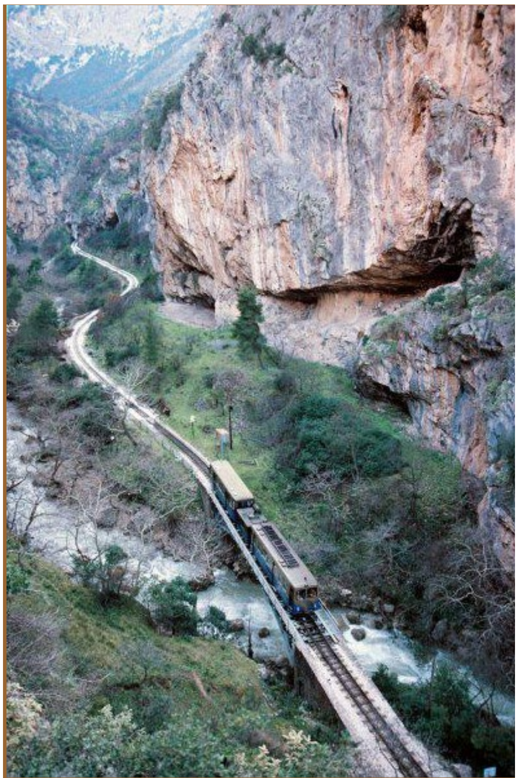
ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ



Οδοντωτός σιδηρόδρομος στο Φαράγγι του Βουραϊκού Ποταμού

Τα Νέα

της Ε Ε Ε Ε Γ Μ

123

Αρ. 123 – ΦΕΒΡΟΥΑΡΙΟΣ 2019

SIMSG ISSMGE

ISRM

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

Vibrant colors light up the North Fork of the 425-mile Koyukuk River in Alaska

Basalt pinnacles can be seen in the Sound of Raasay—the waters between Raasay and Skye island in Scotland

Waves crash against an iconic arch seen from Isla Darwin in the Galápagos

6 – 8 Νοεμβρίου 2019, Αθήνα, Ελλάς
www.8hcge2019.gr

Τα τελευταία 30 χρόνια η ανάπτυξη της γεωτεχνικής μηχανικής στην Ελλάδα υπήρξε αλματώδης, χάρη στην ανεπανάληπτη ανάπτυξη και κατασκευή έργων υποδομής. Αν και με την πολύχρονη οικονομική κρίση η δραστηριότητα του μηχανικού στην Ελλάδα, δυστυχώς, μειώθηκε δραματικά, πιστεύουμε ότι η σημαντική δράση Ελλήνων γεωτεχνικών εκτός χώρας ή σε διεθνή έργα, αλλά και η συνεχιζόμενη, με μικρή μόνον μείωση, ερευνητική δραστηριότητα στα Πανεπιστήμια μας (χάρη κυρίως σε ευρωπαϊκή χρηματοδότηση), έχουν διατηρήσει το επίπεδο της ελληνικής γεωτεχνικής υψηλό. Αυτό ελπίζουμε ότι θα επιβεβαιωθεί στο 8ο Συνέδριό μας τον ερχόμενο Νοέμβριο.

Εκ μέρους της ΕΕΕΕΓΜ σας καλώ λοιπόν να το διαπιστώσουμε ιδίοις όμασιν! Στο 8ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής, στην Αθήνα, 6 – 8 Νοεμβρίου 2019.

Γιώργος Γκαζέτας
Πρόεδρος της ΕΕΕΕΓΜ

Θεματικές Ενότητες

- Συμπεριφορά Εδαφών: Έρευνες Υπαίθρου και Εργαστηρίου
- Συμπεριφορά Εδαφών: Προσομοιώματα
- Επιφανειακές και Βαθειές Θεμελιώσεις
- Αλληλεπίδραση εδάφους - κατασκευής
- Βαθειές εκσκαφές-Αντιστηρίξεις
- Ευστάθεια πρανών-Κατολισθήσεις
- Σήραγγες και Υπόγεια Έργα
- Εδαφοδυναμική
- Τεχνική Σεισμολογία
- Βραχομηχανική
- Βελτιώσεις εδαφών
- Φράγματα
- Άοπλα επιχώματα
- Οπλισμένα επιχώματα
- Εφαρμογές γεωσυνθετικών υλικών
- Οδοστρώματα
- Ευρωκώδικες
- Περιβαλλοντική γεωτεχνική
- Ενεργειακή γεωτεχνική
- Πολιτιστική κληρονομιά και γεωτεχνική μηχανική
- Διδασκαλία και μάθηση γεωτεχνικής μηχανικής
- Θέματα γεωτεχνικής μηχανικής στην Κύπρο
- Μη κορεσμένα και διογκώσιμα εδάφη

Οργάνωση

ΕΕΕΕΓΜ – Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
Πολυτεχνειούπολη Ζωγράφου
15780 ΖΩΓΡΑΦΟΥ
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Γραμματεία Συνεδρίου

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Κολοφώντος 1 & Ευριδίκης, 161 21 Αθήνα
Τηλ.: 210 74 14 700 | Fax: 210 72 57 532
Email: info@8hcge2019.gr

ΑΡΘΡΑ

The biggest bridges in the world

Gaze at the biggest, tallest, longest, and most impressive bridges in the world

You likely use them every day, but have you ever stopped to consider how incredible bridges are? They're massive spans of concrete, metal, and wires that weigh thousands of tons, yet remain standing even through destructive and violent natural disasters like earthquakes, floods, and hurricanes.

Bridges are also key to the way we move and serve as an important tool for many commuters. Despite this, how often do you read a piece extolling the greatness of bridges, or hear an ode to their wonders? Not often enough, by our measure. Let's correct that, shall we? Here's a quick sampling of the biggest bridges out there.

Akashi Kaikyo Bridge
The longest suspension bridge

Location	Japan
Year completed	1998
Length	2.43 miles
Architect	Satoshi Kashima

Suspension bridges are feats of architectural engineering. Think about it: A giant structure of wires and pylons manipulating tension and compression to allow for a single span of heavy material to be suspended in air, thus letting it bridge wide chasms and bodies of water. The Golden Gate Bridge is a suspension bridge, but the Akashi Kaikyo Bridge (aka the Pearl Bridge) holds the title for the world's longest.

This 2.4-mile-long bridge spans the Akashi Strait, connecting the city of Kobe on the Honshu mainland with Awaji Island. Since 1998, the bridge has carried six lanes of traffic and approximately 23,000 cars a day between the two towns.

The impressive central span ranks as the longest in the world at 1.24 miles long, and the bridge itself is built to withstand a magnitude 8.5 earthquake. In fact, during construction the 1995 Kobe Earthquake actually forced the two central towers further apart, making the center span three feet longer than it was originally designed. But earthquakes aren't the only natural disaster the Akashi Kaikyo is built to withstand. The region is also prone to typhoon activity, so designers also built it to withstand 180mph winds too.

Hong Kong-Zhuhai-Macau Bridge
The longest cross-sea bridge

Location	China
Year completed	2018
Length	31 miles
Architect	ARUP

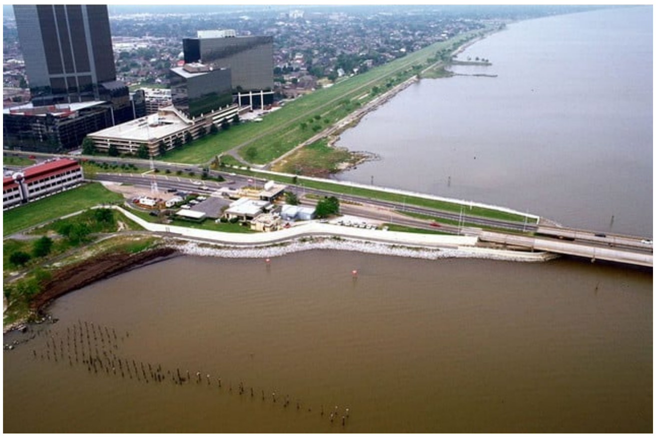
China long ago cemented itself as one of the leading countries when it comes to bridge building, and the Hong Kong-Zhuhai-Macau Bridge only further cements the country's reputation. At 31 miles in length, it is the longest cross-sea bridge in the world, twice as long as the country's Jiaozhou Bay Bridge, the former longest bridge in the world.

Hong Kong-Zhuhai-Macau has completely changed transportation between the cities. The former inland route between Hong Kong and Macau is a four-hour trek: On the bridge, travel time may be as little as 30 minutes. Chinese officials hope that the bridge spurns economic development in southern China, one of the country's poorest areas. At the same time, it strengthens Hong Kong's position as the economic heart of the region.

While the bridge is the longest cross-sea bridge, it actually consists of two sections and three artificial islands. Connecting the two sections is a 1.7-mile tunnel closer to the Hong Kong side, which gives enough space for large shipping vessels to pass through.

Not everything has gone according to plan, however. Construction began in 2009, but ongoing issues with land reclamation caused major delays. Construction on the bridge ended in mid-2017, but paving of the bridge wasn't completed until early in 2018. The cost of the bridge is staggering: At $18.3 billion, it is one of the most expensive in the world.

Lake Pontchartrain Causeway
The longest continuous bridge over water



Location	Louisiana, United States
Year completed	1956
Length	23.87 miles
Architect	Louisiana Bridge Company

The Hong Kong-Zhuhai-Macau Bridge currently has the longest bridge span of any of the bridges on our list in the world in aggregate at 30.1 miles, but the longest *continuous* span over water is the Lake Pontchartrain Causeway in Louisiana. It is a 23.87-mile-long, low-level trestle bridge that lies across Lake Pontchartrain and connects New Orleans with Mandeville on the other side, as well as the rest of the southeastern United States without having to drive around the lake.

Following the completion of construction, communities on the north shore of Lake Ponchartrain saw financial benefits as they were now included in the New Orleans metropolitan area. Drive times were reduced by nearly an hour. With a speed limit of 65mph, you can be across the bridge in about 20 minutes or so.

While not necessarily built to withstand major hurricanes, the Causeway was able to withstand the storm surge of Hurricane Katrina in 2005 with relatively little damage. The bridge itself played a crucial role in getting in emergency supplies to the city of New Orleans and only was closed for three weeks following the storm — the only time the Causeway had ever closed to traffic since its opening.

Millau Viaduct
The tallest bridge

Location	Aveyron, France
Year completed	2004
Length	1.53 miles
Architect	Norman Foster, Michel Virlogeux

We've given a lot of attention to bridges with impressive lengths, but that isn't the only measure that makes a bridge noteworthy. The tallest bridge in the world — meaning the height of the structure's tallest point — is the Millau Viaduct, located in Aveyron, France. The Millau Viaduct is a stayed-cable bridge that stretches 1.5 miles across the Tarn River Valley. The expressway lanes are 890 feet at its highest point above the Valley floor, but the structure itself towers another 235 feet above for a total height of 1,125 feet, making it an iconic fixture of France's countryside.

Routinely heralded as one of the greatest feats of modern engineering, the bridge's iconic look and the impressive engineering behind it are the result of the viaduct's cable-stayed design, which uses massive pylons to hold thick steel cables that bear the weight of the structure's spans.

Duge Bridge
The highest bridge

Location	Guizhou, China
Year completed	2016
Length	4,400 feet
Architect	Guizhou, China

Tallest is one thing, but highest is another — and by highest we mean the length between the bridge's span and the lowest point of the ground beneath it. That record belongs to the Duge bridge (also known as Beipanjiang Bridge Duge) in Guizhou, China. While the cable-stayed bridge itself is only 4,400 feet long, it connects two sides of a deep valley. The span floats a daunting 1,854 feet above ground at the deepest point, and could fit New York City's One World Trade Center underneath it with another 80 feet or so to spare.

Beipanjiang Bridge Duge is not alone in Guizhou Province. Fun fact: The region has more of the world's highest bridges than every other country on earth *combined*, and by 2020 there will be more than 250 bridges at heights greater than 330 feet in the province. While that might seem like a lot, all those bridges serve an important and necessary function. Before serious bridge construction began, traveling through Guizhou's mountainous and ravine-filled countryside was difficult, with most transportation taking place on small, two-lane roads.

Other notable bridges

India's Living Root Bridges

In the Indian state of Meghalaya, in the northeastern part of the country, there is a remarkable practice of training fig trees to grow into bridges. The caretakers slowly but surely manipulate the tree roots as they grow, pushing them along and weaving them into walkways and river crossings. The process can take up to 15 years, but once complete, the bridges are usable for between 500 and 600 years. As the trees grow, the bridges become sturdier thanks to the strengthening and thickening of the roots. The bridges also have to particularly useful attribute of being self-renewing, especially given they don't require the same sort of upkeep as man-made structures. Plus, they just look cool.

Lucky Knot Bridge

Location	Changsha, China
Year completed	2016
Length	600 feet
Architect	Next Architects

Another cool pedestrian bridge comes from China-based Next Architects. These designers got their inspiration from the Mobius ring — which is essentially a ring that twists — and knotting, a form of Chinese folk art that utilizes knots to create decorative shapes. The bridge passes about 78 feet over a river, and spans more than 600 feet in length. Three pedestrian lanes slink up and down across its spine, connecting two parks on opposite sides of a river.

Eshima Ohashi Bridge

Location	Chugoku, Japan
Year completed	2004
Length	5577 feet
Architect	Next Architects

You'll feel like you're about to get on a roller coaster while gazing at Japan's Eshima Ohashi Bridge, but it's more of an optical illusion than anything else. The Inception-evoking structure quickly became an internet sensation upon its completion in 2004, namely because a slew of viral images made the bridge's grades look steeper than they actually are. In reality, the grades on either side are about 5.1 and 6.1 percent, and those who have traveled over the bridge say it's no different than driving over a hill. Still, the actual grades don't make the pictures any less terrifying.

(Ed Oswald / DIGITAL TRENDS, 02.25.19, https://www.digitaltrends.com/cool-tech/biggest-bridges-in-the-world/#/2/5)

(Σημείωση Εκδότη: Όπως βλέπετε, ως δημιουργός του έργου αναφέρεται ο αρχιτέκτονας και όχι ο κατασκευαστής του, όπως γίνεται στην Ελλάδα!)

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

John A. Hudson, 1940–2019

It is with deep sadness that we inform all ISRM members that our Past President and friend John A. Hudson passed away last Wednesday, 14 February 2019, in London, from complications resulting from a severe stroke.

John was one of the most active members ever of our Society - chairman of the Commission on Testing Methods during 19 years, Vice President, President and Fellow. He was one of the most influential teachers of rock mechanics and author and editor of several of the most relevant books on the discipline.

We will keep warm memories from him for his paramount professional contributions, but also for the permanent friendship and kindness. The ISRM will prepare tributes to John Hudson during the coming months.

Our thoughts are with his wife Carol and his close family, to whom we present our deepest condolences.

Luís Lamas
Secretary General, ISRM.

Ελληνική Επιτροπή Τεχνικής Γεωλογίας
Επίσημος Εκπρόσωπος Για Την Ελλάδα Της Διεθνούς Ενώσεως Τεχνικής Γεωλογίας (I.A.E.G. - A.I.G.I.)

Η Ελληνική Επιτροπή Τεχνικής Γεωλογίας έχει την τιμή να σας καλέσει στην διάλεξη που θα πραγματοποιηθεί από τον

Δρ. Νικόλαο Βλαχόπουλο,

Αναπληρωτή Καθηγητή του Τμήματος Πολιτικών Μηχανικών του RMC /University of Canada με θέμα

"Sensing the Ground: The use of Distributed Optical (Fiber) Sensors for Monitoring the Ground as well as for Support in Underground Excavations"

την **Τετάρτη 6/3/2019 και ώρα 18:00**, στην κεντρική αίθουσα τελετών του ΕΜΠ (Πολυτεχνειούπολη Ζωγράφου).

Περίληψη

In this presentation, a distributed optical strain-sensing technique is presented as a solution for measuring the strain distribution along ground support members used in tunnelling and mining works. The technique employs a Rayleigh optical frequency domain reflectometry technology, which measures strain at a spatial resolution of 0.65 mm along the length of a standard optical fiber. The development of a technique to couple optical fiber sensors with rock bolt, umbrella arch, and cable bolt support members demonstrated. A robust laboratory investigation of such optically instrumented support members demonstrated the capability of the technique to capture the expected in situ support behaviour in the form of coaxial, lateral, and shear loading arrangements as would be anticipated in the field. Moreover, the microscale data obtained by this optical sensing technique are shown to provide unprecedented insight into the local/micro-scale geomechanistic complexities associated with the bearing capacity of ground support members, especially when compared with data obtained by discrete strain-sensing technologies. The technique can be employed in order to sense the ground ahead of the excavated face as well as optimize the support scheme associated with underground works.

Σύντομο Βιογραφικό Σημείωμα Ομιλητή

Ο Δρ. Νικόλαος Βλαχόπουλος είναι Αναπληρωτής Καθηγητής στο Τμήμα Πολιτικών Μηχανικών στο Royal Military College/ University of Canada, όπου διδάσκει υποψηφίους αξιωματικούς στις Καναδικές Ένοπλες Δυνάμεις, καθώς και μεταπτυχιακά/διδακτορικά προγράμματα στα Τμήματα Γεωλογικών Επιστημών/Γεωλογικής Μηχανικής, και Περιβαλλοντικών Μελετών στο Queen's University, Kingston, Οντάριο, Καναδά. Ο Δρ. Νικόλαος Βλαχόπουλος είναι Research Director στο Queen's-RMC GeoEngineering Center, (διακεκριμένο ερευνητικό κέντρο της Γεωτεχνικής στην Βόρεια Αμερική (http://www.geoeng.ca/).

Ο Δρ. Βλαχόπουλος είναι μηχανικός (PEng, TEE) με πάνω από 25 χρόνια εμπειρίας στη γεωτεχνική / γεωλογική, τη γεωπεριβαλλοντική μηχανική και τη διαχείριση έργων σε μεγάλα κατασκευαστικά και ερευνητικά έργα. Έχει εργαστεί σε περισσότερες από 120 τοποθεσίες σε εθνικό (Καναδάς) και διεθνές επίπεδο.

Τα ερευνητικά του ενδιαφέροντα περιλαμβάνουν θέματα γεωτεχνικής / γεωλογικής (υποστήριξη σηράγγων και αριθμητική μοντελοποίηση) και περιβαλλοντικής μηχανικής. Χρησιμοποιεί τη φυσική δοκιμή και / ή την παρατήρηση κλίμακας πεδίου συνδυασμένα με αναλυτικές τεχνικές προκειμένου να βελτιωθεί η κατάσταση της τέχνης. Η έρευνά του περιλαμβάνει επίσης την επιτόπια εργασία σε διάφορες τοποθεσίες της Ελλάδας και τις συνεργασίες με το Εθνικό Μετσόβιο Πολυτεχνείο της Αθήνας καθώς και το Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

Είναι ο ιδρυτής και συν-διευθυντής της ομάδας RMC Green Team, ένας οργανισμός που υποστηρίζεται από το Υπουργείο Εθνικής Αμύνης και γνωμοδοτεί όσον αφορά στην κατάλληλη διαχείριση του περιβάλλοντος στις στρατιωτικές βάσεις, συμβάλλει στον έλεγχο και διασφάλιση της ποιότητας και εκπονεί μελέτες για την επίλυση περιβαλλοντικών προβλημάτων, θεμάτων υποδομής και βιωσιμότητας σε εγκαταστάσεις τού Υπουργείου Εθνικής Αμύνης τού Καναδά.

Όσον αφορά τις επαγγελματικές κοινωνίες, είναι:

- Ο Καναδικός Εκπρόσωπος του International Association for Engineering Geology and the Environment (IAEG)
- Ο Πρόεδρος του Τμήματος Μηχανικής Γεωλογίας του Canadian Geotechnical Society (CGS)
- Εκτελεστικό Μέλος του Καναδικού Ιδρύματος Γεωτεχνικής (CFG)
- Εκτελεστικό Μέλος της Canadian Federation of Earth Sciences (CFEG)
- Συμ-πρόεδρος, C4 (Εκπαίδευση) Επιτροπή IAEG

Ιστοσελίδα: https://nicholasvlachopoulos.ca/index.html

Ελληνικός Σύνδεσμος Γεωσυνθετικών Υλικών

Ανακοίνωση - Πρόσκληση σε Γενική Συνέλευση

Ο "Ελληνικός Σύνδεσμος Γεωσυνθετικών Υλικών" πραγματοποιεί την Τακτική, Εκλογική Γενική Συνέλευση στην Αίθουσα Εκδηλώσεων του Τεχνικού Επιμελητηρίου Ελλάδας ΤΕΕ, επί της οδού Νίκης 4, 1ος όροφος.

1η Ημερομηνία: Παρασκευή 15 Μαρτίου 2019, από ώρα 17:30 έως ώρα 19:30

2η Επαναληπτική Ημερομηνία, στην περίπτωση που δε θα υπάρξει απαρτία στην 1η ημερομηνία:

Παρασκευή 29 Μαρτίου 2019, από ώρα 17:30 έως ώρα 19:30

Τα θέματα της Γενικής Συνέλευσης είναι:

- Εγγραφές Νέων Μελών
- Πεπραγμένα - Οικονομικός Απολογισμός
- Δραστηριότητες Ελληνικού και Διεθνών Συνδέσμων Γεωσυνθετικών Υλικών
- Εκλογή νέου Διοικητικού Συμβουλίου
- Εκλογή Εξελεγκτικής Επιτροπής
- Συμμετοχή στο επόμενο 8ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ, Νοέμβριος 2019. Υποβολή περιλήψεων έως **15 Μαρτίου 2019**. Χρειάζονται 8-10 διαφορετικά άρθρα για να υπάρχει στο συνέδριο ειδική συνεδρία.

Δικαίωμα συμμετοχής και ψήφου στη Γ.Σ. έχουν τα ταμειακώς ενήμερα εγγεγραμμένα μέλη (Καταστατικό, Άρθρο 8, §5).

Στη Γενική Συνέλευση Γ.Σ. βάσει του άρθρου 3, §1 του Καταστατικού θα εξεταστούν και θα τεθούν επίσης προς έγκριση αιτήσεις εγγραφής νέων μελών που θα υποβληθούν έως και προ της έναρξης της Γ.Σ., που εφόσον τακτοποιήσουν στη Γ.Σ. και τις ταμειακές τους υποχρεώσεις (εγγραφή και συνδρομή τρέχοντος έτους) θα αποκτήσουν δικαίωμα συμμετοχής και ψήφου.

Όσοι εκ των Μελών επιθυμούν να συμμετέχουν στις εκλογές, σύμφωνα με το άρθρο 15 του Καταστατικού του Συλλόγου, ως υποψήφιοι για το Διοικητικό Συμβούλιο (Δ.Σ.) ή ως υποψήφιοι για την Εξελεγκτική Επιτροπή (Ε.Ε.), παρακαλούνται να το γνωστοποιήσουν μέσω email, έως και την Πέμπτη 28 Φεβρουαρίου 2019,.

Παράκληση θερμή για την συμμετοχή σας.

Το Δ.Σ. του Ελληνικού Συνδέσμου Γεωσυνθετικών Υλικών περιόδου 2016 - 2019

Πρόεδρος
Αναστάσιος Κολλιός

Αντιπρόεδρος
Γιάννης Φίκιρης

Δημόσιες Σχέσεις
Δημήτριος Ζέκκος

Υπεύθυνος Οικονομικών
Νικόλαος Τσάτσος

Μέλη
Ιωάννης Μάρκου , Χρήστος Στρατάκος

Γραμματέας
Απόστολος Ρίτσος

Εξελεγκτική Επιτροπή: Αλέξανδρος Τσιτόπουλος Μιχαήλ Παχάκης Κωνσταντίνος Γιαλίδης

Επικοινωνία: aritsos@edafomichaniki.gr

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

4th Annual URBAN UNDERGROUND SPACE & TUNNELLING 25th – 27th March 2019, Singapore, http://email.marcusevans-lse.com/files/amf_marcus_evans/project_3935/AS-IF5039_-_Catherine.pdf

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

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

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

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

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

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

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

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

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

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

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

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

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

ΕΓΕ2019 - 15th International Congress of the Geological Society of Greece, 22-24 May 2019, Athens, Greece, www.gsg2019.gr

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

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

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

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

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

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

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

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

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

4ο Πανελλήνιο συνέδριο
ΑΝΤΙΣΕΙΣΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ
ΤΕΧΝΙΚΗΣ ΣΕΙΣΜΟΛΟΓΙΑΣ
Αθήνα 5-7 Σεπτεμβρίου 2019

https://conv.eltam.org

Με αφορμή τη συμπλήρωση 20 ετών από τον καταστροφικό σεισμό της Αθήνας του 1999 το Ελληνικό Τμήμα Αντισεισμικής Μηχανικής και το Τεχνικό Επιμελητήριο Ελλάδας συνδιοργανώνουν το 4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας. Σκοπός του Συνεδρίου είναι να φέρει κοντά την επιστημονική και επαγγελματική κοινότητα των Ελλήνων μηχανικών και σεισμολόγων και να παρουσιάσει την πρόοδο που έχει επιτελεστεί την τελευταία εικοσαετία στην αποτίμηση και απομείωση του σεισμικού κινδύνου στην χώρα μας. Το Συνέδριο θα πραγματοποιηθεί στις εγκαταστάσεις της Hellexpo στο Μαρούσι μεταξύ 5-7 Σεπτεμβρίου 2019 και θα αποτελέσει μια πλατφόρμα ουσιαστικής ανταλλαγής απόψεων, γνώσεων και εμπειριών για την αποτελεσματική, εκ μέρους της Πολιτείας, διαχείριση του κρίσιμου ζητήματος της Αντισεισμικής Προστασίας.

Θεματικές Ενότητες

- Αντισεισμική Ανάλυση και Σχεδιασμός Κτιρίων από Ο/Σ
- Αντισεισμική Ανάλυση και Σχεδιασμός Μεταλλικών Κτιρίων
- Αντισεισμική Ανάλυση και Σχεδιασμός Κτιρίων από Τοιχοποιία
- Αντισεισμική Ανάλυση και Σχεδιασμός Γεφυρών
- Αντισεισμική Προστασία Μνημείων και Ιστορικών Κατασκευών
- Ευρωκώδικας 8 - Σύγχρονοι Κανονισμοί Σχεδιασμού, Αποτίμησης και Ενίσχυσης Κατασκευών
- Προσεισμικός Έλεγχος Δημοσίων Κτιρίων και Κρίσιμων Κατασκευών
- Αντισεισμική Θωράκιση και Αναταξιμότητα Δικτύων και Υποδομών
- Νέες Τεχνολογίες Σεισμικής Αναβάθμισης με βάση την Επιτελεστικότητα
- Επισκευές Βλαβών από σεισμούς
- Σεισμική Μόνωση Κατασκευών – Καινοτόμες Μέθοδοι αναβάθμισης της Σεισμικής Επίδοσης
- Ενοργάνωση Κατασκευών και δίκτυα Καταγραφής της Ισχυρής Σεισμικής Κίνησης
- Σύγχρονες Αριθμητικές Μέθοδοι Ανάλυσης Σεισμικής Συμπεριφοράς Κατασκευών – Υπολογιστικές Μέθοδοι Υψηλής Επίδοσης
- Πειραματική Σεισμική Μηχανική
- Μηχανική / Ανακυκλιζόμενη Συμπεριφορά Δομικών Υλικών – Νέα Υλικά
- Γεωτεχνική Σεισμική Μηχανική
- Αλληλεπίδραση Εδάφους – Κατασκευής. Εδαφική Απόκριση.
- Τεχνική Σεισμολογία
- Αποτίμηση Σεισμικής Επικινδυνότητας
- Σύνθεση, επιλογή, αναγωγή και ενόργανη καταγραφή σεισμικών κινήσεων
- Μέθοδοι Αποτίμησης και Στρατηγική Διαχείρισης Σεισμικής Διακινδύνευσης
- Μετασεισμική Διαχείριση Κρίσεων
- Εκπαίδευση Μηχανικών και ευαισθητοποίηση Πολιτείας σε θέματα Αντισεισμικής Προστασίας
- Θεσμικό Πλαίσιο Ενεργειακής Απόδοσης Κτιρίων και Αντισεισμική Προστασία
- Εμπειρίες από πρόσφατους Σεισμούς της τελευταίας πενταετίας στην Ελλάδα και το Εξωτερικό (πλην Αθηνών, 1999)
- Ειδική Ημερίδα για τον Σεισμό της Αθήνας (1999)

ΔΙΟΡΓΑΝΩΣΗ

ΕΤΑΜ ΤΕΕ ΤΕΧΝΙΚΟ ΕΠΙΜΕΛΗΤΗΡΙΟ ΕΛΛΑΔΑΣ

ΕΠΙΚΟΙΝΩΝΙΑ

Γραμματεία του Συνεδρίου
4psamts@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

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

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

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

4^{ο} 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 07-09 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, 21 - 25 October 2019, Taipei, China www.16arc.org

6 – 8 Νοεμβρίου 2019, Αθήνα, Ελλάς
www.8hcge2019.gr

Τα τελευταία 30 χρόνια η ανάπτυξη της γεωτεχνικής μηχανικής στην Ελλάδα υπήρξε αλματώδης, χάρη στην ανεπανάληπτη ανάπτυξη και κατασκευή έργων υποδομής. Αν και με την πολύχρονη οικονομική κρίση η δραστηριότητα του μηχανικού στην Ελλάδα, δυστυχώς, μειώθηκε δραματικά, πιστεύουμε ότι η σημαντική δράση Ελλήνων γεωτεχνικών εκτός χώρας ή σε διεθνή έργα, αλλά και η συνεχιζόμενη, με μικρή μόνον μείωση, ερευνητική δραστηριότητα στα Πανεπιστήμια μας (χάρη κυρίως σε ευρωπαϊκή χρηματοδότηση), έχουν διατηρήσει το επίπεδο της ελληνικής γεωτεχνικής υψηλό. Αυτό ελπίζουμε ότι θα επιβεβαιωθεί στο 8ο Συνέδριό μας τον ερχόμενο Νοέμβριο.

Εκ μέρους της ΕΕΕΕΓΜ σας καλώ λοιπόν να το διαπιστώσουμε ιδίοις όμασιν! Στο 8ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής, στην Αθήνα, 6 – 8 Νοεμβρίου 2019.

Γιώργος Γκαζέτας
Πρόεδρος της ΕΕΕΕΓΜ

Θεματικές Ενότητες

- Συμπεριφορά Εδαφών: Έρευνες Υπαίθρου και Εργαστηρίου
- Συμπεριφορά Εδαφών: Προσομοιώματα
- Επιφανειακές και Βαθειές Θεμελιώσεις
- Αλληλεπίδραση εδάφους - κατασκευής
- Βαθειές εκσκαφές-Αντιστηρίξεις
- Ευστάθεια πρανών-Κατολισθήσεις
- Σήραγγες και Υπόγεια Έργα
- Εδαφοδυναμική
- Τεχνική Σεισμολογία
- Βραχομηχανική
- Βελτιώσεις εδαφών
- Φράγματα
- Άοπλα επιχώματα
- Οπλισμένα επιχώματα
- Εφαρμογές γεωσυνθετικών υλικών
- Οδοστρώματα
- Ευρωκώδικες
- Περιβαλλοντική γεωτεχνική
- Ενεργειακή γεωτεχνική
- Πολιτιστική κληρονομιά και γεωτεχνική μηχανική
- Διδασκαλία και μάθηση γεωτεχνικής μηχανικής
- Θέματα γεωτεχνικής μηχανικής στην Κύπρο
- Μη κορεσμένα και διογκώσιμα εδάφη

Οργάνωση

ΕΕΕΕΓΜ – Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
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Γραμματεία Συνεδρίου

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Κολοφώντος 1 & Ευριδίκης, 161 21 Αθήνα
Τηλ.: 210 74 14 700 | Fax: 210 72 57 532
Email: info@8hcge2019.gr
Website: www.erasmus.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

Chinese National Committee on Large Dams (CHINCOLD) and Spanish National Committee on Large Dams (SPANCOLD) have the honor to invite professionals to the 8th International Symposium on Roller Compacted Concrete (RCC) Dams, which will be held on Nov. 11th-12th , 2019 in Kunming City, China, together with the CHINCOLD 2019 Annual Meeting.

RCC dams have the virtues of saving a great deal of concrete, building quickly, making project cost down and early bringing into playing project advantages and so on. Hence, the technique of constructing dams has been quickly spread and applied since it came out. Today there are more than 400 RCC dams in more than 40 countries. Great successful experiences and advanced technologies have been achieved. CHINCOLD and SPANCOLD have devoted to promote the technology from early 1990's. The first Symposium on RCC dams was jointly organized by the two committees in 1991 in Beijing China, which was a success start of the series of RCC Symposiums.

Following those successful and fruitful Symposiums held in Beijing (China) in 1991, Santander (Spain) in 1995, Chengdu (China) in 1999, Madrid (Spain) in 2003, Zaragoza (Spain) in 2012 and Chengdu (China) in 2015, the coming one jointly organized by CHINCOLD and SPANCOLD, will continue to contribute significantly to the knowledge and application of RCC technology with a wide range of contents and international scope. The Symposium will serve as a perfect venue for practitioners, engineers, researchers, scientists, managers and decision makers from all over the world to exchange ideas and technology about the latest developments dealing with RCC dams.

Beside international best practice, the participants will also have the occasion to visit some famous RCC dams in China in operation or under construction, such as Huangdeng RCC Gravity Dam (H=203m), Jin'anqiao RCC Gravity Dam (H=160m), Dachaoshan RCC Gravity Dam (H=115m), Dahuaqiao RCC Gravity Dam (H=107m) and etc. Also a technical exhibition for enterprises related to hydropower and dams will be held during the Symposium.

TOPICS

- Materials and mixture proportions
- Planning and design
- Construction and quality control
- Performance and monitoring
- RCC dams on non-rock foundation
- Rehabilitation of RCC dams and upgrading of old dams with RCC
- Design, Construction and Performance of Cemented Material Dams (CMD)
- Technological innovations and new trends
- Other uses of RCC and cemented materials in dam construction and hydraulic structures

CORRESPONDENCE ADDRESS

Pre-registration forms, abstracts and correspondence concerning on the 8th international Symposium on RCC dams could be sent to Secretariat as the following,

Dr. Aili Li
Secretariat of RCC 2019
Chinese National Committee on Large Dams
Room 1266, IWHR Building A, A1 Fuxing Rd., Beijing 100038, P.R. China
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Fax: +86-10-68712208
Email: chincold-en@vip.126.com
Website: http://www.chincold.org.cn

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

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

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

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

cs ꙍ

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

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

cs ꙍ

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

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

cs ꙍ

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

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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

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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

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
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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
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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
07-09-2020 ÷ 11-09-2020, Budapest, Hungary
www.isc6-budapest.com

Organizer: Hungarian Geotechnical Society
Contact person: Tamas Huszak
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Website: http://www.isc6-budapest.com
Email: info@isc6-budapest.com

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

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

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

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

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

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

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

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

200 tons of TNT blasts largest landslide dam in recent years, Russia

Following three weeks of preparation under -30 °C (-22 °F) and strong ice winds, Russian military finally blew up a huge natural dam in the remote Russian region of Khabarovsk. The dam was created on the Bureya River mid-December 2018 after a 'large and unusual' landslide. This is the largest landslide event in Russia in recent years. There are speculations it was caused by a meteorite impact but scientists concluded the cause was a rockslope failure.

Some 34 million m^3 (1 200 698 668 $feet^3$) of rocks suddenly fell into the river sometime around December 11, 2018, completely blocking the river and forcing authorities to issue evacuation orders for downstream villages.

Some 520 military personnel built 80 km (50 miles) of roads to access the site and used more than 200 tons of TNT and 12 km (7.4 miles) of Bickford fuse to blast a hole in the dam.

The new channel they created is 200 m (650 feet) long, 35 m (115 feet) wide and 20 m (65 feet) deep.

Russian scientists say a 50 m (164 feet) high river tsunami swept along the river after the landslide. Since this is a remote region, there were no reports of it at the time.

The event took place at 50.559, 131.472, some 75 km (46 miles) from the village of Chekunds, where river level was observed rising a few centimeters each day.

Hunters who first reached the site said they were alerted by a sudden and inexplicable change in the flow of the river. They reported 'hot rocks' on which they could warm their hands, sparking the meteor impact theory.

(THE WATCHERS, February 7, 2019, https://watchers.news/2019/02/07/200-tons-of-tnt-blasts-largest-landslide-dam-in-recent-years-russia/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+adorraeli%2FtsEq+%28The+Watchers+-+watching+the+world+evolve+and+transform%29)

Το άρθρο για την κατολίσθηση παρουσιάσθηκε στο προηγούμενο τεύχος του περιοδικού

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Deadly earthquake traveled at 'supersonic' speeds—why that matters

A powerful earthquake struck the island of Sulawesi in Indonesia in September 2018, triggering a tsunami and killing thousands of people. Now, research suggests the earthquake was a rare breed of temblor known as supershear (The monuments of the Pancha Rathas complex in southern India were hewn from single slabs of granite 1,300 years ago. Stone versions of earlier wooden temples, these structures were never consecrated)

A powerful temblor in Indonesia offered a detailed look at supershear, a phenomenon that can create the geologic version of a sonic boom.

When the earthquake struck on September 28, 2018, Indonesia's Sulawesi island flowed like water. Currents of mud swallowed anything in their paths, sweeping away entire sections of the city of Palu and crosscutting the region's neat patchwork of crop fields. Minutes after the shaking began, locals were caught unaware by a wall of water that crashed onshore with devastating results.

As the sun set that evening, thousands were missing. Within days, the smell of corpses permeated the air. The 7.5-magnitude event was 2018's deadliest quake, killing more than 2,000 people.

In the efforts to understand how this fatal series of events clicked into place, much attention has focused on the surprise tsunami. But a pair of new studies [(*)], published February 4 in *Nature Geoscience*, tackles another remarkable aspect: The earthquake itself was likely an unusual and incredibly fast breed of temblor known as supershear.

The Palu quake cracked through the earth at nearly 9,200 miles an hour—fast enough to get from LA to New York City in a mere 16 minutes. Such a fast rupture causes earthquake waves to pile up in what's known as a Mach front, similar to the pressure wave from a plane traveling at supersonic speed. This concentrated cone of waves can amplify the quake's destructive power.

“It's like a sonic boom in an earthquake,” says Wendy Bohon, an earthquake geologist at the Incorporated Research Institutions for Seismology (IRIS).

While it's not yet possible to say for sure if the supershear speed intensified the Indonesia quake's landslides, liquefaction, or tsunami, the pair of new studies does offer a rare look at this little-understood and potentially deadly phenomenon.

“We have observed only a handful of supershear earthquakes, and even fewer with this level of detail,” says seismologist Jean-Paul Ampuero of the Université Côte d'Azur in France, a coauthor of one of the studies.

“This is going to tell us something fundamental about the way the Earth works,” says Bohon, who was not involved in either study. “And it has the potential to actually save lives and help us inform people in a better way.”

Unzipping the Earth

During an earthquake, the entire length of a fracture doesn't break all at once. Rather, it unzips the planet's surface at a rate known as the rupture speed.

Stephen Hicks, a seismologist at the University of Southampton, explains the phenomenon by grabbing a colorful flier sitting on a table at the American Geophysical Union Fall Meeting in Washington, D.C. He makes a tiny tear on one side, and says: “Imagine that's your nucleation,” or the start of a rupture on a fault. The rupture speed is how fast that point moves through time, he says, and with a sharp jerk, he rips the flier in two.

It's this speed that caught geologists' attention with the Indonesia event. To take a closer look, Ampuero and his colleagues harnessed the power of the growing global network of seismic stations, which detect the echoes of earthquakes from hundreds of miles away. From that network, they collected data from 51 locations across Australia.

By studying the arrival of earthquake waves at each station, the team recreated the racing rupture. It's similar to how your brain figures out where a sound is coming from, Ampuero explains. If someone is talking to you from the right, the noise arrives at your right ear a fraction of a second before your left. Your brain then uses that delay to locate the speaker.

“What we're doing is the same, [but] instead of using only two ears we're using hundreds of ears,” he says. “Each ear is one seismometer on the ground.”

This revealed that the temblor broke so fast that the rupture speed overtook a type of radiating waves known as shear waves, thus the term “supershear.” Over roughly 36 seconds, the quake cracked southward through some 93 miles of Earth's surface.

“That is the ground breaking that fast, which is pretty amazing,” marvels Hicks, who wasn't involved in the research.

Earthquake superhighway

A second team took a closer look at changes to the surface after the temblor ripped through, using data and imaging from satellites before and after the event.

“We were immediately struck by the sharpness of the rupture at the surface south of the city of Palu and by the great amount of displacement in this area,” study coauthor Anne Socquet, of the Université Grenoble Alpes in France, writes in an email.

This analysis suggests that the land largely shifted horizontally, and that the change was massive: The ground offset by 16.4 feet at its maximum point south of Palu City. The shift was so large, it was easily seen in images of the region post-quake. Roads were offset; buildings seemingly cut in two.

"This is definitely huge for a [magnitude] 7.5 earthquake," Socquet says. "And this is likely enhanced by the fact that this earthquake was supershear." It didn't happen just at the surface, either, but also as deep as roughly three miles underground.

In the southern stretches of the fault, an important feature behind this rapid speed and the deep shift is what Socquet calls its "maturity." Tectonics have tested this break time and time again, continually shoving the blocks of Earth side by side and carving the fault into a fairly continuous, smooth, straight break—features previously associated with other examples of super-fast ruptures.

Anatomy of supershear

Yet even within this category of rare events, the Palu quake may stand apart. Most supershear earthquakes actually travel even faster than the one in Palu, cruising along almost as fast as another type of earthquake wave known as a pressure wave. These commonly zoom by around 11,200 miles an hour. But Ampuero and his colleagues found that while the Indonesia quake was fast enough to be supershear, it didn't hit this top speed.

"It's extremely rare to see events in this intermediate range," he says.

Ampuero and his colleagues believe the discrepancy is due to the fact that earthquake models, including the one used in this work, commonly assume that the rocks surrounding a fault are one intact unit. But that's not always the case in the real world, where zones of fractures around the break can slow the speeds of a quake's associated waves through the surface.

If true for Sulawesi, this would mean the quake's pressure waves could have moved about as fast as its rupture speed, as is expected for supershear ruptures. The quake was still weirdly slow for supershear, but at least its waves and rupture would have moved at the right relative speeds. However, the scientists won't know for sure that this was the case without more study in the region.

That's not the only thing unusual about the event. September's earthquake also seemed largely undeterred by two major bends in the fault. Zigs and zags along the rupturing fault usually slow earthquakes, like cars on a winding road, but not this one. And unlike most supershear breaks, which need a little warmup, the Palu temblor seemed to hit its galloping pace early on.

"This earthquake is like a Lamborghini," Bohon says. "It goes from zero to 60 in no time."

This behavior raises even more questions. Could the fault be straighter at depth? This would have helped it barrel through bends higher up, Ampuero notes. Did smaller foreshocks supercharge the big quake? This could have sent it galloping out of the gates. But this early speed could also have to do with the roughness of the fault, which could stick the sides together like the rough sides of sandpaper and cause the ground to break with extra oomph.

More to come?

These unusual features make this earthquake all the more valuable, since they can help researchers better understand both where and how super-fast quakes can happen. The scientists who reviewed the work all stressed the significance of this information for future modeling and hazard assessments not just in Indonesia, but around the globe.

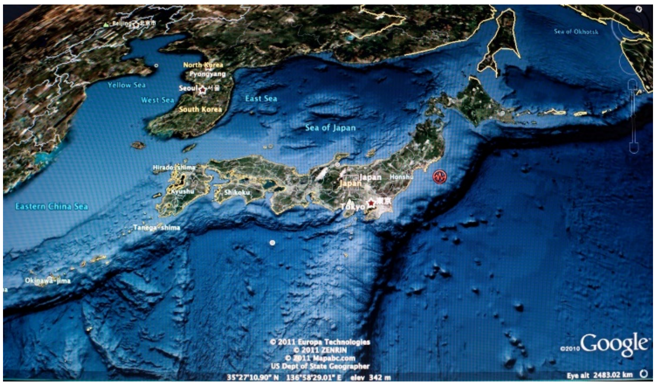
"What happened here could likely happen on other faults, especially major plate-boundary faults," says Eric Dunham, a geophysicist at Stanford University.

"This type of fault is the same one we can find in California, Northern Turkey, Northern Aegean, the Dead Sea fault zone, Central Asia," says earthquake geologist Sotiris Valkaniotis, who was not involved in the new studies. "The detections from this earthquake apply worldwide."

(Maya Wei-Haas / NATIONAL GEOGRAPHIC, February 4, 2019, https://www.nationalgeographic.com/science/2019/02/deadly-earthquake-supersonic-supershear-speed-indonesia/?cmpid=org=ngp::mc=crm-email::src=ngp::cmp=editorial::add=Science_20190213::rid=1084349954)

(*) https://www.nature.com/articles/s41561-018-0296-0, https://www.nature.com/articles/s41561-018-0297-z

A Single Earthquake Can Move Millions of Tons of Carbon into Earth's Deepest Trenches



A Google satellite map shows where the 2011 Tohoku earthquake struck off Japan.

In 2011, a magnitude-9.0 earthquake rumbled to life off the coast of Tohoku, Japan, triggering a massive tsunami and killing more than 15,000 people.

The global effects of the Tohoku earthquake — now regarded as the fourth most powerful since recording began in 1900 — are still being studied. Scientists have since estimated that the quake shoved the main island of Japan 8 feet (2.4 meters) to the east, knocked the Earth as many as 10 inches (25 cm) off its axis and shortened the day by a few millionths of a second, NASA reported in 2011. But for Arata Kioka, a geologist at the University of Innsbruck in Austria, the most interesting and mysterious effects of the quake can't be seen with a satellite; they can be measured only in the deepest chasms of Earth's oceans.

In a new study published Feb. 7 in the journal Scientific Reports, Kioka and his colleagues visited the Japan Trench — a subduction zone (where one tectonic plate dives beneath another) in the Pacific ocean that plunges more than 26,000 feet (8,000 m) at its deepest point — to determine how much organic matter had been dumped there by the history-making quake. The answer: A lot. The team found that roughly one teragram — or 1 million tons — of carbon had been dumped into the trench following the Tohoku earthquake and subsequent aftershocks.

"This was much more than we were expecting," Kioka told Live Science.

Earth's deepest places

The huge quantity of carbon relocated by earthquakes may play a key role in the global carbon cycle — the slow, natural processes by which carbon cycles through the atmosphere, the ocean and all living things on Earth. But, Kioka said, research on this topic has been lacking.

Part of that might be because it involves visiting the deepest places on Earth. The Japan Trench is part of the hadal zone (named for Hades, the Greek god of the underworld), which includes places lurking more than 3.7 miles (6 kilometers) below the ocean's surface.

"The hadal zone only occupies 2 percent of the total surface area of the seafloor," Kioka told Live Science. "It's probably less explored than even the moon or Mars."

On a series of missions funded by several international science institutions, Kioka and his colleagues cruised over the Japan Trench six times between 2012 and 2016. During these cruises, the team used two different sonar systems to create a high-resolution map of the depths of the trench. This allowed them to estimate how much new sediment had been added to trench's floor over time.

To see how the chemical contents of that sediment had changed since the 2011 quake, the team dug up several long sediment cores from the bottom of the trench. Measuring up to 32 feet (10 meters) long, each of these cores served as a sort of geologic layer cake that showed how sundry bits of matter from land and sea piled onto the bottom of the trench.

Several meters of sediment appeared to have been dumped into the trench in 2011, Kioka said. When the team analyzed these sediment samples at a lab in Germany, they were able to calculate the amount of carbon in each core. They estimated that the total amount of carbon added across the entire trench was up to a million tons.

That's a lot of carbon. For comparison, about 4 million tons of carbon are delivered to the sea annually from the Himalaya mountains via the Ganges-Brahmaputra rivers, Kioka and his colleagues wrote in their study. For a quarter of that amount to end up in the Japan Trench following a single seismic event underscores the mysterious power earthquakes hold in the global carbon cycle.

How, exactly, carbon dumped into Earth's deepest places figures into the broader cycle is still uncertain. However, Kioka said, subduction zones like the Japan Trench might give carbon sediments a relatively quick path into the Earth's interior, where they may eventually be released into the atmosphere as carbon dioxide during volcanic eruptions. Further research is needed, and a planned 2020 expedition to collect even longer core samples from the trench may fill in some historical details going back hundreds or thousands of years.

(Brandon Specktor, Senior Writer / LIVESCIENCE, February 18, 2019, https://www.livescience.com/64795-deep-carbon-earthquakes.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190218-ls)

Megathrust earthquake drives drastic organic carbon supply to the hadal trench

A. Kioka, T. Schwestermann, J. Moernaut, K. Ikehara, T. Kanamatsu, C. M. McHugh, C. dos Santos Ferreira, G. Wiemer, N. Haghipour, A. J. Kopf, T. I. Eglinton & M. Strasser

Scientific Reports, **Volume 9**, Article number: 1553 (2019)

Abstract

The giant 2011 Tohoku-oki earthquake has been inferred to remobilise fine-grained, young surface sediment enriched in organic matter from the slope into the >7 km deep Japan Trench. Yet, this hypothesis and assessment of its significance for the carbon cycle has been hindered by limited data density and resolution in the hadal zone. Here we combine new high-resolution bathymetry data with sub-bottom profiler images and sediment cores taken during 2012–2016 in order to map for the first time the spatial extent of the earthquake-triggered event deposit along the hadal Japan Trench. We quantify a sediment volume of ~0.2 km^3 deposited from spatially-widespread remobilisation of young surficial seafloor slope sediments triggered by the 2011 earthquake and its aftershock sequence. The mapped volume and organic carbon content in sediment cores encompassing the 2011 event reveals that this single tectonic event delivered >1 Tg of organic carbon to the hadal trench. This carbon supply is comparable to high carbon fluxes described for other Earth system processes, shedding new light on the impact of large earthquakes on long-term carbon cycling in the deep-sea.

(https://www.nature.com/articles/s41598-019-38834-x)

Earthquakes can systematically trigger other ones on opposite side of Earth

Earthquake mangled track

New research shows that a big earthquake can not only cause other quakes, but large ones, and on the opposite side of the Earth.

The findings, published today in Scientific Reports, are an important step toward improved short-term earthquake forecasting and risk assessment.

Scientists at Oregon State University looked at 44 years of seismic data and found clear evidence that tremblors of magnitude 6.5 or larger trigger other quakes of magnitude 5.0 or larger.

It had been thought that aftershocks — smaller magnitude quakes that occur in the same region as the initial quake as the surrounding crust adjusts after the fault perturbation — were the only seismic activity an earthquake could lead to.

But the OSU analysis of seismic data from 1973 through 2016 — an analysis that excluded data from aftershock zones — provided the first discernible evidence that in the three days following one large quake, other earthquakes were more likely to occur.

Each test case in the study represented a single three-day window "injected" with a large-magnitude (6.5 or greater) earthquake suspected of inducing other quakes, and accompanying each case was a control group of 5,355 three-day periods that didn't have the quake injection.

"The test cases showed a clearly detectable increase over background rates," said the study's corresponding author, Robert O'Malley, a researcher in the OSU College of Agricultural Sciences. "Earthquakes are part of a cycle of tectonic stress buildup and release. As fault zones near the end of this seismic cycle, tipping points may be reached and triggering can occur."

The higher the magnitude, the more likely a quake is to trigger another quake. Higher-magnitude quakes, which have been happening with more frequency in recent years, also seem to be triggered more often than lower-magnitude ones.

A tremblor is most likely to induce another quake within 30 degrees of the original quake's antipode — the point directly opposite it on the other side of the globe.

"The understanding of the mechanics of how one earthquake could initiate another while being widely separated in distance and time is still largely speculative," O'Malley said. "But irrespective of the specific mechanics involved, evidence shows that triggering does take place, followed by a period of quiescence and recharge."

Earthquake magnitude is measured on a logarithmic 1-10 scale — each whole number represents a 10-fold increase in measured amplitude, and a 31-fold increase in released energy.

The largest recorded earthquake was a 1960 temblor in Chile that measured 9.5. The 2011 quake that ravaged the Fukushima nuclear power plant in Japan measured 6.6.

In 1700, an approximate magnitude 9.0 earthquake hit the Cascadia Subduction Zone — a fault that stretches along the West Coast of North American from British Columbia to California.

Collaborating with O'Malley were Michael Behrenfeld of the College of Agricultural Sciences, Debashis Mondal of the College of Science and Chris Goldfinger of the College of Earth, Ocean and Atmospheric Sciences.

Reference

Robert T. O'Malley, Debashis Mondal, Chris Goldfinger, Michael J. Behrenfeld. Evidence of Systematic Triggering at Teleseismic Distances Following Large Earthquakes. Scientific Reports, 2018; 8 (1) DOI: 10.1038/s41598-018-30019-2

Note: The above post is reprinted from materials provided by Oregon State University. Original written by Steve Lundeberg.

(August 2, 2018, http://www.geologypage.com/2018/08/earthquakes-can-systematically-trigger-other-ones-on-opposite-side-of-earth.html#ixzz5eXbSQEXg)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Mount Everest is NOT the Tallest Mountain in the World

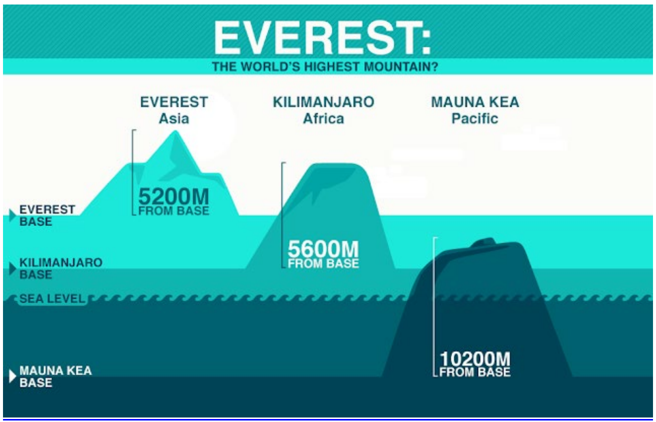
Mauna Kea Volcano, Hawaii.

The world's tallest mountain technically is not Mount Everest.

Mount Everest is the tallest mountain above sea level, but if we're talking sheer height here, base to summit, then the tallest mountain is **Mauna Kea** on the island of Hawaii.

The secret of Everest's height is not found at the summit but deep underground. Because of how it was formed it sits on higher ground.

Fifty million years ago, India's continental plate crashed into Asia – the biggest collision on Earth in the last 400 million years. The collision was so violent that India's plate did not just crumple, it pushed under Asia – raising the land mass high into the sky.



Everest stands 29,035 feet above sea level. Mauna Kea only stands 13,796 feet above sea level, but the mountain extends about 19,700 feet below the Pacific Ocean. Over half of it is submerged.

That puts the total height of **Mauna Kea at about 33,500 feet** — nearly a mile taller than Everest.

Mauna Kea is actually an inactive volcano on the big island of Hawaii. It is about a million years old, created when the Pacific tectonic plate moved over the Hawaiian hotspot — a plume of liquid magma from deep inside Earth. It last erupted about 4,600 years ago.

(Geology, http://www.geologyin.com/2017/07/mount-everest-is-not-tallest-mountain.html)

Scientists Crack Mystery of How Fossil Concretions Form

Moeraki boulders: Gigantic concretions formed in mudstone on New Zealand's Moeraki coast; about 50 million years old. The present research shows that even concretions of this size formed very rapidly, within several decades.

All over the world, spectacular fossils have frequently been found preserved inside solid, roughly spherical rocks called "concretions." From geologists to casual observers, many have wondered why these hardened masses of carbonate formed around dead organisms, with round shapes and sharp boundaries with the surrounding material, typically in marine mud and mudstone.

Several important questions regarding concretions have long puzzled scientists. What conditions cause them to form? How long do they take to grow? Why do they stop growing? Why are they so distinct from the surrounding rock or sediments?

Now, researchers led by Nagoya University have developed a method to analyze concretions using L-shaped "cross-plot diagrams" of diffusion and growth rate, reported in a new study published in Scientific Reports. With this method, they analyzed dozens of concretions from three sites across Japan and compared them with concretions from England and New Zealand.

The results of this new study dramatically impact understanding of the rate at which concretions form. "Until now, the formation of spherical carbonate concretions was thought to take hundreds of thousands to millions of years," co-author Koshi Yamamoto says.

"However, our results show that concretions grow at a very fast rate over several months to several years." This rapid sealing mechanism could explain why some concretions contain well-preserved fossils of soft tissues that are rarely fossilized under other conditions.

Study first author Hidekazu Yoshida explains, "The concretions maintained their characteristics, with well-preserved fossils at their centers or textures indicative of the original presence of organic matter. Simple mass balance calculations also demonstrate that the carbon fixed in the carbonate concretions came predominantly from the organs of organisms inside the concretions."

All of the studied concretions were composed of calcite, with relatively consistent compositions throughout, distinct from the surrounding muddy matrix. Fine-grained, generally clay-rich sediments were found to be important to limit diffusion and permeability, and to slow the migration of solutes. Thus, bicarbonate concentrations would rise high enough at a reaction front to cause rapid precipitation of calcium carbonate, with sharp boundaries from the surrounding mud.

This new unified model for the creation of spherical concretions, which can be generalized by simple formulas, can be applied to interpret concretions from all over the world. In addition to advancing our knowledge of this important preservation mechanism in the fossil record, this improved understanding of the rapid precipitation of calcite due to the presence of organic material may have practical applications in the field of sealing technology.

Read more at
http://www.geologyin.com/2018/05/researchers-resolve-formation-mechanism.html#A1X7xxifQXY4Dj6I.99

Earth Once Swallowed Its Own Superocean. Could It Happen Again?

Around 320 million years ago, the supercontinent Pangea formed.

The ancient supercontinent of Rodinia turned inside out as the Earth swallowed its own ocean some 700 million years ago, new research suggests.

Rodinia was a supercontinent that preceded the more famous **Pangea**, which existed between 320 million and 170 million years ago. In a new study, scientists led by Zheng-Xiang Li of Curtin University in Perth, Australia, argue that supercontinents and their superoceans form and break up in alternating cycles that sometimes preserve the ocean crust and sometimes recycle it back into Earth's interior.

"We suggest that the Earth's mantle structure only gets completely reorganised every second supercontinent [or every other cycle] through the regeneration of a new superocean and a new ring of fire," Li wrote in an email to Live Science. The "Ring of Fire" is a chain of subduction zones around the Pacific, where the crust of the ocean grinds underneath the continents. Volcanoes and earthquakes are frequent around the Ring of Fire, lending it its name.

Deep history

The history of supercontinents is a bit murky, but geoscientists are increasingly convinced that the continents merge into one giant landmass every 600 million years, on average. First came Nuna, which existed between 1.6 billion and 1.4 billion years ago. Then Nuna broke apart, only to coalesce as Rodinia about 900 million years ago. Rodinia broke up 700 million years ago. Then, around 320 million years ago, Pangea formed.

A rare view of the divide between two continental plates is visible at Thingvellir National Park in Iceland. This chasm divides the Eurasian continent from the North American continent.

There are patterns in the circulation of the mantle (the layer beneath Earth's crust) that seem to match nicely with this 600 million-year cycle, Li said. But some mineral and gold deposits and geochemical signatures in ancient rock reoccur in a longer cycle — one that's closer to a billion years. In a new paper in the April issue of the journal Precambrian Research and just published online, Li and his colleagues argue that the Earth actually has two concurrent cycles running: a 600 million-year-long supercontinent cycle and a billion-year-long superocean cycle. Each supercontinent breaks up and reforms by two alternating methods, the researchers hypothesize.

An alternating pattern?

The two methods are called "introversion" and "extroversion." To understand introversion, imagine a supercontinent surrounded by a single superocean. The continent begins to split into pieces separated by a new, internal ocean. Then, for whatever reason, subduction processes begin in this new, internal ocean. At these fiery spots, oceanic crust dives back into Earth's hot mantle. The internal ocean is chewed back into the planet's interior. The continents come back together again. Voilà — a new supercontinent, surrounded by the same old superocean that was there before.

Extroversion, on the other hand, creates both a new continent and a new superocean. In this case, a supercontinent rifts apart, creating that internal ocean. But this time, the subduction occurs not in the internal ocean, but in the superocean surrounding the rifting supercontinent. The Earth swallows the superocean, dragging the rifting continental crust clear around the globe. The supercontinent essentially turns inside out: Its former coastlines smash together to form its new middle, and its torn-apart middle is now the coast. Meanwhile, the once-interior ocean is now a brand-new superocean surrounding the new supercontinent.

Li and his colleagues used modeling to argue that over the past 2 billion years, introversion and extroversion have alternated. In this scenario, the supercontinent Nuna broke apart and then formed Rodinia via introversion. Nuna's superocean thus survived to become Rodinia's superocean, which scientists have dubbed Mirovoi. Nuna and Rodinia had similar configurations, Li said, which bolsters the notion that Nuna simply broke apart and then came back together again.

But then, the oceanic crust of Mirovoi began to subduct. Rodinia pulled apart as its superocean disappeared. It slammed back together on the other side of the planet as Pangea. The new ocean that formed as Rodinia rifted, and then it became Pangea's superocean, known as Panthalassa.

Earth's future

Pangea, of course, rifted apart to become the continents we know today. Panthalassa's remnants survive as the Pacific oceanic crust.

The past 2 billion years of history posited in the new research are plausible, said Mark Behn, a geophysicist at Boston College and Woods Hole Oceanographic Institution, who studies Earth's deep history but was not involved in the new research. However, it's hard to know whether the cycles studied represent a true, fundamental pattern.

"You only have three iterations, so you're trying to extrapolate trends out of not very many cycles," Behn said.

If the alternating pattern holds, Li said, the next supercontinent will form by introversion. The internal oceans created by Pangea's rifting — the Atlantic, the Indian and the Southern oceans — will close. The Pacific will expand to become the new continent's single superocean. Scientists call this theoretical future supercontinent Amasia. (At this moment in time, the Pacific is actually shrinking slightly via subduction, but that pattern may or may not continue over hundreds of millions of years.)

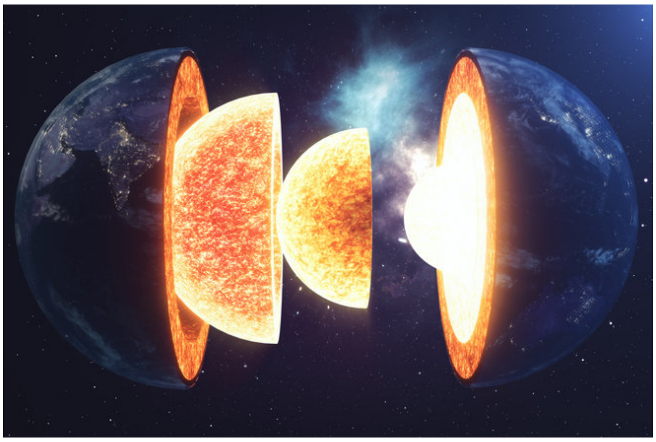
Earth's supercontinent future remains unclear. Models that attempt to combine the movements of Earth's continents with the internal dynamics of the mantle could help determine if the introversion/extroversion assembly methods are realistic, Li said. The methods used by Li and his colleagues, which involved studying molecular variation patterns in ancient rocks, are probably on the right track for tackling these fundamental questions of plate tectonics, Behn said.

Ultimately, Behn said, the question comes down to what drives plate tectonics. No one knows what triggers the start of subduction at a particular place and time, he said. There is even debate about when Earth's plates started sashaying around. Some scientists think plate tectonics began soon after Earth formed. Others think it started 3 billion, 2 billion or a billion years ago.

"The data for these things is just coming of age," Behn said, "and we're only now being able to start pulling the pieces together."

(Stephanie Pappas, Live Science Contributor, LIVESCIENCE, February 7, 2019, https://www.livescience.com/64707-earth-swallowed-superocean.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190210-ls)

Geologists Figured Out Where the Most Remote Part of the Ocean Came From



A Korean icebreaker made its way to one of the most remote parts of the ocean in 2011 and 2013, an area near Antarctica and south of New Zealand. There it dredged up material from the seafloor that revealed a previously unknown region of Earth's molten deeps.

Scientists analyzed a mix of chemical variants called isotopes in seafloor samples from different parts of the planet to figure out what "mantle domain" produced them. Most of the solid stuff on or near Earth's surface was, at some point, part of the planet's hot molten interior. But different parts (or domains) of that interior contain different ratios of various isotopes and thus produce different telltale compositions, or signatures. Scientists studying the material from this faraway part of the ocean, termed the Australian-Antarctic Ridge (AAR), determined that it had a unique chemical signature. This new signature means the samples must have emerged from a domain that was previously unknown.

This 1,200-mile-wide (1,900 kilometers) region was "the last gap" in the geological model of the seafloor, the researchers wrote in a paper published Jan. 28 in the journal Nature Geoscience(*).

Scientists had predicted that the AAR would have a similar isotopic signature to the Pacific, they wrote, suggesting the two seafloor regions emerged from the same part of Earth's mantle — the hot, rocky region later sandwiched between the crust and the core. Instead, it appears to have burst upward separately from its own part of the mantle, likely as part of a major geologic disruption that occurred about 90 million years ago.

That was the end of the period when Earth's landmasses were joined together into the supercontinent Gondwana, with present-day Antarctica at its center. When Gondwana finally broke up, the researchers wrote, a "deep mantle upwelling," which they've dubbed the Zealandia-Antarctic Swell, appears to have pushed its way between the separating continental chunks, forming the relatively shallow seafloor of the AAR.

So that's the last part of the ocean's mantle domain identified. But it likely won't be the end of the discussion of how all this new mantle domain and the already-established ones have interacted throughout Earth's deep prehistory to produce the planet we recognize today.

(Rafi Letzter, Staff Writer / LIVESCIENCE, February 11, 2019, https://www.livescience.com/64737-antarctic-new-mantle-ocean.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190211-ls)

(*) **An isotopically distinct Zealandia–Antarctic mantle domain in the Southern Ocean**

Nature Geoscience, **Volume 12**, pages206–214 (2019), https://www.nature.com/articles/s41561-018-0292-4

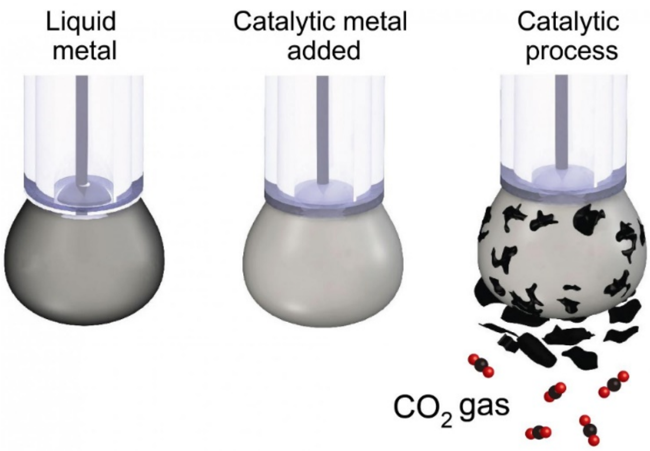
ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Συλλογή Σκουπιδιών στην Ελβετία
(όπως στην Ελλάδα, δηλαδή…)

Versenkt1112.mp4

Liquid metal catalyst solidifies CO2 for safe storage

In what is claimed to be a world first, researchers have used a liquid metal catalyst to turn CO2 back into solid coal, an advance with implications for carbon capture and storage.



Schematic showing how liquid metal is used as a catalyst for converting carbon dioxide into solid coal

Published in *Nature Communications* (*), the research led by RMIT University in Melbourne, Australia is claimed to offer an alternative direction for safely and permanently removing the greenhouse gas from the atmosphere.

Technologies for carbon capture and storage (CCS) involve compressing CO2 into a liquid form, transporting it to a suitable site and injecting it underground but implementation has been hampered by engineering challenges, economic viability and environmental concerns about possible leaks from the storage sites.

RMIT researcher Dr Torben Daeneke said converting CO2 into a solid could be a more sustainable approach.

"While we can't literally turn back time, turning carbon dioxide back into coal and burying it back in the ground is a bit like rewinding the emissions clock," said Daeneke, an Australian Research Council DECRA Fellow.

"To date, CO2 has only been converted into a solid at extremely high temperatures, making it industrially unviable.

"By using liquid metals as a catalyst, we've shown it's possible to turn the gas back into carbon at room temperature, in a process that's efficient and scalable.

"While more research needs to be done, it's a crucial first step to delivering solid storage of carbon."

Lead author, Dr Dorna Esrafilzadeh, a Vice-Chancellor's Research Fellow in RMIT's School of Engineering, developed the electrochemical technique to capture and convert atmospheric CO2 to storable solid carbon.

https://www.youtube.com/watch?v=03gWgCN61F0

To convert CO2, the researchers designed a liquid metal catalyst with specific surface properties that made it extremely efficient at conducting electricity while chemically activating the surface.

According to RMIT, the carbon dioxide is dissolved in a beaker filled with an electrolyte liquid and a small amount of the liquid metal, which is then charged with an electrical current.

The CO2 slowly converts into solid flakes of carbon, which are naturally detached from the liquid metal surface, allowing the continuous production of carbonaceous solid.

"A side benefit of the process is that the carbon can hold electrical charge, becoming a supercapacitor, so it could potentially be used as a component in future vehicles," Esrafilzadeh said. "The process also produces synthetic fuel as a by-product, which could also have industrial applications."

The research was conducted at RMIT's MicroNano Research Facility and the RMIT Microscopy and Microanalysis Facility. The collaboration involved researchers from Germany (University of Munster), China (Nanjing University of Aeronautics and Astronautics), the US (North Carolina State University) and Australia (UNSW, University of Wollongong, Monash University, QUT).

(theENGINEER, 27th February 2019, https://www.theengineer.co.uk/liquid-metal-catalyst-co2/?cmpid=tenews_7529885&utm_medium=email&utm_source=newsletter&utm_campaign=tenews&adg=25D5594B-61A5-4477-9BBF-F97F87829407)

(*) Room temperature CO_2 reduction to solid carbon species on liquid metals featuring atomically thin ceria interfaces

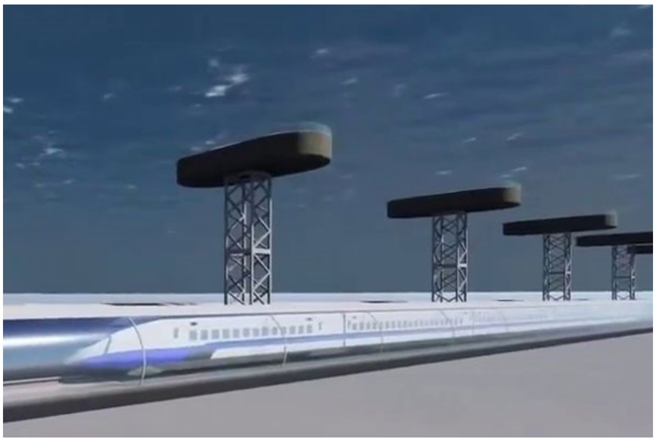
(*Nature Communications*, **volume 10**, Article number: 865 (2019), https://www.nature.com/articles/s41467-019-08824-8))

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

UAE mulls Fujairah-Mumbai subsea tunnel project

The UAE's National Advisor Bureau, a consultancy firm based in Masdar city in Abu Dhabi, has announced its latest futuristic project - The Fujairah-Mumbai Subsea Tunnel Project.

It aims to connect the UAE and other GCC countries for the first time with Mumbai, India, via a subsea tunnel and an ultra speed 1,000 km/hour subsea railway line.



The floating underwater tunnel may consist of two curved concrete tubes, submerged below the surface of the Arabian Sea.

The concept of the tunnel is based on well-known technology applied to floating bridges, offshore structures and immersed tunnels, said a top official of the Bureau.

"The project, which is currently at the concept stage, is meant to connect the UAE and the other GCC countries for the first time with India via a subsea tunnel and an ultra speed subsea railway line, with the aim of improving the bilateral trade between the two nations," remarked Abdulla Alshehhi, managing director of the National Advisor Bureau.

The floating underwater tunnel may consist of two curved concrete tubes, submerged below the surface of the Arabian Sea. The submerged tubes would be stabilised by being attached to pontoons on the surface of the sea or by vertical tethers to the sea floor, he explained.

"Provision can be made for enough gaps between the pontoons to allow ships to pass through. The tubes would be placed underwater, deep enough to avoid water traffic and weather," stated Alshehhi.

The tunnel would be a watertight, resisting the salty sea water, and should be able to withstand the hydrostatic forces upon it, he pointed out.

Creating a vacuum inside the tunnel will result in tremendous speed for trains due to the minimal air resistance, he added.

The main expected benefits from the project are:

- Transportation of passengers, tourists and workers between the UAE (as well as other GCC countries) and India;
- Export oil and gas from Fujairah Port to India via a pipeline and possibly China and Pakistan;
- Import water from Narmada River, north of Mumbai to the UAE (it is well noted that the Narmada River is flooding during monsoon season; excess water may be exported to the UAE);
- Transport goods and commodities between the two nations;
- Supply bunker fuel to ships passing between the floating pontoons via a floating bunker fuel station

Alshehhi, while quoting Mahatma Gandhi, India's independence leader and a global icon of peace and non-violence, said: "in a gentle way, you can shake the world."

"This ambitious project will surely shake the way we travel between continents," he added.

Future expansion may include the One Belt One Road Initiative, linking the China-Pakistan Economic Corridor at Gwadar Port with the UAE (and other GCC countries) via Fujairah Port to complement the Chinese Silk Road.

The train stations in the future may also include the port city of Karachi in Pakistan and Muscat, the capital city of Oman.

The speed of trains can be set to the range of 600 to 1,000 km/hour. The 1,826-km distance between Mumbai to Fujairah station can be covered within two to four hours while Gawader port in Pakistan to Fujairah can be covered within one hour.

The Bureau is also planning to make provisions for a road to be constructed within the floating tunnel for cars and truck transportation as well as a floating hotel, shopping centres and fuel stations in the middle of the Arabian Sea, where commuters can rest and shop.

(TradeArabia News Service, 20 Feb. 2019, http://www.tradearabia.com/news/CONS_351322.html)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

Standardisation needs for the design of underground structures

Corporate author(s): Joint Research Centre (European Commission)

Personal authors: Bogusz, W; Breunese, A; Nuijten, G; Athanasopoulou, A; Psomas, S; Lewandowska, A; Stille, H; Dimova, S; Pecker, A; Grunicke, U; Bezuijen, A; Frank, R; Burbaum, U; Roessler, K; Brandtner, M; Jung, H; Ganz, H; Bournas, B; Sousa, M.L; Subrin, D; Pinto, A; Sciotti, A

Tunnel projects in Europe form a large portion of the infrastructure market, and there is continuous demand for the construction of new tunnels. Underground structures and particularly tunnels are unique structures. Their key design considerations and structural behaviour are different from other structures, such as buildings and bridges, as the main bearing element in tunnels is the surrounding soils and rocks. Despite the unique characteristics of tunnel design, there are no currently available European tunnel design standards or harmonised guidelines at European level. Thus tunnel design in Europe is being carried out based on national knowledge and experience with the use of industrial/client standards and guidelines, as well as with parts of the Eurocodes (European Standards EN 1990 – EN 1999). The Eurocodes are a set of European Standards (Européenne Normes - EN) which provide common rules for the design of buildings and other construction works to check their strength, stability and fire resistance. However, the scope of the first generation of the Eurocodes covers buildings and some other civil engineering works, e.g. bridges, towers, masts, chimneys, silos, tanks, pipelines. There are no parts devoted to the design of tunnels, as the Eurocodes do not include explicitly all underground structures. In view of the above fact and the strategic importance of the construction industry in the European market, the Joint Research Centre (JRC) of the European Commission started in 2017 activities on the assessment of standardisation needs for the design of underground structures. The initiative was launched in the framework of the series of Administrative Arrangements between DG JRC and Directorate-General (DG) for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) of the European Commission on support to policies and standards for sustainable construction. The activities on standardisation needs for underground structures are supported by an Expert Group on the design of underground structures convened by the JRC. The JRC Expert Group on design of underground structures held its first meeting on 22-23 May 2017 at the JRC site in Ispra (Italy). Subsequent to the first meeting of the Expert Group, the present document on the needs for new standard(s) regarding the design of underground structures was prepared by the JRC, based on the discussions during the meetings in May 2017 and May 2018, and the technical notes prepared by the experts. The document delineates that the development of design standards for tunnels and underground structures is certainly feasible (at least for typical configurations) and that it would be advantageous to foster harmonisation of design rules between countries. It appears suitable that the concept of new standards or guidelines for the design of tunnels shall be developed in line with the Eurocodes and delineate how to complete and/or restrict their use for tunnels without limiting the required flexibility, having in mind the specificity and diversity of tunnel design. In parallel, it would be beneficial that the concept will be consistent with the new developments in the second generation of the Eurocodes currently under development and expected to be published soon after 2020. Further, it is evident that there is need to (i) define what is specifically being used for tunnel design from the current Eurocodes, (ii) assess what is missing and (iii) identify what should not be used in tunnel design, keeping in mind that the Eurocodes were originally not meant for dealing with tunnels. Sufficient literature, case studies and experience is available to prepare the general framework of a standard or guiding document, as well as addressing most common types of underground structures. Currently existing standards, guidelines and recommendations for tunnels in some European countries, as well as the Eurocodes and international codes, can serve as the basis for the development of the new standards or guidelines. As next step, it is considered important for the Expert Group to brief CEN/Technical Committee 250 "Structural Eurocodes" (CEN/TC 250) on its views on the standardisation.

(Publication Office of the European Union, 29 January 2019)

Ευχαριστούμε τον Ομότιμο Καθηγητή ENPC Roger Frank για την σχετική ενημέρωση. Μπορείτε να κατεβάσετε την έκθεση από το url https://publications.europa.eu/en/publication-detail/-/publication/cda16e27-2446-11e9-8d04-01aa75ed71a1/language-en.

Seismic Design of Foundations: Concepts and applications

Subhamoy Bhattacharya, Rolando P. Orense and Domenico Lombardi

With easy-to-understand explanations of the basic concepts, *Seismic Design of Foundations* examines recent and worldwide research outputs and post-earthquake reconnaissance case studies and offers practical means of applying them to the real world. Each case study also provides worked examples of new and innovative findings that reveal background information behind the codes of practice in various parts of the world as well as the lessons learned from recent large-scale earthquakes.

Seismic Design of Foundations presents state-of-the-art information which will be ideal for any student studying postgraduate civil engineering or structural engineering as well as researchers working in the field of seismic design.

This book aims to

- assimilate latest state-of-the-art research from Europe, Japan and New Zealand

- break down and explain the codes of practice into easy-to-understand concepts
- showcases worked examples at the end of each chapter highlighting the concepts covered
- includes case studies from all over the world including Italy, Greece, India and Taiwan amongst others.

Seismic Design of Foundations presents state-of-the-art information which will be ideal for any student studying postgraduate civil engineering or structural engineering as well as researchers working in the field of seismic design.

(ICE Publishing, 07 February 2019)

Civil Engineering

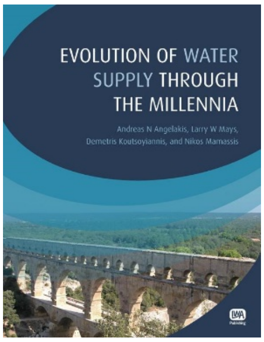
Crossrail's Engineering functions together established the Crossrail Technical Papers Competition which ran annually and receives papers on a range of engineering and technical disciplines. It was open to all organisations currently or previously involved in the project, including designers, contractors, joint ventures and those working for Crossrail Limited. The papers from the 6 years of competitions have been published in a series of books *Crossrail Project: Infrastructure Design and Construction* by the Institution of Civil Engineers.

Activities in the Civil Engineering discipline dominated for the initial years of delivery of Crossrail and the majority of the papers presented to the Technical Papers Competition in the first three years cover design and construction of these works. All the papers relevant to the Civil Engineering discipline are included in this topic area.

The Civil Engineering topic area also includes case studies and micro-reports produced separately on key subjects such as geology and geotechnical baseline reports, piling and deep foundations, and sprayed concrete.

https://learninglegacy.crossrail.co.uk/learning-legacy-themes/engineering/civils/

(πληροφορία από τον Δρ. Γιώργο Τσιφουτίδη)



Evolution of Water Supply Through the Millennia

Andreas N. Angelakis, Larry W. Mays, Demetris Koutsoyiannis, Nikos Mamassis, Editors

Evolution of Water Supply Through the Millennia presents the major achievements in the scientific fields of water supply technologies and management throughout the millennia. It provides valuable insights into ancient water supply technologies with their apparent characteristics of durability, adaptability to the environment, and sustainability. A comparison of the water technological developments in several civilizations is undertaken. These technologies are the underpinning of modern achievements in water engineering and management practices. It is the best proof that "the past is the key for the future."

Rapid technological progress in the twentieth century created a disregard for past water technologies that were considered to be far behind the present ones. There are a great deal of unresolved problems related to the management principles, such as the decentralization of the processes, the durability of the water projects, the cost effectiveness, and sustainability issues such as protection from floods and droughts. In the developing world, such problems were intensified to an unprecedented degree.

Moreover, new problems have arisen such as the contamination of surface and groundwater. Naturally, intensification of unresolved problems led societies to revisit the past and to reinvestigate the successful past achievements. To their surprise, those who attempted this retrospect, based on archaeological, historical, and technical evidence were impressed by two things: the similarity of principles with present ones and the advanced level of water engineering and management practices.

(IWA Publishing, Volume 11, DOI: https://doi.org/10.2166/9781780401041, April 2012)

Dear All,

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Best wishes,

Andreas N. Angelakis

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

https://www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/47/issue/1

Κυκλοφόρησε το Τεύχος 1 του Τόμου 47 (Φεβρουαρίου 2109) του Geotextiles and Geomembranes της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

Regular Articles

Swelling behaviour of expansive soils with recycled geofoam granules column inclusion, S. Selvakumar, B. Soundara, Pages 1-11

Effect of vacuum removal on consolidation settlement under a combined vacuum and surcharge preloading, Pengpeng Ni, Kai Xu, Guoxiong Mei, Yanlin Zhao, Pages 12-22

Behavior evaluation of geogrid-reinforced ballast-subballast interface under shear condition, Kumari Sweta, Syed Khaja Karimullah Hussaini, Pages 23-31

Application of the two-layer system theory to calculate the settlements and vertical stress propagation in soil reinforcement with geocell, J.O. Avesani Neto, Pages 32-41

Interface transmissivity of conventional and multicomponent GCLs for three permeants, A.Y. AbdelRazek, R. Kerry Rowe, Pages 60-74

Investigating the mechanism of downslope bentonite erosion in GCL liners using X-Ray CT, T. Mukunoki, K. Sato, J. Fukushima, K. Shida, W.A. Take, Pages 75-86

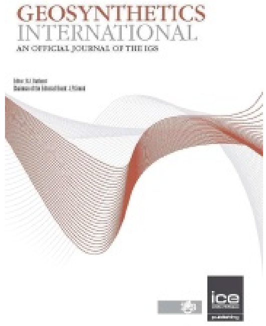
Field study of a retaining wall constructed with clay-filled soilbags, Sihong Liu, Kewei Fan, Siyuan Xu, Pages 87-94

Technical Notes

Hydro-mechanical behavior of a lateritic fiber-soil composite as a waste containment liner, M. Ehrlich, M.S.S. Almeida, D. Curcio, Pages 42-47

Review Article

Biodegradable geotextiles – An overview of existing and potential materials, M. Prambauer, C. Wendeler, J. Weitzenböck, C. Burgstaller, Pages 48-59



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Behavior of expanded polystyrene (EPS) blocks under cyclic pavement foundation loading, S. M. A. Ghotbi Siabil, S. N. Moghaddas Tafreshi, A. R. Dawson, M. Parvizi Omran, 26(1), pp. 1–25

Static and dynamic analysis of two mechanically stabilized earth walls, P. P. Capilleri, F. Ferraiolo, E. Motta, M. Scotto, M. Todaro, 26(1), pp. 26–41

Failure investigation of a geosynthetic-reinforced soil slope subjected to rainfall, K.-H. Yang, J. N. Thuo, J.-W. Chen, C.-N. Liu, 26(1), pp. 42–65

On the small-strain stiffness of polypropylene fibre-sand mixtures, H. Li, K. Senetakis, A. Khoshghalb, 26(1), pp. 66–80

Hydration of geosynthetic clay liners (GCLs) on compacted zeolite, T. Özdamar Kul, A. H. Ören, 26(1), pp. 81–91

Physical and mechanical properties of Gravel-Tire Chips Mixture (GTCM), S. M. K. Pasha, H. Hazarika, N. Yoshimoto, 26(1), pp. 92–110

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2015 – 2018)

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