulting in widespread flooding and forcing thousands to evacuate their homes.**

According to reports from the United Nations, a dam on the Orontes river in the Salqin subdistrict was breached after the earthquakes on February 6, 2023, including M7.8 and M7.5. The river was already swollen from heavy rain, which only exacerbated the situation.



Image credit: Copernicus EU/Sentinel-2, EO Browser, The Watchers

Around 500 households in the village of Al-Tloul were evacuated on February 8, and by February 11, 1000 homes in nearby villages, including Hardana, Delbiya, Jakara, and Hamziyeh, were flooded. Approximately 7000 people were forced to evacuate as a result.

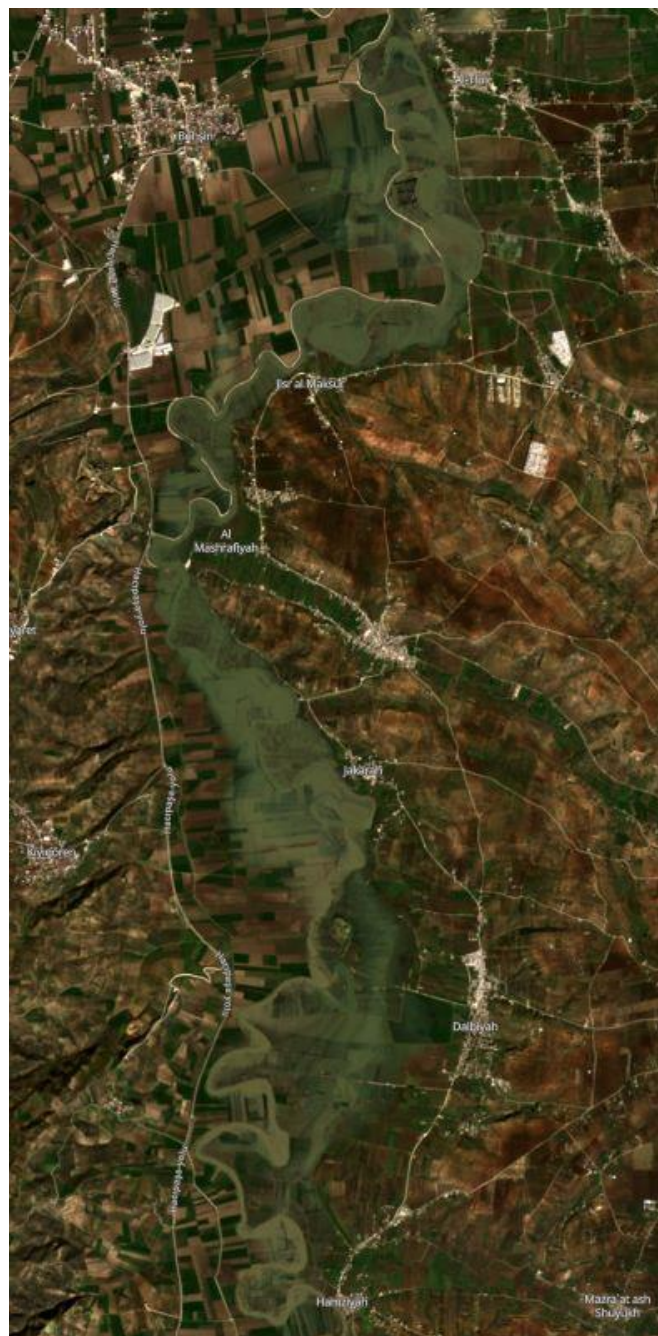


Image credit: Copernicus EU/Sentinel-2, EO Browser, The Watchers

Relief efforts are underway to assist those affected by the flooding, but the situation remains dire. The earthquakes have only added to the already challenging humanitarian situation in the region, and the international community is working together to provide support and assistance to those in need.



VIDEO: Water floods the village of al-Taloul near the town of Salqin in the countryside of the northwestern Syrian Idlib province, after a dam collapsed following the deadly earthquake.



12:40 PM · Feb 10, 2023



The quakes left a total of 37 357 people dead by February 13, including 31 643 in Turkey and 5 714 in Syria. This makes it the deadliest earthquake in Turkey in over 80 years and one of the deadliest in the country's history, as well as the 5<sup>th</sup> deadliest earthquake globally since 2002.



## Extremely damaging M7.8 earthquake hits Turkey – Syria border region, leaving over 37 000 people dead

A powerful earthquake registered by the USGS as M7.8 hit the highly populated Turkey – Syria border region at 01:17 UTC (04:17 local time) on Monday, February 6, 2023. The agency is reporting a depth of 17.9 km (11.1 miles). EMSC reports M7.8 at a depth of 10 km (6.2 miles). Numerous moderate to very strong aftershocks were registered, including M6.7 at 01:28 and M7.5 at 10:24 UTC.



Featured image credit: Copernicus EU/Sentinel-2, EO Browser, The Watchers

(THE WATCHERS, [Monday, February 13, 2023, https://watchers.news/2023/02/13/thousands-displaced-by-flooding-in-northern-syria-after-earthquakes-trigger-dam-breach](https://watchers.news/2023/02/13/thousands-displaced-by-flooding-in-northern-syria-after-earthquakes-trigger-dam-breach))



## Earthquake's sheer power turned a Turkish olive grove into a huge canyon

About 39,000 people have died in Turkey and Syria as a result of the quakes. New pictures illustrate just how intense the tremors were.



TEPEHAN, Turkey — An olive grove split into two, separated by an enormous canyon 1½ miles long, is a lasting testament to the sheer power of the [deadly earthquakes](#) that devastated large swaths of Turkey and Syria.

Drone video released Wednesday showed how the grove, in the small town of Tepehan in rural eastern Turkey, is now bisected by a valley that wasn't there just days ago.

The town is near the East Anatolian Fault line that caused last week's earthquakes, which have been declared the deadliest ever in Turkey and also caused widespread death and devastation in neighboring Syria. More than 39,000 people have been killed in both countries and officials say the number is likely to rise.

The new pictures illustrate just how intense the tremors were, to have forever altered this ancient landscape.



A man takes a photo of the newly formed canyon. Oguz Yeter / Anadolu Agency via Getty Images

The transformation is so large that it is attracting families from nearby villages who are coming to peer over the newly formed cliffs, some of which are still crumbling, freshly exposed rock crashing to the canyon floor.

Meanwhile, against all odds, people are still being pulled alive from the wreckage of their homes. The Turkish National Defense Ministry released video Wednesday showing a 77-year-old woman being rescued in the southern city of Adiyaman, 212 hours after the last earthquake struck.

In Adiyaman province, a daring and delicate rescue operation saved 18-year-old Muhammed Cafer Cetin. Medics gave him an IV with fluids before rescuers removed him from a building that was falling down around them. Turkish TV video showed him wearing a neck brace and an oxygen mask as he was taken away for treatment.



The split is more than 1 mile long by almost 700 feet wide.  
Oguz Yeter / Anadolu Agency via Getty Images

The first of the devastating quakes that struck Turkey and Syria last week registered at magnitude-7.8. It qualified as "major" on the official magnitude scale. Hours later, a second quake, registering at 7.6-magnitude, struck nearby.

As the rescue operations begin to end, the job of rebuilding and caring for displaced people begins. The World Health Organization said in a statement Tuesday that 26 million people across both Turkey and Syria need immediate humanitarian help.

In Turkey alone, it's estimated that 1 million people lost their homes and 80,000 people are in hospitals, many of which were badly damaged in the quakes, according to the WHO.

Across the border in northwest Syria, the death toll is nearly 5,000, it added.

(Kelly Cobiella, Laura Saravia and Patrick Smith NBC NEWS, Feb. 15, 2023, <https://www.nbcnews.com/news/world/earthquakes-sheer-power-turned-turkish-olive-grove-huge-canyon-rcna70742>)



## How ultralow frictional healing could help predict large earthquakes



A new study published in the journal *Science* could be a game-changer in the field of seismology, as researchers have discovered a potential missing piece in the puzzle of predicting earthquakes. The study suggests that ultralow frictional healing, a common physical phenomenon, could be crucial in understanding when and how violently faults move. While it won't enable scientists to forecast the next big earthquake, it could be a valuable new way to investigate the causes

## and potential for large, damaging earthquakes.

The study suggests that ultralow frictional healing could help explain recurring slow slip events and aid in understanding when and how violently faults move.

Slow slip events, also known as aseismic slip or silent earthquakes, are a type of fault movement that occurs slowly and steadily over days or weeks, in contrast to the abrupt and irregular movement that characterizes an earthquake. These events have been observed in several subduction zones around the world, including New Zealand's Hikurangi margin.

Researchers from the University of Texas at Austin used rock samples from a fault off the coast of New Zealand to determine the frictional healing properties of the shallow, slow slip portion of the Hikurangi fault. They found that the ability of the material to strengthen after failure was limited, unlike for earthquake-producing events. These observations could explain why these shallow, slow slip events happen frequently and at low stress, and have short recurrence times of 1 to 2 years.

The study suggests that near-zero frictional healing rates associated with weak phyllosilicates that are common in subduction zones may promote frequent, small-stress-drop, slow ruptures near the trench. While the discovery won't allow scientists to predict when the next big earthquake will strike, it provides researchers with a valuable new way to investigate the causes and potential for a large, damaging earthquake to happen.

The researchers suggest that their findings could be used to determine whether a fault is likely to slip silently with no earthquakes or have large ground-shaking earthquakes. The study's co-lead author Demian Saffer, director of the University of Texas Institute for Geophysics, said, "With the right samples and field observations, we can now start to make testable predictions about how big and how often large seismic slip events might occur on other major faults, like Cascadia in the Pacific Northwest."

This new study comes as scientists continue to search for ways to predict earthquakes. The forces behind large earthquakes are complex, but the discovery of the role of ultralow frictional healing could provide a valuable tool for researchers to better understand slow slip events and their potential to cause large earthquakes. The new insights could help improve our understanding of subduction zone faults and how they work, and ultimately aid in efforts to better forecast earthquakes.

## References:

<sup>1</sup> Earthquake scientists have a new tool in the race to find the next big one – University of Texas Austin – February 16, 2023

<sup>2</sup> Ultralow frictional healing explains recurring slow slip events – Shreedharan et al. *Science* – February 16, 2023 – DOI: 10.1126/science.adf4930

(THE WATCHERS, Tuesday, February 21, 2023, <https://watchers.news/2023/02/21/how-ultralow-frictional-healing-could-help-predict-large-earthquakes>)

## Ultralow frictional healing explains recurring slow slip events

Srisharan Shreedharan, Demian Saffer, Laura M. Wallace, and Charles Williams

Silently not able to heal



Faults on the Earth rupture over time but do not always produce earthquakes. Such aseismic, or slow slip, events are an important way to release stress. Shreedharan *et al.* determined the frictional healing properties of a slow slip portion of the Hikurangi fault in New Zealand. They found that the ability of the material to strengthen after failure was limited, unlike for earthquake-producing events. These observations could explain why these shallow, slow slip events happen frequently and at low stress. —BG

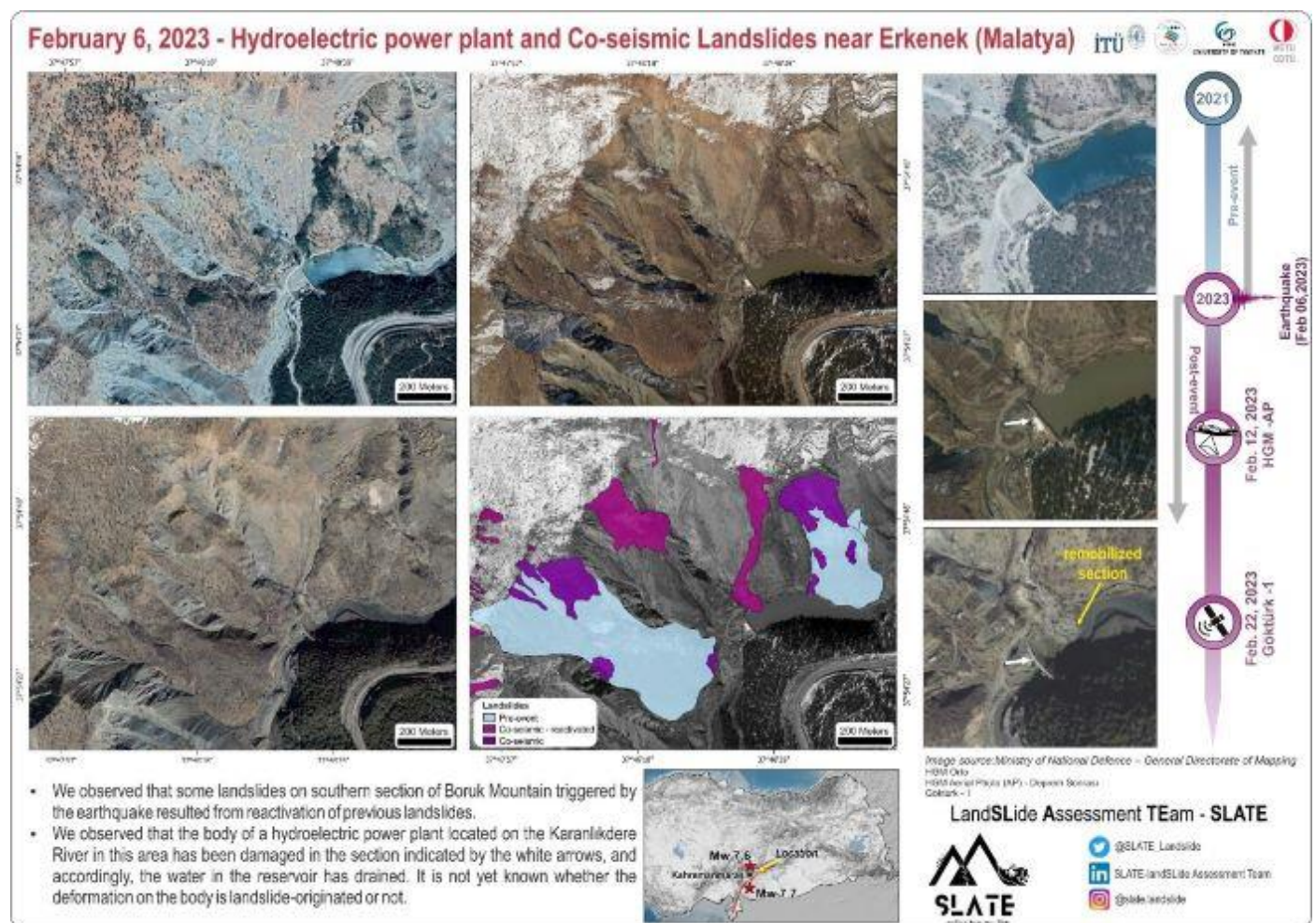
## Abstract

Plate motion on shallow subduction megathrusts is accommodated by a spectrum of tectonic slip modes. However, the frictional properties and conditions that sustain these diverse slip behaviors remain enigmatic. Frictional healing is one such property, which describes the degree of fault re-strengthening between earthquakes. We show that the frictional healing rate of materials entrained along the megathrust at the northern Hikurangi margin, which hosts well-

characterized recurring shallow slow slip events (SSEs), is nearly zero ( $<0.0001$  per decade). These low healing rates provide a mechanism for the low stress drops ( $<50$  kilopascals) and short recurrence times (1 to 2 years) characteristic of shallow SSEs at Hikurangi and other subduction margins. We suggest that near-zero frictional healing rates, associated with weak phyllosilicates that are common in subduction zones, may promote frequent, small-stress-drop, slow ruptures near the trench.

Science, 16 Feb 2023, Vol 379, Issue 6633, pp. 712-717, DOI: [10.1126/science.adf4930](https://doi.org/10.1126/science.adf4930)

<https://www.science.org/doi/10.1126/science.adf4930>



That is an amazing example of how effects of earthquakes last for longer periods. Earthquakes cause not only slope failures but also create excess sediment flux that may continue for decades. These secondary effects should be taken into consideration in planning studies.

Feb. 27, 2023

[https://twitter.com/SLATE\\_Landslide](https://twitter.com/SLATE_Landslide)

[https://twitter.com/SLATE\\_Landslide/status/1630152331114291200](https://twitter.com/SLATE_Landslide/status/1630152331114291200)



# ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

## Stanislav Grand Canyon in Kherson Mountains

Stanislav Grand Canyon in Kherson Mountains is one of the most amazing and beautiful places in Ukraine. Vertical slopes of canyon consisting of multi-coloured clay and they reach up to 55 meters in height.



### [Geographical Features](#)

<https://www.facebook.com/1044714239005165/posts/stanislav-grand-canyon-in-kherson-moutains-is-one-of-the-most-amazing-and-beauti/1891984304278150/>



# ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

## Ancient Megaliths That Completely Defy Logic

Here are some of the most impressive examples of ancient megaliths around the world

### Al Naslaa Rock Formation

This impressive rock is split down the middle into two parts, so neatly that it seems as if it was performed with the precision of a laser beam. It measures about 6 m high and 9 m wide, and the overall shape may have been the result of wind erosion and chemical weathering. The two parts of the rock are both balanced on small pedestals and the southeast face of the rock is covered with numerous petroglyphs.



### The Ancient Megalithic Wall of Arwad



Arwad – formerly known as Arados, also called Ruad Island – located in the Mediterranean Sea, is the only inhabited island in Syria. The town of Arwad covers the entire island. The island was settled in the early 2nd millennium BC by the Phoenicians. Located some 50 kilometers north of Tripolis, it was a barren rock covered with fortifications and houses several stories in height. The island was about 800 m long by 500 m wide, surrounded by a massive wall, and an artificial harbor was constructed on the east toward the mainland.

### [Göbekli Tepe](#)

Göbekli Tepe is a Neolithic site in Şanlıurfa, Turkey. Dated between 9600- 8200 BC, it is the oldest known temple in the world. During excavations, more than 20 circular stone enclosures were discovered. The largest one was 20m across with two 5.5m tall pillars weighing up to 10 tons at its center. The stone pillars had carvings of stylized human figures with folded hands on them. The structures were at least 11,000 years old which makes them the oldest known monumental structures in the world.



### The Wall of the Six Monoliths at Ollantaytambo Ruins

The wall of the Six Monoliths stands directly in front of the terraces at Temple Hill at Ollantaytambo Ruins. For unknown reasons, this construction was never completed. It is notable because of the distance the Inca had to move the huge stones from a quarry high on the mountainside on the opposite side of the Rio Urubamba, across the river and up to the place where it now sits, a distance of 6 km (3.7 miles).





### Moai, Head Statues in Polynesia

Moai or mo'ai are monolithic human figures carved by the Rapa Nui people on Rapa Nui in eastern Polynesia between the years 1250 and 1500. Almost all moai have overly large heads, which comprise three-eighths the size of the whole statue – which has no legs. Moai are carved from volcanic tuff (solidified ash). The human figures would be outlined in the rock wall first, then chipped away until only the image was left. The over-large heads (a three-to-five ratio between the head and the trunk, a sculptural trait consistent with the Polynesian belief in the sanctity of the chiefly head) have heavy brows and elongated noses with a distinctive fish-hook-shaped curl of the nostrils.



### **Temple G Columns in Selinunte Ancient City**

Temple G was the largest in Selinunte (113.34 meters long, 54.05 meters wide, and about 30 meters high) and was among the largest in the [Greek world](#). This building, although under construction from 530 to 409 BC (the long period of construction is demonstrated by the variation of style: the east side is archaic, while the west side is classical), remained incomplete, as shown by the absence of fluting on some of the columns and by the existence of column drums of the same dimensions ten kilometers away at Cave di Cusa, still in the process of extraction.



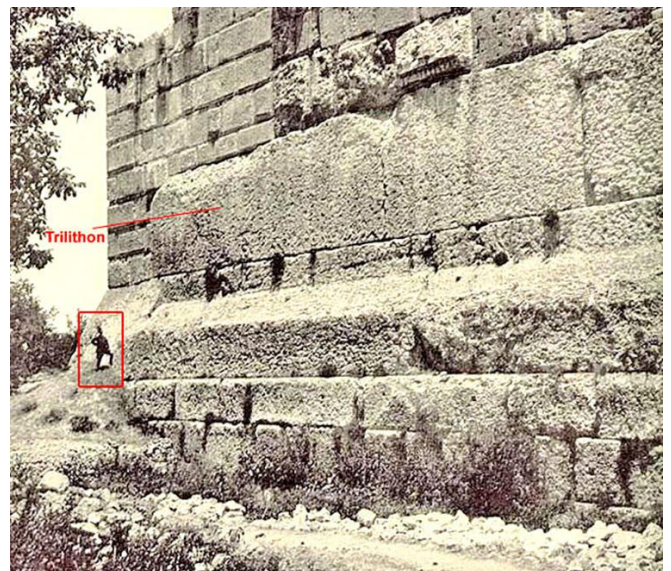
### **Baalbek Stones**

The Baalbek Stones are six massive Roman worked stone blocks in Baalbek (ancient Heliopolis), Lebanon, characterized by a megalithic gigantism unparalleled in antiquity. The smallest three are part of a podium wall in the Roman complex of the Temple of Jupiter Baal (Heliopolitan Zeus) on Tel Baalbek and are known as the "Trilithon".

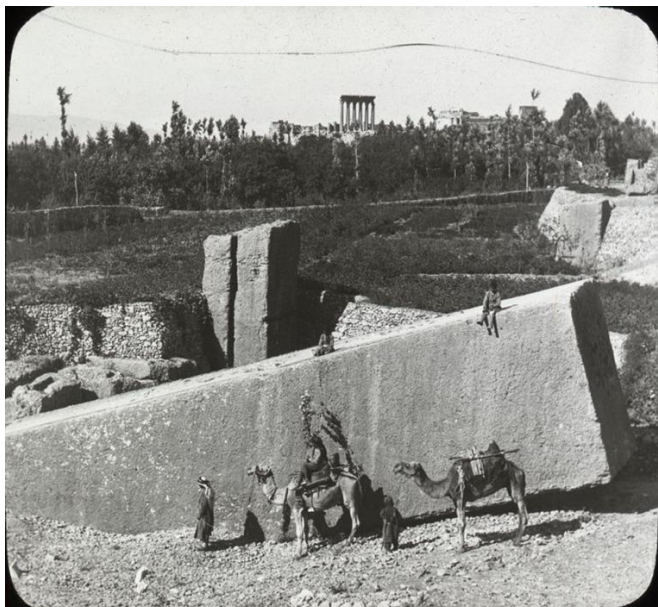
Each of these is estimated at about 750–800 tonnes (830–880 short tons). The remaining three are Roman monoliths, not part of a larger structure, conventionally known as the "Stone of the Pregnant Woman" (estimated at 1,000 t), the "Stone of the South" (est. 1,242 t), and the "Forgotten Stone" (est. 1,650 t). These are, in reverse order, the first, third, and tied fifth largest known stones ever quarried in human history. They are believed to have been intended for the nearby Jupiter Baal complex, possibly as an addition to the Trilithon; but, perhaps due to their size, they were never removed from their quarry. They have not been used since their extraction in ancient times.



The blocks known as the Trilithon in the Temple of Jupiter Baal.







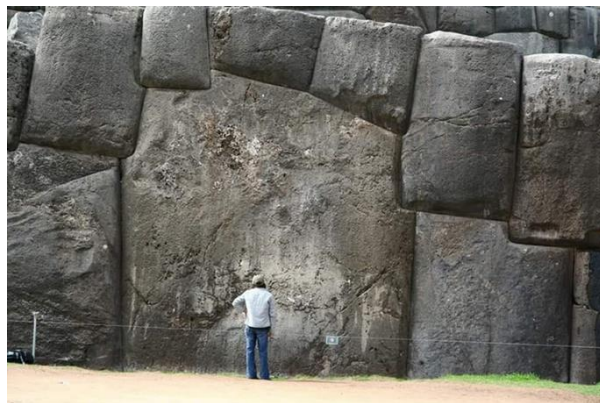
Stone of the Pregnant Woman on an early 20th-century lantern slide.

### [Dolmen de Soto](#)

Dolmen de Soto, dated between 3000 and 2500 B.C., belongs to a family of dolmens known as long corridor dolmens. The large size of the 21-meter-high Dolmen de Soto is one of its most astonishing features. It is the largest dolmen that has been found in the Huelva province in Spain. Its width varies depending on the area. Close to the door, it is about 0.8 meters wide, while in the chamber section, it is over three meters wide.



Megalithic walls at Sacsayhuamán, near Cusco, [Peru](#)—Built in the 1100s by the Killke Culture



### [Mysterious Newgrange Tomb](#)

The Newgrange Tomb, which is a part of the extensive Brú na Bóinne complex (Palace of the Boyne) in County Meath, is one of the most famous Megalithic monuments in the world and the most famous site of Neolithic art in Ireland. Carbon-14 dating methods indicate that Newgrange Tomb was constructed between c.3300-2900 BCE, which is six centuries older than the oldest pyramid in Egypt and seven hundred years older than the stone circle at Stonehenge, during the late Stone Age or early Bronze era. Megalithic art experts calculate it took a workforce of 300, about 20 years to complete.



<https://themindcircle.com/ancient-megaliths/?fbclid=IwAR385cP8WYe7m7MljXjEI1iZdw6thKABzegAMFyVdpiSssFX8kM9C8tjvnk>



### **Ισημερινός: Τούβλα από κοκαΐνη ως... δομικό υλικό**

Πάνω από 350 τόνοι κοκαΐνης έχουν μεταποιηθεί σε ειδικό εργοστάσιο στη χώρα





Ο Ισημερινός, η χώρα στη βορειοδυτική άκρη της Νότιας Αμερικής, έχει κατασχέσει τόσα πολλά δέματα με κοκαΐνη ώστε σκέπτεται να τα χρησιμοποιήσει ως δομικά υλικά.

Τα πακέτα με κοκαΐνη που έχουν σχήμα τούβλου αποφασίστηκε να χρησιμοποιηθούν ως αυτό ακριβώς που λέει το σχήμα τους, για τούβλα σε οικοδομές.

Η χώρα, γνωστή και με το ισπανικό της όνομα, Εκουαδόρ, κατ'άσχει κάθε εβδομάδα τόσα πολλά πακέτα κοκαΐνης ώστε είναι αδύνατον να τα φυλάξει με ασφάλεια.

Ετσι κατέληξε στην ιδέα της χρήσης πολλών από αυτά ως υλικό για οικοδομές, κατόπιν ειδικής επεξεργασίας σε χώρο μεταποίησης απορριμμάτων.



DW News  
@dwnews · Ακολουθήστε



Ecuador is recycling seized bricks of cocaine into concrete for use in construction.



10:59 π.μ. · 20 Φεβ 2023



<https://twitter.com/i/status/1627593862666485760>

Συγκεκριμένα, τα πακέτα της κοκαΐνης φτάνουν κατά εκατοντάδες στο εργοστάσιο μεταποίησης μαζί με... συμβατικά απορρίμματα. Εκεί ειδικές μηχανές κονιορτοποιούν όλα τα πακέτα μαζί με τα υπόλοιπα σκουπίδια και μετά τα αναμιγνύουν με τσιμέντο, άμμο και νερό για την παραγωγή χρήσιμων δομικών υλικών.

Σύμφωνα με τους επικεφαλής του εργοστασίου, έχουν ήδη χρησιμοποιηθεί περί τους 350 τόνους κοκαΐνης.

Η μέθοδος αυτή είναι τέσσερις φορές ταχύτερη από την καύση της κοκαΐνης και έχει την πλήρη στήριξη και της αρμόδια υπηρεσίας του Οργανισμού Ηνωμένων Εθνών. Ο Ισημερινός σκοπεύει να την εφαρμόζει σε όλο και μεγαλύτερη κλίμακα αφού τα οφέλη είναι πολλαπλά.

Πηγή: DW TV

(newsroom / Η ΚΑΘΗΜΕΡΙΝΗ, 20.02.2023,  
<https://www.kathimerini.gr/world/562287634/isimerinos-toyvla-apo-koka-ni-os-domiko-yliko>)

08 80



Coal miners coming up in a coal mine elevator after a day of work in Belgium 1920's.

<https://twitter.com/historydefined/status/1524599197550395392>

# ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



## Progress in Landslide Research and Technology, Volume 1 Issue 1, 2022

**Editors: Kyoji Sassa, Kazuo Konagai, Binod Tiwari, Zeljko Arbanas, Shinji Sassa**

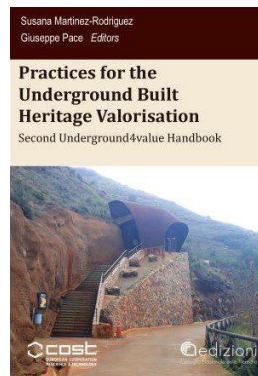
Progress in Landslide Research and Technology is the Open Access Book Series of the International

Consortium on Landslides (ICL). The series provides a common platform for the publication of recent progress in landslide research and technology for practical applications and the benefit for the society contributing to the Kyoto Landslide Commitment 2020, which is expected to continue up to 2030 and even beyond to globally promote the understanding and reduction of landslide disaster risk, as well as to address the 2030 Agenda Sustainable Development Goals. The contributions include the following eight categories:

1. Original articles reporting progress of landslide research and technology.
2. Review articles (minimum 8 pages): Review of landslide research and technology in a thematic area of landslides. A review article integrating a series of research and technology of the author or its group.
3. ICL landslide lessons (minimum 10 pages): Lessons by global and emerging experts with distinguished achievements in one of specific aspects in understanding and reducing landslide disaster risk.
4. IPL/WCoE/Kyoto Commitment activities (minimum 8 pages): Progress or achievements of the projects of the International Programme on Landslides (IPL), the World Centres of Excellence on Landslide Risk Reduction (WCoEs) and Kyoto Landslide Commitment.
5. Teaching tools with online extras (minimum 8 pages): User-friendly teaching tools with extras (i.e. photos, illustration, videos, guidelines, and manuals) online to fill the gap between the available level of science and technologies and the practical use in the society.
6. Technical note and case studies (minimum 4 pages): Technical note and case studies on landslides and landslide disaster risk reduction practice.
7. World Landslide Reports (2-4 pages): Landslide reports from landslide-prone developing countries and urbanizing areas of the developed countries from around the world. No processing charge, but limited to approximately 10 reports per issue.
8. Introduction of KLC2020 official promoters (1-3 pages): KLC2020 official promoters are eligible for this category. The introduction of the official promoters is published in all issues throughout the year.

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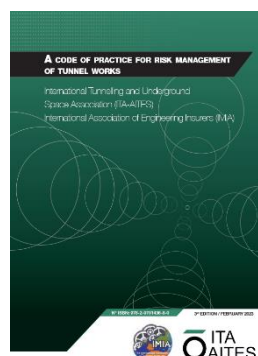
## Practices for the Underground Built Heritage Valorisation: Second Handbook

### Proceedings of the Second Underground4value Training School.

This book collects all original materials produced during the Second Underground4value Training School, held in September 2021 at the University of Murcia (Murcia, ES). In these pages, the reader can experience how a real committed group of young and talented trainees, organised in research groups, faced such a challenge of penetrating theoretical and methodological contents and then operating them to produce their case-study storytelling. This second handbook, structured in three parts, tries to catch all this, not replying the already published lectures, but giving space to the case-studies' description and to the research groups' work. In these pages, the research teams, composed by tutors and trainees, emerge as the real protagonists, by providing a fertile ground to create alternative options for the selected case-studies - the Old White Marble Quarries of Paros (GR), the Ayia Napa Monastery (CY), the Dolmens of Antelas and Carapito (PT), and the Underground City of Camerano (IT). Through their eyes, free from any predefined design and not tied to the local communities' expectations, the reader can penetrate the logic path, in some way connected to the Strategic Transition Practice (STP) approach, which created the pre-conditions for the options' definition. Following the First Handbook orientation, this new volume aims to make available to the scientific community and the general public an original product based on scientific comparison, real studies, community experiences, and creativity.

Furthermore, in line with the COST Action philosophy, the final goal of this Handbook is to promote Underground Built Heritage as a valuable resource to celebrate and preserve, realising its full potential to support local communities' development.

(CNR Edizioni, 2023)



## A code of practice for risk management of tunnel works

**ITA; IMIA**

**Bill Grose and Patrick Bravery**

This Code of Practice is the latest edition of a Code prepared jointly by the insurance and tunnelling industries aimed at reducing the frequency and severity of serious incidents (resulting in insurance claims) to within sustainable boundaries.

This 3rd Edition follows an industry-wide survey that canvassed opinions on the application of the Code to date and any necessary updates. The main areas of revision include

adding a list of the principal attributes expected in the Code, addressing competence and culture, differentiating between risk management and management of risk, a new section on digital modelling, improved language on both instrumentation and monitoring and emergency response plans, and clarification of the importance of managing high consequence events.

The Code sets out industry best practice for the management of construction risks in underground works which, if followed, should reduce the risk of significant losses (insured and uninsured) across the industry. The Code has been in use since 2003 and its widespread adoption has succeeded in reducing incidents and losses to tolerable levels.

The tunnelling industry is committed to high quality risk management as an enabler of successful project delivery, and the Code represents a robust framework on which projects can be modelled.

The Insurance industry uses the Code as a benchmark against which projects can be assessed. Insurers may require compliance with the Code as a pre-requisite for their provision of insurance cover for damage to the works during construction.

The Code is intended to apply to all project participants insured via a Construction All Risks (or similar) policy and is recommended reading for any other party involved in the planning, design, procurement, and construction of underground works. It assumes that the reader has a working understanding of the terms defined in Appendix A.

Construction All Risks Insurance policies generally provide cover to all the project participants from Client to Sub-contractor, and the Code is written to reflect the responsibilities of each of the participants. Appendix B lists the deliverables that are expected to be produced at each project stage and will therefore assist in benchmarking against and/or demonstrating compliance with the Code.

The words shall and should are used to indicate actions that are either required for compliance, or recommended best practice, respectively. It is recognised, however, that all projects are unique and may have alternative means of achieving the overriding principles expected in the Code. Section 1 lists the principal attributes expected of a project adhering to these best practice principles.

The document is termed as a "Code of Practice", or "Code" and is intended to describe best practice or guidance – it is not, in itself, a legal or legally binding document. It may, however, be contractually binding if referred to as such in, for example, a construction contract or an insurance policy.

The Code is published jointly by the International Tunnelling and Underground Space Association (ITA) and the International Association of Engineering Insurers (IMIA).

Download document [1551-AITES-IMIA-2023-BD-Pro.pdf](#)

(January 2023)



### **Geotechnical baseline reports: a guide to good practice**



### **Geotechnical baseline reports: a guide to good practice (C807)**

This guide outlines the background, purpose and process of developing a geotechnical baseline report (GBR). A GBR forms the basis of dealing with uncertainty in below-ground conditions for infrastructure projects. The guide should assist in the development of equitable contract terms between client and consultant/contractor across a range of procurement scenarios and infrastructure types, with a view that the GBR provides a common understanding of what is known and indeed not known at various stages of the contract lifecycle. The guide has been developed with a cross-section of industry expertise and has drawn extensively on experience from outside the UK.

The guide systematically outlines:

- Why a GBR might be needed.
- Who should write and use and a GBR.
- When and how a GBR should be used.
- What a GBR should and should not contain.
- The application of GBR's to a range of typical scenarios.

The intention is that this guide facilitates the production of appropriate and proportionate GBR's which can be agreed between all parties at each stage of the construction process.

(CIRIA, January 2023)



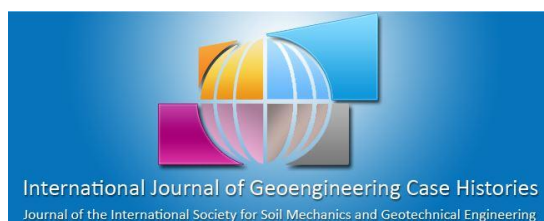
# ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



[www.issmge.org/publications/issmge-bulletin/vol-17-issue-1-february-2023](http://www.issmge.org/publications/issmge-bulletin/vol-17-issue-1-february-2023)

Κυκλοφόρησε το Τεύχος 1 του Τόμου 17 του ISSMGE Bulletin Φεβρουαρίου 2023 με τα ακόλουθα περιεχόμενα:

- **ISSMGE Heritage Time Capsule**
- **Conference report**
  - 2nd Int. Conf. on ACE Forensic Engineering
  - Nigerian Institution of Geotechnical Engineers Conference 2022
- **ISSMGE Foundation report**
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Volume 7, Issue #3

[www.geocasehistoriesjournal.org/pub/issue/view/53](http://www.geocasehistoriesjournal.org/pub/issue/view/53)

[Liquefaction and Non-liquefaction Cases from the Mataquito Bridge, Chile, after the Mw 8.8 \(2010\) and Mw 6.6 \(2019\) Earthquakes](#), Ricardo Moffat, Robb Moss



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#### Editorial

[Note of appreciation to paper reviewers](#), 30(1), pp. 1–2

#### Papers

[Effect of a two-tiered configuration on the seismic behaviour of reinforced soil walls](#), [A. R. Jamnani](#), [M. Yazdandoust](#), [M. Sabermahani](#), 30(1), pp. 3–28

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[Behaviour of soilbags subjected to monotonic and cyclic vertical loading](#), [S. H. Liu](#), [B. X. Fang](#), [Y. Lu](#), [S. Chen](#), 30(1), pp. 81–94

[Influence of geosynthetic stiffness on analytical solutions for reinforced fill over void](#), [F.M. Naftchali](#), [R.J. Bathurst](#), 30(1), pp. 95–107

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[Editorial Board](#), Page ii

## Regular Articles

[Required strength of geosynthetic-reinforced soil structures subjected to varying water levels using numeric-based kinematic analysis](#), Z.L. Zhang, Z.W. Li, C.T. Hou, Q.J. Pan, Pages 1-15

[Numerical modeling of geosynthetic reinforced soil retaining walls with different toe restraint conditions](#), Wan Zhang, Jianfeng Chen, Pages 16-29

[Importance of thickness reduction and squeeze-out Std-OIT loss for HDPE geomembrane fusion seams](#), William Francey, R. Kerry Rowe, Pages 30-42

[Influence of geosynthetic stiffness on bearing capacity of strip footings seated on thin reinforced granular layers over undrained soft clay](#), Reza Jamshidi Chenari, Richard J. Bathurst, Pages 43-55

[Calculating local geomembrane strains from gravel particle indentations with thin plate theory](#), H.M.G. Eldesouky, R.W.I. Brachman, Pages 56-72

[Dynamic response of Mechanically Stabilised Earth \(MSE\) structures: A numerical study](#), Arman Kamalzadeh, Michael J. Pender, Pages 73-87

[Change pattern of geomembrane surface roughness for geotextile/textured geomembrane interfaces](#), Gaojie Xu, Jianyong Shi, Yan Li, Pages 88-99

[Estimation of seismic active earth pressure on reinforced retaining wall using lower bound limit analysis and modified pseudo-dynamic method](#), Koushik Halder, Debarghya Chakraborty, Pages 100-116

[Influence of uncertainty in geosynthetic stiffness on deterministic and probabilistic analyses using analytical solutions for three reinforced soil problems](#), Richard J. Bathurst, Fahimeh M. Naftchali, Pages 117-130

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[Effect of pressurization frequency and duration on the consolidation of a dredged soil using air booster vacuum preloading combined with prefabricated horizontal drains](#), Jun Wang, Hongtao Fu, Weikai Zhang, Junfeng Ni, ... Ying Cai, Pages 209-218

[Effect of elevated temperatures on the degradation behaviour of elastomeric bituminous geomembranes](#), A. Samea, F.B. Abdelaal, Pages 219-232

[Experimental investigation on the accumulated strain of coarse-grained soil reinforced by geogrid under high-cycle cyclic loading](#), Kai Cui, Dongjie Zhang, Qionglian Li, Shangchuan Yang, Haodong Zhang, Pages 233-244

[Use of polyethylene terephthalate fibres for mitigating the liquefaction-induced failures](#), Arpit Jain, Satyendra Mittal, Sanjay Kumar Shukla, Pages 245-258

[Analytical method for quantifying performance of wicking geosynthetic stabilized roadway](#), Wuyu Zhang, Xiongyu Tang, Xiaohui Sun, Ruochen Yang, ... Jun Guo, Pages 259-274

## Technical Note(s)

[A preliminary study of the application of the strain-self-sensing smart geogrid rib in expansive soils](#), Gang Bi, Shaohua Yang, You Wu, Yijie Sun, ... Suqian Cao, Pages 275-281

[Forecasting the moisture dynamics of a landfill capping system comprising different geosynthetics: A NARX neural network approach](#), S.M. Dassanayake, Ahmad Mousa, Gary J. Fowmes, S. Susilawati, K. Zamara, Pages 282-292



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