



Seychelles' Granites

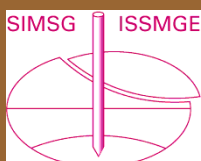


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ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
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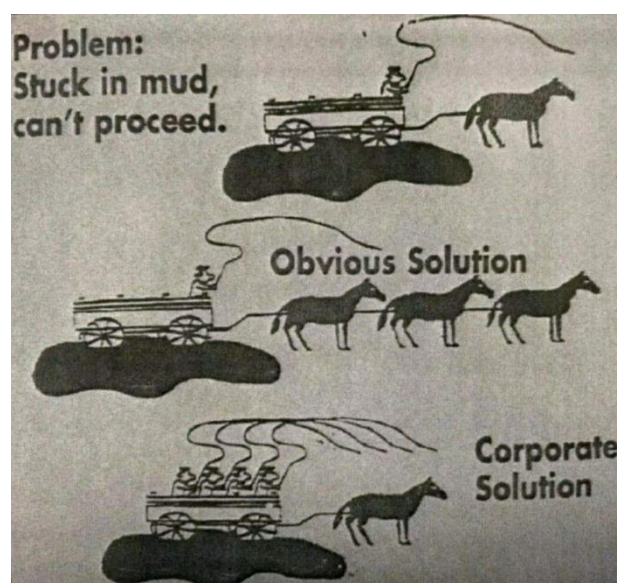
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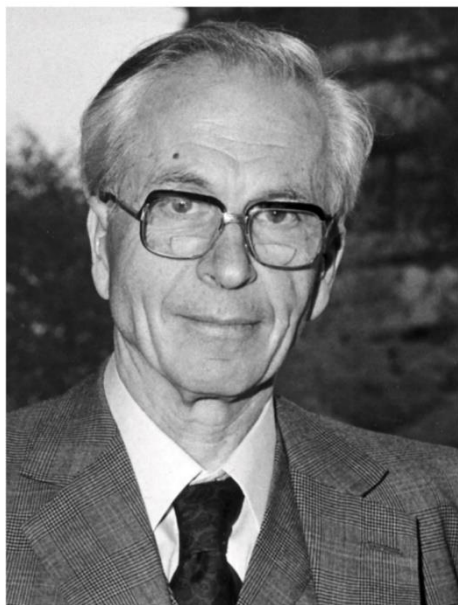
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Ιωάννης Αργύρης

Ο John H. Argyris, Ιωάννης Αργύρης ή (Ioannis Hatzargyris), γιος του Νικόλαου Χατζηαργύρη και της Λουκίας Καραθεοδωρή (σας λέει κάτι?) η οποία αργότερα υπήρξε σύζυγος του πρωθυπουργού (Θεμιστοκλή Σοφούλη), δεν υπήρξε μόνον ο επιφανέστερος Έλληνας επιστήμων της διασποράς, αλλά χωρίς αμφιβολία η μεγαλύτερη επιστημονική προσωπικότητα παγκοσμίως στον τομέα της Υπολογιστικής Μηχανικής.



Ο ευπατριδής επιστήμων της διασποράς Ακαταπόνητος καθηγητής σε δύο ευρωπαϊκά πανεπιστήμια συγχρόνως, πρωτοπόρος ερευνητής στην Αεροναυτική και στην Αστροναυτική, εφευρέτης της μεθόδου των πεπερασμένων στοιχείων "Finite Element Analysis" στη Μηχανική (με συνεισφορά των R. W. Clough and O. C. Zienkiewicz), συνεργάτης της NASA στην κατασκευή διαστημοπλοίων, κορυφαίος επιστήμων με μνημειώδες συγγραφικό έργο. Πολλάκις τιμηθείς από κράτη, ακαδημίες και ανώτατα εκπαιδευτικά ιδρύματα ο επίζηλος βίος του Ιωάννη Ν. Αργύρη, του λαμπρού τέκνου του Βόλου που διέπρεψε στα διεθνή πεδία της επιστήμης, ετελεύτησε στη Στουτγάρδη στις 2 Απριλίου.

Ο Ιωάννης Ν. Αργύρης γεννήθηκε στις 19 Αυγούστου 1913 στην πρωτεύουσα της Μαγνησίας. Τα πρώτα χρόνια της ζωής του σμιλεύτηκαν μέσα από τις εμπειρίες μιας αυστηρής οικογενειακής ανατροφής, τα βιώματα της μεγάλης ιδέας και της Μικρασιατικής Καταστροφής. Σημαδεύτηκαν όμως και από τα τραύματα του εθνικού διχασμού της εποχής. Η εισαγωγή του, το 1930, στη Σχολή Πολιτικών Μηχανικών του Εθνικού Μετσόβιου Πολυτεχνείου ήταν η απαρχή της λαμπρής επιστημονικής πορείας του. Με την ολοκλήρωση του τέταρτου έτους των σπουδών του στο ΕΜΠ συνεχίζει τις σπουδές του στο Μόναχο, όπου δύο χρόνια αργότερα παίρνει το δίπλωμα του πολιτικού μηχανικού από το Πολυτεχνείο του Μονάχου.

Ο Β' Παγκόσμιος Πόλεμος τον βρίσκει στο Πολυτεχνείο του Βερολίνου για μεταπτυχιακές σπουδές. Η ναζιστική Γερμανία επιθυμεί να τον εντάξει στο επιστημονικό δυναμικό για την ανάπτυξη της πολεμικής αεροναυπηγικής της βιομηχανίας. Η άρνησή του, που συνέπεσε με την εισβολή της Γερμανίας στην Ελλάδα, τον έστειλε σε στρατόπεδο συγκέντρωσης από όπου

με κίνδυνο της ζωής του δραπέτευσε κατά τους βομβαρδισμούς του Βερολίνου και διέφυγε στην Ελβετία, όπου και ολοκλήρωσε τις μεταπτυχιακές σπουδές του στο Πολυτεχνείο της Ζυρίχης. Στη συνέχεια μεταβαίνει στη Βρετανία όπου εργάζεται ως ερευνητής μηχανικός στη Βασιλική Αεροναυτική Εταιρεία ως το 1949.

Μελέτες για τη NASA

Η πανεπιστημιακή πορεία του ξεκινάει το 1949 από το Imperial College του Πανεπιστημίου του Λονδίνου. Το 1959, διατηρώντας την καθηγητική του έδρα στο Λονδίνο, αναλαμβάνει καθηγητής των Αεροδιαστημικών Επιστημών στο Πανεπιστήμιο της Στουτγάρδης. Επί 16 χρόνια διατηρεί και τις δύο καθηγητικές έδρες και ταξιδεύει κάθε εβδομάδα στο Λονδίνο για τις αναγκαίες παραδόσεις και την καθοδήγηση της ερευνητικής δραστηριότητας των εκεί συνεργατών του. Στο Πανεπιστήμιο της Στουτγάρδης, ως τακτικός καθηγητής επί 32 χρόνια και ως ομότιμος καθηγητής για τα υπόλοιπα 13 χρόνια της ζωής του, δεν θα σταματήσει να εργάζεται άοκνα και να δημοσιεύει πρωτοποριακές πραγματείες τόσο στη βασική όσο και στην εφαρμοσμένη έρευνα.

Από τα πρώτα του βήματα τον συναρπάζουν οι τομείς της Αεροναυτικής και της Αστροναυτικής όπου και επικεντρώνει το ερευνητικό του ενδιαφέρον. Το 1956 ο καθηγητής Αργύρης αντιμετώπισε ένα δύσκολο πρόβλημα της Μηχανικής που αναφερόταν στη μελέτη της συμπεριφοράς ατράκτων αεροπλάνων με οπές και άλλες σημαντικές αποκλίσεις από την κανονικότητα.

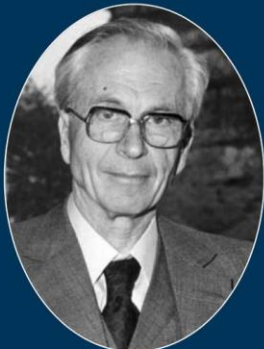
Με οδηγό για μία ακόμη φορά τη διαίσθησή του προτείνει μια νέα θεωρία των πεπερασμένων στοιχείων (FEM), η οποία εφαρμόστηκε ευρέως στον σχεδιασμό του Boeing 747 από τις αρχές τις δεκαετίας του 1960. Την ίδια εποχή η NASA τού αναθέτει τη θερμική θωράκιση του διαστημοπλοίου Απόλλων, ενώ αργότερα θα εκπονήσει ανάλογη μελέτη για το ευρωπαϊκό διαστημικό λεωφορείο Ερμής. Αλλά και η συμβολή του στην ανάλυση της καλωδιωτής οροφής του Ολυμπιακού σταδίου του Μονάχου, για τη διοργάνωση των Ολυμπιακών Αγώνων του 1972, υπήρξε καθοριστική αφού η κατασκευή της κατέστη δυνατή χάρη στη πεπερασμένων στοιχείων που ανέπτυξε για τον σκοπό αυτόν. Παρόλο που ο John Argyris δεν ήταν άμεσα εμπλεκόμενος στον σχεδιασμό του Ολυμπιακού Σταδίου του Μονάχου, η ανάπτυξη της Μεθόδου Πεπερασμένων Στοιχείων είχε σημαντική επίδραση στην ανάλυση και βελτιστοποίηση των καινοτόμων εντατικών δομών που χρησιμοποιήθηκαν στο σχεδιασμό του σταδίου, συμβάλλοντας έτσι στην επιτυχία του έργου.

Το πρόβλημα που απασχολούσε τους αεροναυπηγούς μηχανικούς περί τα τέλη του Β' Παγκοσμίου Πολέμου ήταν σχετικό με την κατασκευή των πρώτων αεριωθούμενων μαχητικών αεροπλάνων τα οποία κινούνταν με υψηλές ταχύτητες και απαιτούσαν οπισθοκλινείς πτέρυγες. Οι γνωστές ως τότε μέθοδοι αναλύσεως αδυνατούσαν να προσομοιώσουν με αξιοπιστία την κεκλιμένη γεωμετρία των πτερύγων. Το 1944 ο (Ι.Α.) ύστερα από μια υπεράνθρωπη διανοητική προσπάθεια και με τη βοήθεια ενός πρωτόγονου υπολογιστή βρίσκει τη λύση με τη χρήση τριγωνικών πεπερασμένων στοιχείων αντί των ορθογωνικών πλεγμάτων της μεθόδου των πεπερασμένων διαφορών. Αυτή ήταν η στιγμή της γέννησης της μεθόδου των πεπερασμένων στοιχείων. Ο (Ι.Α.) ήταν μόλις 31 ετών.

Η προφητική δήλωση του μεγάλου von Karman πριν από χρόνια, ότι η επινόηση από τον Αργύρη της μεθόδου των πεπερασμένων στοιχείων σηματοδοτεί μία από τις σπουδαιότερες ανακαλύψεις της Μηχανικής, αποδείχθηκε περισσότερο αληθινή από ό,τι φανταζόταν ακόμη και ο ίδιος. Η μέθοδος των πεπερασμένων στοιχείων αναγνωρίζεται σήμερα ως μία από τις θεωρίες στις οποίες βασίστηκαν οι σημαντικότερες εξελίξεις που συντελέστηκαν τις τελευταίες δεκαετίες στις Επιστήμες του Μηχανικού, ενώ βρήκε εφαρμογή σε πλήθος άλλων

προβλημάτων των Εφαρμοσμένων Μαθηματικών, της Φυσικής και της Χημείας. Στη μέθοδο αυτή βασίζονται όλοι οι υπολογιστικοί κώδικες για τον σχεδιασμό και την ανάλυση κατα-

σκευών της αεροναυπηγικής και της ναυπηγικής βιομηχανίας, της αυτοκινητοβιομηχανίας και των μεγάλων τεχνικών έργων όπως τα υψηλά κτίρια και οι γέφυρες.



Accomplishments

- Worked for the Royal Aeronautical Society
- Consultant to the Boeing Aircraft Corporation
- Elected Fellow of the Royal Society
- Professor at Imperial College in London
- Set up the Aeronautical Department (now known as the Institute for Statics and Dynamics of Aircraft and Aerospace Structures) at the University of Stuttgart.
- One of the creators of the Finite Element Method
- Recognized that the digital computer had enlarged the potential capabilities of engineering designers
- Created the ASKA (Automatic System for Kinematic Analysis) computer program - one of the first universal computer programs for calculations by the method of finite elements
- Founded the journal 'Computer Methods in Applied Mechanics and Engineering'

Honors and Awards

- 1955 Fellow of the RAeS, UK
- 1970 Honorary Dott.Ing., Genoa, Italy
- 1971 Silver Medal of the RAeS, UK
- 1972 Honorary Dr.Tech., Trondheim, Norway
- 1975 Von Karman Medal of the American Society of Civil Engineers, USA
- 1979 Copernicus Medal of the Polish Academy of Sciences, Poland
- 1980 Honorary Professor of the Northwestern Polytechnic University, Xi'an, China
- 1981 Timoshenko Medal of the American Society of Mechanical Engineers, USA
- 1983 Honorary Professor of the Technical University of Beijing, China; Fellow of the American Institute of Aeronautics and Astronautics, USA; Member of Accademico Italia, Italy
- 1984 Honorary Professor of Qinghua University, Beijing, China
- 1985 Fellow of the American Association for the Advancement of Science, USA; Honorary Fellow of the Aeronautical Society of India, India; Royal Medal of the Royal Society
- 1986 Foreign Associate Fellow of the US National Academy of Engineering; Honorary Fellow of the RAeS, UK; Honorary TekDr, Swedish Technical University, Sweden; Fellow of the Royal Society
- 1989 Honorary DSc, University of Athens, Greece; Grand Cross of Merit with Star, Federal Republic of Germany
- 1990 Fellow of the Royal Academy of Engineering, UK
- 1991 Fellow of the American Society of Civil Engineers, USA
- 1992 Honorary Fellow of the Romanian Academy, Romania
- 1993 Honorary DSc, Technical University of St Petersburg, Russia; Honorary DSc, Technical University of Timisoara, Romania
- 1994 Honorary Member of the Greek Association of Computational Mechanics, Greece
- 1995 Honorary DSc, Technical University of Athens, Greece; Honorary DSc, University of Ioannina, Greece
- 1996 Honorary DSc, University of Thessaly, Greece; Prince Philip Medal, UK
- 2000 Einstein Award of the Einstein Foundation, USA; Commander of the British Empire (CBE), UK

Information taken from [this Biographical Memoir](#) about John Hadji Argyris' life.

Ο πολυτίμητος συγγραφέας

Το συγγραφικό έργο του χαρακτηρίζεται όχι μόνο από την ποσότητα αλλά κυρίως από τη διαχρονική απήχσή του στη διεθνή επιστημονική κοινότητα. Εκτός από τις 500 περίπου εκτεταμένες, πρωτότυπες και ευρύτατα αναφερόμενες ερευνητικές εργασίες που έχει συγγράψει, έχει αφήσει παρακαταθήκη ένα μνημειώδες έργο 10 πολυσέλιδων βιβλίων. Ο (Ι.Α.) έχει προσεγγίσει και άλλες θεωρίες, όπως τη Θεωρία των Ομάδων, τη Θεωρία της Σχετικότητας και τη Θεωρία του Χάους και έχει προτείνει αποτελεσματικές υπολογιστικές λύσεις. Το βιβλίο του για τη Θεωρία του Χάους είχε ανεπανάληπτη εκδοτική επιτυχία. Οι τιμητικές ακαδημαϊκές διακρίσεις που του έχουν απονεμηθεί από τη διεθνή επιστημονική κοινότητα ξεπερνούν κάθε προηγούμενο. Κάτοχος 18 επίτιμων διδακτορικών διπλωμάτων, μέλος πέντε ακαδημιών διαφόρων χωρών, επίτιμος καθηγητής σε έξι πανεπιστήμια.

Επιστέγασμα της αναγνώρισης ενός τόσο λαμπρού και διακλαδικού επιστημονικού έργου αποτελεί η απονομή του Χρυσού Βραβείου του Φοίνικα από τον Πρόεδρο της Ελληνικής Δημοκρατίας, του τίτλου Εταίρου της Βασιλικής Εταιρείας της Μ. Βρετανίας, του Μεγαλόσταυρου Αξίας της Ομοσπονδιακής Δημοκρατίας της Γερμανίας, του βραβείου Prince Philip της Βασιλικής Ακαδημίας Μηχανικών, το οποίο θεωρείται στις αγγλοσαξονικές χώρες ισότιμο του Βραβείου Νομπέλ, καθώς και του βραβείου Einstein, ύψιστης διάκρισης στις Θετικές Επιστήμες στις ΗΠΑ.

Οικουμενική ακτινοβολία

Ο Ιωάννης Αργύρης είναι μία κορυφαία προσωπικότητα της πνευματικής ζωής της νεότερης Ελλάδας. Ήταν ένας άνθρωπος με οικουμενική ακτινοβολία που διαδραμάτισε εξέχοντα ρόλο στην παγκόσμια επιστημονική κοινότητα προσφέροντας

σπουδαίες υπηρεσίες στην επιστήμη και στην πατρίδα του. Ο (Ι.Α.) υπήρξε φαινόμενο πνευματικής πολυμέρειας και ποικίλων ταλέντων: στοχαστής, ερευνητής, πανεπιστημιακός δάσκαλος, οραματιστής, μύστης, ρήτορας, γλωσσολόγος. Με την πολυμορφία των ικανοτήτων του θα μπορούσε να χαρακτηριστεί ως ο κατ' εξοχήν αναγεννησιακός άνθρωπος της εποχής του. Πάνω από όλα όμως ο Ιωάννης Αργύρης υπήρξε ένας αληθινός Έλληνας στη σκέψη και ένας φλογερός πατριώτης στην ψυχή. Πίστευε βαθιά και σταθερά ότι είχε υποχρέωση να θέτει όλες τις δυνάμεις του στην υπηρεσία της πατρίδας και στην υπεράσπιση των εθνικών δικαιών. Δείγμα αυτής της στάσης είναι η παρέμβαση που έκανε στον καγκελάριο Κολ για την φιλοτουρκική στάση της τότε Δ. Γερμανίας. Όπως επίσης είναι η άρνησή του να αλλάξει υπηκοότητα, για την οποία ψηφίστηκε ειδικός νόμος, το περίφημο διάταγμα Αργύρη, προκειμένου να παραμείνει στο Πανεπιστήμιο της Στουτγάρδης.

Η τόσο σημαντική παρουσία του (Ι.Α.) στο παγκόσμιο επιστημονικό στερέωμα οφείλεται και στη ζύμωση των γνήσιων ελληνικών καταβολών του με την πιο γόνιμη ευρωπαϊκή ρασιοναλιστική σκέψη. Έτσι μπόρεσε να είναι Ρωμιός με ευρωπαϊκή ωριμότητα και νηφαλιότητα και ταυτόχρονα Ευρωπαίος με ρωμαιοκό οίστρο. Ο (Ι.Α.) ανήκει σε αυτούς τους λίγους φωτισμένους Έλληνες της διασποράς που έλαμψαν με το πνεύμα τους και την τέχνη τους και έγιναν οι καλύτεροι πρεσβευτές του μεγαλείου της φυλής μας.

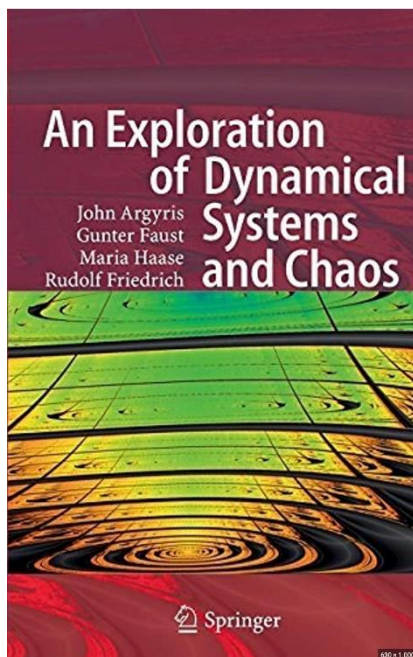
Ο (Ι.Α.) αποτελεί έναν τελευταίο κρίκο σε αυτή την περιλαμπρή αλυσίδα για την οποία όλοι οι Έλληνες αισθάνονται υπερήφανοι. Έχει γραφτεί ότι αν ο Κωνσταντίνος Καραθεοδωρής, θείος από μητέρα του Ι.Α., είναι ο διαπρεπέστερος μαθηματικός της νεότερης Ελλάδας, ο Ιωάννης Αργύρης είναι ο σημαντικότερος Έλληνας στην περιοχή της Μηχανικής και των Εφαρμοσμένων Μαθηματικών. Εδώ θα προσέθετα ότι ο Ιωάννης Αργύρης δεν υπήρξε μόνον ο επιφανέστερος Έλληνας επιστή-

μων της διασποράς, αλλά χωρίς αμφιβολία η μεγαλύτερη επιστημονική προσωπικότητα παγκοσμίως στον τομέα της Υπολογιστικής Μηχανικής και ίσως ο σημαντικότερος μηχανικός-ερευνητής του 20ού αιώνα.

Και αναρωτιέμαι, για αυτόν τον επιφανή επιστήμονα – σταθμό, που κορυφαίοι επιστήμονες του χώρου αναφέρουν πως η μέθοδος του “πεπερασμένων στοιχείων” (FEM) ισοδυναμεί με την μαθηματική ανάλυση “Calculus” του Νεύτωνα, υπάρχει εδώ στην Ελλάδα έστω κάποιο μικρό δρομάκι, πάροδος, μια μικρή πλατεία, μια βιβλιοθήκη, μια έδρα, ένας σύλλογος, ένα βραβείο ...με αναφορά σε αυτόν τον μεγάλο επιστήμονα?

(Σαν αύριο (2 Απρ 2004) χάσαμε τον Ιωάννη Αργύρη, αλλά τον παρουσιάζω σήμερα λόγω αργίας, μήπως και το διαβάσει ένας (1) έστω φίλος περισσότερος, γιατί τη θεωρώ σπουδαία αναφορά.)

Μάρκος Κωνσταντίνος



ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ



Κέντρο Εκτίμησης Διακινδύνευσης και Ανθεκτικότητας Δημοκρίτειου Πανεπιστημίου Θράκης

Η επίσημη παρουσίαση της καινοτόμου υποδομής του ΔΠΘ "Κέντρο Εκτίμησης Διακινδύνευσης και Ανθεκτικότητας της Περιφέρειας ΑΜΘ (ΚΕΔΙΑΚ-ΠΑΜΘ)" έγινε την Πέμπτη 6 Απριλίου στο κτήριο των Πολιτικών Μηχανικών, στην Πανεπιστημιούπολη της Ξάνθης – Κιμμεριών.

Ακολουθεί απόσπασμα ενημερωτικού τεύχους με ενδεικτικές δραστηριότητες και υπηρεσίες του ΚΕΔΙΑΚ. Το πλήρες τεύχος διατίθεται από τον καθηγητή Νίκο Κλήμη, όπως και στην σελίδα του ΚΕΔΙΑΚ στο <https://www.facebook.com/riskacDUTh>

Σκοπός και Δομή του ΚΕΔΙΑΚ

Το Κέντρο Εκτίμησης Διακινδύνευσης και Ανθεκτικότητας (ΚΕΔΙΑΚ) του Δημοκρίτειου Πανεπιστημίου Θράκης είναι μία νέα καινοτόμα ερευνητική υποδομή που σκοπό έχει την **ενίσχυση της διαδικασίας λήψης αποφάσεων κατά το στάδιο της πρόληψης και καταστολής των φυσικών και τεχνολογικών καταστροφών**.

Για την επίτευξη αυτού του σκοπού το ΚΕΔΙΑΚ δημιουργήθηκε με γνώμονα την «ολιστική προσέγγιση» και την «αρθρωτή δομή». Το αποτέλεσμα είναι σήμερα το ΚΕΔΙΑΚ να συντίθεται από 10 επιστημονικές ομάδες (Βλ. διπλανό Πίνακα) και να απασχολεί 53 νέους επιστήμονες.

Η συγκέντρωση υπό μία σκέπη τόσων ετερογενών και διαφορετικών επιστημονικών ομάδων για την ικανοποίηση της ανάγκης της κοινωνίας για ανθεκτικότητα απέναντι στις φυσικές και τεχνολογικές καταστροφές και απέναντι στην κλιματική κρίση υλοποιείται **στην χώρα μας για πρώτη φορά**.

Με τόσες επιστημονικές ομάδες στη σύνδεσή **του το ΚΕΔΙΑΚ είναι σε θέση να προσφέρει ολοκληρωμένες επιστημονικές υπηρεσίες** σε θέματα πρόληψης και καταστολής φυσικών και τεχνολογικών κινδύνων.

Η «αρθρωτή δομή» του ΚΕΔΙΑΚ, επιτρέπει μάλιστα τη δημιουργία ή την ενσωμάτωση επιπρόσθετων επιστημονικών ομάδων που ειδικεύονται σε επιπλέον κινδύνους όπως λ.χ. Θαλάσσια Ρύπανση και Ράδιο-Βιοχημικών – Πυρηνικών κινδύνων.

	Συντονισμού-Οργάνωσης και Αλληλεξάρτησης Κινδύνων και Υποδομών
	Κινδύνου Πυρκαγιάς
	Αέριας Ρύπανσης και Μετεωρολογίας
	Υδρολογικών Κινδύνων
	Υποδομών και Συστημάτων Μηχανικού
	Υλικών Πληροφορικής Και Λογισμικού
	Πολιτιστικού Κεφαλαίου
	Επιπτώσεων Υγείας
	Εδαφικών Κινδύνων και ΓΣΠ
	Σεισμικών Κινδύνων

Ω Ω



Εκπαιδευτική Εκδρομή Φοιτητών Τομέα Γεωτεχνικής Σχολής Πολιτικών Μηχανικών ΕΜΠ

120 φοιτητές της Σχολής Πολιτικών Μηχανικών του ΕΜΠ σε ένα εμβληματικό εκπαιδευτικό ταξίδι 11 ημερών στην Ευρώπη, διδάσκονται μέσα από ιστορικές γεωτεχνικές αστοχίες αλλά και νέα τεχνικά έργα.

Μετά από 11 ημέρες στην Ευρώπη (5-15 Απριλίου), ολοκληρώθηκε η εκπαιδευτική εκδρομή 120 φοιτητών Πολιτικών Μηχανικών του ΕΜΠ του Τομέα Γεωτεχνικής.

Στο πλαίσιο του μαθήματος Τεχνική Γεωλογία 4ου έτους διοργανώθηκε η μεγάλη εκδρομή στην Ιταλία, Γαλλία, Ελβετία και Ελλάδα σε μεγάλα τεχνικά έργα και περιστατικά μεγάλων αστοχιών έργων Πολιτικού Μηχανικού όπου οι τεχνικογεωλογικές συνθήκες δεν είχαν αξιολογηθεί κατάλληλα.

Οι φοιτητές είχαν την ευκαιρία να παρακολουθήσουν την γεωτεχνική εξέλιξη μεγάλων τεχνικών έργων όπως σιδηρόδρομων, μεγάλων αυτοκινητοδρόμων, θεμελιώσεων, επισκεπτόμενοι μια σειρά από έργα-ορόσημα μηχανικής και έργα διαχείρισης γεωτεχνικών κινδύνων.

Η εκδρομή στέφθηκε με απόλυτη επιτυχία. Χαμογελαστά πρόσωπα, πάθος, νέα επιτεύγματα και γνώσεις για τους φοιτητές. ☺

Υπεύθυνος της Εκδρομής ήταν ο Επ. Καθηγητής [Vassilios Marinou](#) και συνοδός ήταν ο Υποψήφιος Διδάκτορας του Τομέα Γεωτεχνικής [Themistoklis Chatzitheodosiou](#)

Οι 35 χορηγοί φρόντισαν να καλύψουν το 85% του συνολικού κόστους των 120 συμμετεχόντων. Οι περισσότερες από τις εταιρείες αυτές στελεχώνονται από παλαιούς απόφοιτους που έχουν συμμετάσχει σε αυτή την μοναδική εκδρομή. Ιδιαίτερα βοήθησε και το ίδιο το ΕΜΠ εκτυπώνοντας τις εκπαιδευτικές σημειώσεις αλλά και η Σχολή Πολιτικών Μηχανικών που υποστηρίζει με κάθε δυνατό μέσο την εκδρομή αυτή.

Είμαστε ευγνώμονες σε όλους τους χορηγούς μας για την υποστήριξή τους.

Η εκπαιδευτική μας εκδρομή με αριθμούς:

- 11 ημέρες (5-15 Απριλίου)
- 4 χώρες (Ελλάδα, Ιταλία, Γαλλία, Ελβετία)
- Διαδρομή: Αθήνα - Πάτρα - Ανκόνα - Φλωρεντία - Πίζα - Νίκαια, Μονακό - Γαλλικές Άλπεις - Γκαπ - Γκρενόμπλ - Γενεύη - Ανεμάς - Chamoniex - Μπέργκαμο - Δολομιτικές Άλπεις - Βενετία - Πάντοβα - Ανκόνα - Πάτρα - Αθήνα
- 120 φοιτητές, δύο λεωφορεία (ένα διώροφο και ένα μονό)
- 22 τεχνικά θέματα σε πλήθος αντικειμένων
- Ένας τόμος από 800 σελίδες με εκπαιδευτικό υλικό και ένα τεύχος υπαίθρου για ασκήσεις & ανάλυση επιτόπου
- 35 Χορηγοί!

<http://www.civil.ntua.gr>



International Society for Soil Mechanics and Geotechnical Engineering

ISSMGE News & Information Circular April 2023

www.issmge.org/news/issmge-news-and-information-circular-April-2023

1. LIFETIME ACHIEVEMENT MEDAL

For details of this new award, see <https://www.issmge.org/news/issmge-lifetime-achievement-medal-announcement-and-call-for-nominations>.

Nominations must be received by **15 April 2023**.

2. ISSMGE HERITAGE TIME CAPSULE (HTC) UPDATE

At the ISSMGE board meeting, 6 March 2023, Hurgada, Egypt, the following policy was approved:

- contributions to the HTC could be in any language provided that the relevant ISSMGE Vice Presidents approved and that at least an abstract relating to the contribution should be in either English or French

HTC Contributions by 28 Member Societies and 14 Technical Committees are hosted on <https://www.issmge.org/the-society/time-capsule/part-a>. We will provide updates here of HTC contributions from the remaining 62 Member Societies and 23 Technical Committees. The parallel/plenary sessions dedicated to the HTC project at each of the five ISSMGE regional conferences in 2023 & 2024 will provide important venues to engage in depth with the HTC Project.

3. ISSMGE SECRETARY GENERAL

The President, Professor Marc Ballouz, is pleased to announce that Dr Andrew McNamara will be appointed as the new Secretary General of ISSMGE. Dr McNamara will take up the appointment after the next ISSMGE Council Meeting on 13 August 2023 held in conjunction with the 17th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering, Astana, Kazakhstan.

Dr McNamara is a practicing engineer with a strong attachment to academia and research. He is both Chief Engineer, Skanska UK Building and Senior Lecturer in Geotechnical Engineering, City, University of London. He will bring a wealth of experience and leadership to the ISSMGE Secretariat, and we look forward to working with him on the Board of ISSMGE.

4. TC301 PRESERVATION OF HISTORIC SITES

Please visit the new TC301 website: <https://tc301-historic-sites.com/> for information about the ongoing activities, for a list of upcoming and past conferences of interest, for webinars and Kerisel Lectures, as well as for a large collection of references on civil engineering aspects of the preservation of historic sites.

5. ISSMGE INTERACTIVE TECHNICAL TALK AVAILABLE FROM THE ISSMGE WEBSITE

- [ISSMGE Interactive Technical Talk Episode 4: Environmental Geotechnics \(TC215\)](#)
- [ISSMGE Interactive Technical Talk Episode 5: Sustainability in Geotechnical Engineering \(TC307\)](#)

6. ISSMGE BULLETIN

The latest edition of the ISSMGE Bulletin (Volume 17, Issue 1, February 2023) is available from the [website](#).

7. ISSMGE FOUNDATION

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

8. CONFERENCES

Member Societies, Technical Committees, Sister Societies and related organisations may add their events directly to the ISSMGE Events database via the link + Submit Event at the top of the EVENTS page

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

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

ISSMGE EVENTS

INTERNATIONAL CONFERENCE ON CASE HISTORIES IN GEOTECHNICAL ENGINEERING & 4TH ASRTC6 URBAN GEOENGINEERING SYMPOSIUM - 25-09-2023 - 28-09-2023 Pullman Jakarta Central Park, West Jakarta, Indonesia; Language: English; Organiser: Universitas Katolik Parahyangan - Indonesia, Universiti Teknologi Malaysia - Malaysia, National Taiwan University of Science and Technology - Taiwan, National Chung Hsing University (NCHU), Contact person: Aswin Lim, Ph.D; Address: Jl. Ciumbuleuit 94, Bandung, West Java, Indonesia; Email: geo-case2023@gmail.com; Website: <http://www.geo-case2023.com>

2ND INTERNATIONAL CONFERENCE ON CONSTRUCTION RESOURCES FOR ENVIRONMENTALLY SUSTAINABLE TECHNOLOGIES - 20-11-2023 - 22-11-2023 Fukuoka International Congress Center, Fukuoka, Japan, Language: English; Organiser: Kyushu University; Contact person: Secretariat of CREST 2023; Address: Room No. 1124, West Building 2, Kyushu University 744 Motooka, Nishi-ku, Fukuoka, Japan; Phone: +81 092-802-3369 ; Email: info@ic-crest.com; Website: <https://www.ic-crest.com>

NON-ISSMGE EVENTS

7TH INTERNATIONAL CONFERENCE SERIES ON GEOTECHNICS, CIVIL ENGINEERING AND STRUCTURES (CIGOS) - 04-04-2024 - 05-04-2024 Ho Chi Minh City, Vietnam, Language: English; Description Organisers: Association of Vietnamese Scientists and Experts (AVSE Global) and University of Architecture Ho Chi Minh City (UAH); Contact: cigos2024@sciencesconf.org; <https://cigos2024.sciencesconf.org/>

ISSMGE Interactive Technical Talk Episode 6: Unsaturated Soils (TC106)

ISSMGE IT Administrator / [TC106](#) / 26-05-2023

The sixth episode of International Interactive Technical Talk has just been launched and is supported by TC106. Prof. Enrique Romero, Dr. Maha Saleh and Liuxin Chen are discussing with Dr. Marc Ballouz about "Unsaturated Soils".

[Watch ISSMGE Interactive Technical Talks](#)

Call for Abstracts: 5th International Conference on Transportation Geotechnics

Jennifer Nicks / [TC202](#) / 14-04-2023

On behalf of the Organising Committee, we have the pleasure of inviting you to the 5th International Conference on Transportation Geotechnics (ICTG) 2024, to be held in Sydney, Australia from 20 to 22 November 2024 at the Sydney Masonic Centre, organised by the Transport Research Centre, University of Technology Sydney (UTS), in liaison with ISSMGE Technical Committees, Transportation Geotechnics (TC202), Ground Improvement (TC211), Sustainability in Geotechnical Engineering (TC307) and the Australian Geomechanics Society (AGS).

The Conference will aim at promoting concepts and applications predominantly in the fields of sustainable transport infrastructure design, associated ground improvement and natural hazards mitigation. This major event will act as a platform to disseminate the most recent research and field advances to the geotechnical community around the globe through active pathways of academia and practice. Outstanding Keynote lectures, State of the Art and State of Practice Lectures, ISSMGE Bright spark lectures and Australian Heritage Oration, together with brain-storming technical discussions will highlight three days of scientific and technical discourse, followed by attractive excursions encompassing the awesome natural landscape of the state of New South Wales (NSW).

Conference Chair

Distinguished Prof Buddhima Indraratna (Director, UTS Transport Research Centre) Buddhima.Indraratna@uts.edu.au

Technical Program Chair

Prof Chalachat Rujikiatkamjorn (UTS & AGS Sydney Chapter) Chalachat.Rujikiatkamjorn@uts.edu.au

Please plan to join us in Sydney as we reconnect and share our experiences.

Abstracts submissions site: <https://ictg2024-c10000.eor-ganiser.com.au/index.php?r=site/login>

All abstracts must be submitted online only by Friday 30 June 2023.

Abstract Themes: The themes of the Conference include all design, analysis, construction, maintenance, site investigations and field monitoring aspects of pavements, highways, railways and ports, including related ground improvement and sustainability perspectives of current and future transportation infrastructure (see below for more information).

Call for Abstracts

5th International Conference on Transportation Geotechnics
Ground Improvement and Evolving Technologies
for Sustainable Transport Infrastructure



20-22 November 2024
Sydney Masonic Centre, Australia



IMPORTANT DATES

Abstract Due: 30 June 2023

Full paper submission: **28 February 2024**

Final paper submission: **30 May 2024**

Conference Chair:

Distinguished Prof. Buddhima Indraratna
(buddhima.indraratna@uts.edu.au)

Abstract submission site:

<https://ictg2024-c10000.eorganiser.com.au/>



Conference website:

www.ictg2024.com.au

For all General Enquiries regarding the Conference, please contact our Conference Manager: ictg2024@arinx.com.au

For specific Technical Program Enquiries, you may contact ictg2024@uts.edu.au (c/o Prof. Chulachit Rajkietkarnjorn, Chair, Technical Program Committee or Conference Chair, Prof. Buddhima Indraratna)

OVERVIEW

It is our great pleasure to invite you to the 5th international conference on transportation Geotechnics (ICTG2024).

This conference will focus on the current challenges associated with transport infrastructure development and will act as a platform to disseminate the most recent research and field advances to the engineering community. Presentations from leading experts, professionals, and industry specialists will display technical advances and experience related to transport infrastructure. Keynote and invited lectures from world-renowned experts in transport infrastructure will add value to the technical skills of all participants. The conference will act as a platform for delegates to share the issues, knowledge transfer, and to learn the impact of emerging and sustainable technologies. The conference will include the ISSMGE's 5th Proctor Lecture, 2-3 Bright Spark Lectures, keynote speakers and State of the Art, State of Practice and Heritage Lectures.

Please submit via: <https://ictg2024-c10000.eorganiser.com.au/>

Technical Themes



- Mechanistic-empirical design (road, railways, airfields, waterways and harbor facilities)
- Optimized characteristics of geomaterials (e.g., hydraulically bound materials & asphalt mixtures)
- Recycled materials in road and rail embankments and sub-structural layers
- Sustainability in transportation geotechnics
- Fundamentals of road and rail geotechnics
- Offshore soil improvement, port development and harbour geotechnics
- Dynamics of Transportation Infrastructure and Numerical Modelling
- Soft Subgrade Instability including yielding and fluidisation (experimental and numerical)
- Behaviour of Airfields and Pavement structures
- Transition Zones for railways
- Applied Ground Improvement methods for Transportation Infrastructure
- Stabilisation and reinforcement of geomaterials and waste materials
- Geosynthetics in transportation applications
- Geotechnics in underground transportation including tunnels
- Use of Rigid Inclusions and Retaining Structures for Enhanced Stability
- Pile-supported transport infrastructure
- Geotechnical-seismic vulnerability of transportation infrastructures
- Subsurface sensing for transportation infrastructure
- Intelligent construction in earthworks technology and management
- Climatic effects on the behavioral transformation of geomaterials
- Properties and behavior of Unsaturated subgrade and compacted fills
- Slope stability and risk management in relation to transport corridors
- Transport asset management
- Planning and design of mega transport projects,
- AND MORE



ABSTRACT FORMAT (Template and instructions can be downloaded from <https://ictg2024-c10000.eorganiser.com.au/>)

TITLE OF PAPER HERE

[First Name] [Last Name] & [First Name] [Last Name] (Indicate the presenter in bold font, Arial, 10pt)
[Department], [Affiliation], [Country], [Presenter's email address] (Same affiliation)
[First Name] [Last Name]
[Department], [Affiliation], [Country]

ABSTRACT

The abstract should summarise the scope of the paper and outline the impact of the work. Your abstract should not be longer than 250 words.

Papers should be typed in Arial 10pt using MS Word (.docx) in A4 format and should not exceed six (6) pages. Note that no copyright transfer is required for the Conference papers, but only the permission to publish.

Please submit via: <https://ictg2024-c10000.eorganiser.com.au/>



Proceedings from the 10th International Conference on Physical Modelling in Geotechnics available in open access

ISSMGE IT Administrator / General / 26-04-2023



The Innovation and Development Committee of ISSMGE is pleased to announce that through the initiative of the Korean Geotechnical Society (KGS), the 205 papers from the proceedings of the 10th International Conference on Physical Modelling in Geotechnics (ICPMG2022) are available in the ISSMGE Online Library here:

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

ICPMG2022 was held in Daejeon, South Korea from September 19th to September 23rd in 2022. Acknowledgements for the symposium can be found at the ISSMGE online library acknowledgements section

The 5th ERTC10 Webinar on the Second Generation of Eurocode 7 - Ground Model, Representative Values and Reliability-Based Design

Witold Bogusz / [ERTC10](https://www.ertc10.org/) / 19-04-2023

The 5th Webinar organised jointly by ISSMGE ERTC10, CEN TC250 SC7 and NEN is now open for registration:

Novel elements in the Second Generation of Eurocode 7 - Ground model, representative values and reliability-based verification of limit states

Time: Wednesday, **24.05.2023, 15:00-17:00 CEST**

The webinar will be only 2h long and it is free of charge.

It will cover aspects of the new version of Eurocode 7 related to:

- Assembling the Ground Model for design - presented by Håkan Garin
- Selection of representative values of parameters, how to get from derived to design values - presented by Jose Estaire
- Reliability-based methods as alternative to use of partial factors in design based on calculations - presented by Timo Schneckendiek
- Some very interesting design examples (e.g. use of probabilistic methods in FEM calculations in line with Eurocode 7) - presented by Alexandra Ene

Link to the website with the registration form: <https://webinar-eurocode7-groundmodel.nen-evenementen.nl/>

Invitation to participate in continuing TC106 (Unsaturated Soils) - TC306 interactions

Marina Pantazidou / [TC306](https://www.tc306.org/) / 24-04-2023

At the PanAm UNSAT 2021 preconference webinar "**Teaching unsaturated soil mechanics at the undergraduate level**" (Del Fredlund, Bernardo Caicedo, John McCartney, Katia Bicalho, Gilson Gitirana), we heard about how specialists teach unsaturated soil mechanics in their undergraduate courses.

Next week on May 3rd, a follow up panel discussion will take up the perspective of the non-specialist at the UNSAT 2023 in Milos Island, Greece: "**Unsaturated Soil Mechanics instruction: Guiding the non-specialist instructor**". Panelists Sandra Houston, John McCartney and Alessandro Tarrantino have been asked by panel moderator Marina Pantazidou to give their answers to [14 questions, which have been posted at the conference site](#).

You are invited to [visit the UNSAT 2023 site](#), take a look at the questions and join the discussion by sending comments, answers and additional questions to the panel moderator.



News

<https://www.isrm.net>

7th Peruvian Symposium on Geoengineering 2023-04-13

The Peruvian Geotechnical Society is organizing the 7th Peruvian Symposium on Geoengineering, to take place at the Hilton Garden Inn, in Lima, Peru, from 29 November to 1 December.

[Click here for the conference website.](#)

New ISRM National Group of Bangladesh 2023-04-21

It is with great pleasure that we welcome the Bangladesh Society for Rock Mechanics - BSRM as the new ISRM National Group of Bangladesh



Scooped by ITA-AITES #89, 4 April 2023

[Advanced tunneling technology used in China's high-speed railway construction](#)

[Yonge Street Project combines trenchless rehab, new install practices | Canada](#)

[Chennai Metro Rail phase 2: Tunnelling to begin in T Nagar in Oct | India](#)

[Construction of country's longest mountain tunnel in full swing | Philippines](#)

[Tokyo averts floods with an intricate cavern of underground tunnels and vaults | Japan](#)

[Tunnelling in Greece, a culture of underground activities](#)

[HS2 tunnelling team celebrated TBM breakthrough | UK](#)

[Exploring the world of underground urban farming](#)

[New Seattle underwater tunnel to connect downtown to Bainbridge | United States of America](#)

[Light Rail Tunnel Karlsruhe | Germany](#)

[Queensland government reveals Cross River Rail cost blow-out of \\$960 million, now not due to open till 2026 | Australia](#)

[Countdown begins for Türkiye's high speed train, metro lines](#)

Scooped by ITA-AITES #90, 18 April 2023

[A third tunnel boring machine has been launched by HS2 in London | UK](#)

[Work on Zojila Tunnel in full swing, India to get Asia's longest tunnel by 2026 | India](#)

[Swiss' underground mission: Soilless crop cultivation](#)

[£844M tunnelling contract awarded for Austria's longest section on the Brenner Base Tunnel](#)

[Mountain Tunnel, key piece of Bay Area water infrastructure, getting major overhaul | U.S.A](#)

[Elsie completes stretch to SkyTrain station at city hall | Canada](#)

[East River Tunnel Rehabilitation Project RFQ launched | U.S.A.](#)

[ITA and TAI Presidents meet at Delhi Metro headquarters | India](#)

[New breakthrough made in China's Helan mountain railway tunnel construction | China](#)

[1st tunnel breakthrough for Delhi section of rapid rail linking Meerut | India](#)



BTS Young Member Workshop

Monday 03rd April 2023 from 10:00 to 17:30 hrs

The British Tunnelling Society Young Members workshop will cover the role of sustainability in underground construction

projects and provide examples. It will also cover waterproofing in underground structures.

Programme

Sustainability and Underground Space - Dr Chrysothemis Paraskevopoulou (PhD, MSc, MEng) Assistant Professor, University of Leeds

Sustainable ground engineering – What are the opportunities? - Dr Helen Reeves, Director of Ground Engineering, Jacobs

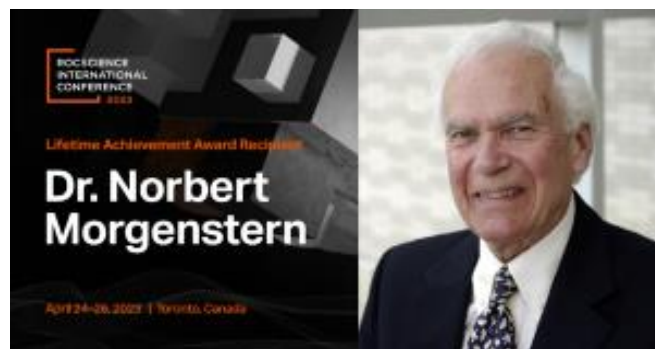
Role of engineering geology in the energy transition and ensuring safety of underground Gas Storage - Dr Carla Martin Clave, Engineering Geologist, Jacobs

An activity in sustainable solutions in Underground Projects - Sandeep Singh Nirmal, Senior Tunnel Engineer, Jacobs

Risk mitigation approach in underground waterproofing - Stefano Anzani, Business Development Manager, MAPEI (Lee Wildman, Specifications Manager, MAPEI to be in attendance)

Waterproofing in Underground Projects 2

An activity on waterproofing materials - (Showcasing samples of the products) MAPEI



During RIC2023, Rocscience awarded the 2023 Lifetime Achievement Medal to Dr. Norbert Morgenstern, an internationally recognized authority in the engineering community. As both a practitioner and educator, Dr. Morgenstern's contributions to the geotechnical community continue to benefit engineers worldwide.

BTSYM Lecture Euston Station LU tunnels for HS2: Design and Construction

Speakers: Benjamin Lafarga & Matt Hubble

Thursday 20th April 2023 at 18:00 to 19:00 hrs



The construction sequence of the project, involving the excavation, construction of the Euston Station box and associated oversite development, led to challenging unloading and re-loading load combination. In addition to this, the new connection to the more than 100 years old cast iron LU existing assets added further complexity to the design requirements. This incredibly durable design, joining old and new and along with the world wide material shortages led to several challenges for the construction.



ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

UNSAT 2023 - 8th International Conference on Unsaturated Soils, 2-5 May 2023, Milos island, Greece, www.unsat2023.org

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

2nd International Workshop on Complex Formations, 9th May 2023, Torino, Italy, agi@associazionegeotecnica.it

NROCK2022 - The IV Nordic Symposium on Rock Mechanics and Rock Engineering, 24 - 26 May 2023, Reykjavic, Iceland, www.nrock2023.com

Underground Construction Prague 2023, May 29 - 31, 2023, Prague, Czech Republic, www.ucprague.com

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

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

SuperPile'23 Piling Design & Construction Conference, June 7-9, 2023, Atlanta, USA, www.dfi.org/superpile2023

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

RETC2023 Rapid Excavation and Tunneling Conference, June 11-14, 2023, Boston, USA, www.retc.org/index.cfm

ICOLD Annual Meeting 2023, 11th to 15th June 2023 Gothenburg, Sweden, <https://icold-cigb2023.se>

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

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

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

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

GEO-RISK 2023 Advances in Theory and Innovation in Practice, July 23-26, Arlington, Virginia, USA, www.geo-risk.org

STPRFC 3rd Edition Short-Term Prediction of Rock Failure Competition August 2023, Taiyuan, China, alv-1001@163.com, zc-feng@163.com

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

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

ISMLG 2023 - 4th International Symposium on Machine Learning & Big Data in Geoscience, 29 August - 1 September 2023, University College Cork, Ireland, www.ismlg2023.com

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

6th Meeting of EWG Dams and Earthquakes Workshop on Case studies, September 5, 2023, Interlaken, Switzerland, guillaume.veylon@inrae.fr

12th ICOLD European Club Symposium "Role of dams and reservoirs in a successful energy transition", 5 to 8 September 2023, Interlaken, Switzerland, www.ecsympo-sium2023.ch

NGS 2023 10th Nordic Grouting Symposium, 11 - 13 September, 2023, Stockholm, Sweden www.ngs2023.se

SUT OSIG 9th International Conference "Innovative Geotechnologies for Energy Transition", 12-14 September 2023, London, UK, www.osiq2023.com, www.sut.org

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



XX Technical Dam Control International Conference
Safety of Hydraulic Structures
12-15 September 2023, Chorzów Poland
<https://tkz.is.pw.edu.pl>

We warmly invite you to participate in the 20th jubilee edition of the Technical Dam Control International Conference TKZ'2023. The conference will be held on 12-15 September 2023.

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

The conference will be held in a hybrid formula – stationary in Hotel Diament Arsenal Palace in Chorzów (Poland) and online via a streaming platform.

Conference topics

- 140th anniversary of Silesian Waterworks Company
- Dam safety
- Geotechnical aspects of water engineering structures
- Exploitation, maintenance and renovation of hydraulic structures
- Modern technologies and methods of designing and monitoring water engineering facilities
- Hydraulic transport and wet waste disposal
- Hydroelectricity
- Role of hydraulic structures in shaping waterways
- Sustainable development and impact of hydraulic structures on environment
- Water retention in urban areas

ORGANIZING COMMITTEE

Division of Hydro-Engineering and Hydraulics
Faculty of Building Services, Hydro and Environmental Engineering
Warsaw University of Technology
Nowowiejska St., 20, 00-653 Warsaw
Tel. +48 22 234 74 53
Email tkz.ibs@pw.edu.pl



17-21 September 2023, Copenhagen, Denmark
<https://icse11.org>

Welcome to the 11th International Conference on Scour and Erosion 2023

It is a great pleasure to welcome you to the 11th International Conference on Scour and Erosion 2023 which will be held in Copenhagen on 17-21 September 2023.

We will celebrate what new things we have discovered together, what we have learned from our discoveries and what we can achieve together.

ICSE11 will be held in collaboration with the Danish Technical University and DHI.

LIST OF TOPICS

- **Track A:** Mechanics of Internal Erosion. Including sub-topics such as mechanisms, field studies and observations, theoretical assessment of internal erosion mechanisms.
- **Track B:** Sediment Transport: Grain Scale and Continuum Scale. Including sub-topics such as advancement in sediment transport theories, tools, and new data sets for the understanding of sediment particle motion at both

grain scale and continuum scale, and the implications for scour.

- **Track C:** Effects of Geology on Internal Erosion. Including sub-topics such as anisotropy, heterogeneity, random field analysis, field investigations versus actual conditions.
- **Track D:** Rock Scour. Including sub-topics such as theoretical, computational, laboratory, and field studies on rock scour processes. Spillway and stilling basin erosion.
- **Track E:** Erosion and Structures. Including sub-topics such as offshore wind foundation scour interaction with seabed, inter-array cables, cable-protection systems, bridge scour, internal erosion along structures, erosion around foundations, physical processes controlling the local scour around structures; interactions among fluid flow, sediment, and structures; new techniques and designs to alter the flow and scour processes.
- **Track F:** River, Coastal, Estuarine and Marine Scour and Erosion. Including sub-topics such as scour and erosion research and case studies specific for the riverine, coastal, estuarine and marine environments.
- **Track G:** Numerical Modelling of Scour and Erosion. Including sub-topics such as advanced computing techniques, numerical schemes, novel approaches for data assimilation, uncertainty quantification and analysis. Field and laboratory scale.
- **Track H:** Physical Modelling of Scour and Erosion. Including sub-topics such as scale models, flume tests for internal and surficial erosion, centrifuge testing, small and large-scale testing.
- **Track I:** Erosion Monitoring and Measurement. Including sub-topics such as novel sensors and instruments, subsurface monitoring, underwater monitoring, innovative techniques, interpretation methods and data processing techniques for monitoring and measuring scour and erosion across spatial and temporal scales.
- **Track J:** Watershed Scale Soil Erosion, Restoration, and Conservation. Including sub-topics such as technology, management, and policy for the control of soil erosion at watershed scale including effect of land use change, riparian buffer construction to reduce sediment input, reservoir sedimentation and management.
- **Track K:** Scour and Erosion Countermeasures and Mitigation. Including sub-topics such as applications of both traditional and emerging countermeasures to scour and internal erosion problems.
- **Track L:** Geo-Hazards Induced by Scour and Internal Erosion. Including sub-topics such as debris flows, landslide, bank erosion, river meandering, and their impact to infrastructure.
- **Track M:** Erosion Risk Assessment. Including sub-topics such as assessment methods, risk assessment methods, mitigation methods, monitoring.
- **Track N:** Case Histories, Lessons Learned, and General Practice. Including practical aspects and lessons learned on technical topics in Tracks A through K such as success and failures related to innovative solutions, construction experience, field observations, etc.
- **Track O:** Impact and Adaptation: flooding, drought, and scour in a changing climate. Including sub-topics such as changing patterns of flooding and drought due to changing climate, potential effects of changing climate on scour prediction

Contact Us

Address: ICSE11 secretariat: c/o CAP Partner

Nordre Fasanvej 113
DK-2000 Frederiksberg
Denmark

Phone: +45 70 20 03 05
Fax: +45 70 20 03 15
Email: info@cap-partner.eu



XII ICG - 12th International Conference on Geosynthetics,
September 17 – 21, 2023, Rome, Italy, www.12icg-roma.org

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

Charles-Augustin COULOMB : A geotechnical tribute, 25 – 26
September 2023, Paris, France, www.cfms-sols.org/organi-sees-par-le-cfms/charles-augustin-coulomb-geotechnical-tribute



GEOCASE 2023

**International Conference on
“Case Histories In Geotechnical Engineering”
&**

**4th AsRTC6 Urban Geoengineering Symposium
September 25 – 28, 2023, Bandung, Indonesia
www.geocase2023.com**

The committee of International Conference on CASE HISTORIES IN GEOTECHNICAL ENGINEERING and 4th AsRTC6 “Urban GeoEngineering” Symposium (GEOCASE 2023 cordially invites you to participate and contribute papers in the conference. The committee of GEOCASE 2023 also welcomes members of the Indonesian Geotechnical Society (HATTI), International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), Ministry of Public Works and Housing, Institution of Civil Engineers (ICE), government of Indonesia, geotechnical engineers, and all interested parties to attend and share knowledge in this important conference.

Forth AsRTC6 “Urban GeoEngineering” symposium under International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) will be hosted simultaneously at the same venue and the symposium will focus to present academic and practical works in aspects of deep excavation, tunneling and urban regeneration so any paper related is welcome to be submitted.

Secretariat GEOCASE 2023
geocase2023@gmail.com
secretariat.geocase2023@gmail.com



SEG23 Symposium on Energy Geotechnics, 3-5 October
2023, Delft, The Netherlands, <https://seg23.dryfta.com>



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

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

Contact person: PhD Ivan Luzin
Address: NR MSUCE, 26 Yaroslavskoye shosse
Phone: +7-495-287-4914 (2384)
Email: youngburo@gmail.com



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

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



The Second Mediterranean Symposium on Landslides “Slope Stability in Stiff Fissured Clays and Soft Rocks”

**October 5-7, 2023, Hammamet, Tunisia
<https://msl-2023.webnode.fr>**

Landslides represent a relevant problem for most of the countries overlooking the Mediterranean. This trivial consideration should prompt researchers, professionals, and stakeholders in this region to form closer relationships and engage themselves in a continuous exchange of data and ideas to find common strategies of landslide risk mitigation. A common problem concerns the stability of slopes and in particular stiff fissured clays and soft rocks, which are widespread all over the region, posing major problems to the development of these areas. It is evident that the behaviour of such a wide and complex class of materials, spreading across large areas

in this corner of the world, cannot be interpreted simply through the basic laws of the Soil or Rock Mechanics. With the goal in mind of urging people living on the Mediterranean to join their efforts, we have organized the second Mediterranean Symposium on Landslides, hoping that this event will be an occasion to strengthen our scientific and technical knowledge's.

SESSIONS

Session 1 Geological Settings, Triggers and Mechanisms

Session 2 Site, Laboratory Investigations and Monitoring

Session 3 Weather and earthquake-induced Landslides

Session 4 Remedial Measures

The **MSL - 2023** will also be online and the link will be published on the conference website.

Contact

Hotel "Diar Lemdina", Hammamet, TUNISIA

medsymplandslides23@gmail.com

<https://www.facebook.com/MSL2023>



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

HYDRO 2023 New Ideas for Proven Resources, 16-18 October 2023, Edinburgh, Scotland, www.hydropower-dams.com/hydro-2023



**1st International Conference on
Geotechnics of Tailings and Mine Waste**
**24th to 26th, October 2023, Ouro Preto, Minas Gerais,
Brazil**

<https://geominouropreto.com.br/2023/icgtmw2023>

The 1- ICGTMW 2023 is going to be held from 24th to 26th, October 2023 in Ouro Preto, State of Minas Gerais, Brazil. The 1-ICGTMW 2023 is organized by the Brazilian Geotechnical Society under the auspices of the International Society of Soil Mechanics and Geotechnical Engineering – Technical Committee TC221 on Tailings and Mine Waste. This conference aims to bring together engineers, scientists, researchers, educators and practitioners, with the purpose of generating a forum for discussion, knowledge exchange and dissemination of the best engineering practices in different geotechnical issues related to tailings storage facilities (TSF) and mine waste. The event will take place in parallel with the Geo-

min Symposium, a Brazilian event that attracts different stakeholders and practitioners from the mining industry.

Topics include, but are not limited to, the following:

- Undrained shear resistance of tailings
- Mechanical behavior of tailings
- Mechanical behavior of mine waste
- Advanced monitoring of TSF (UAV, Satellite, etc.)
- Construction methods of TSF
- Field testing in TSF
- Sampling and laboratory testing of tailings
- Constitutive modelling of tailings
- Case histories
- Limit Equilibrium Analysis of TSF
- Effective-Stress (Deformation) analysis of TSF
- Static and seismic stability of TSF
- National and international standards, recommendations, rules
- Geomechanical characterization of chemically unstable tailings
- Conventional and non-conventional tailings deposition.

Contact

E-mail: secretaria@nrmg-abms.com



**21st Southeast Asian Geotechnical Conference &
4th AGSSEA Conference**

25th to 27th October 2023, Bangkok Thailand

<https://seagcagssea2023.com>

Thai Geotechnical Society, Southeast Asian Geotechnical Society under the auspices of Association of Geotechnical Societies in Southeast Asia (AGSSEA) are delighted to welcome you all to the 21st Southeast Asian Geotechnical Conference and 4th AGSSEA Conference (SEAGC-AGSSEA 2023) from 25th to 27th October 2023 at the "Centara Grand & Bangkok Convention Centre, CentralWorld, Bangkok Thailand.

The conference is organized by Thai Geotechnical Society and Southeast Asian Geotechnical Society under the auspices of Association of Geotechnical Societies in Southeast Asia (AGSSEA) and International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). Since the first Southeast Asian Geotechnical conference in Bangkok in 1967, which was followed by a series of successful conferences held in each member society of the region, the 21st Southeast Asian conference will be back to the place of its beginning. Again, our geotechnical colleagues in the region and many other places around the world will have the unique opportunity to meet and exchange ideas as well as establish a stronger networking and friendship.

Conference Themes

The theme of the conference is "Innovative geotechnology to meet new challenges in the region and beyond". Topics of the conference includes, but not limited to,

- Soil characteristics, Engineering geology and investigation
- Slope, Dam and embankments
- Shallow and deep foundations
- Soil dynamics and geotechnical earthquake engineering
- Geosynthetics and Ground improvement
- Geo-Energy and Geoenvironmental engineering
- Geotechnical reliability, risk assessment and management
- Offshore engineering
- Regional development and Sustainability (Green geotechnology)
- Climate change and Natural disasters
- AI and machine learning in Geotechnics



ACUUS SINGAPORE 2023 18th Conference of the Associated Research Centers for the Urban Underground Space "Underground Space – the Next Frontier", 1 - 4 Nov 2023, Singapore, www.acuus2023.com

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

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

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

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

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

9th International Symposium on RCC Dams and CMDs December, 2023, Guangzhou, China, www.chincold-smart.com/meetings/rcc2023



**7th International Conference Series on
Geotechnics, Civil Engineering and Structures
(CIGOS)
April 4-5, 2024, Ho Chi Minh City, Vietnam**

Organiser: Association of Vietnamese Scientists and Experts (AVSE Global) and University of Architecture Ho Chi Minh City (UAH)

Contact person: cigos2024@sciencesconf.org
Email: cigos2024@sciencesconf.org



World Tunnel Congress 2024 19 to 25, April, 2024, Shenzhen China, www.wtc2024.cn



**International Conference of
Geotechnical Engineering
April 25-27, 2024, Hammamet, Tunisia
www.icge24.com**

On behalf of the organizing committee, I am delighted to invite you to attend the International Conference of Geotechnical Engineering (ICGE'24) scheduled in Hammamet, Tunisia, on April 25-27, 2024. This conference aims to bring together researchers and engineers around the most recent advances in geotechnical engineering. The attendance of experts in geotechnical engineering will provide an enriched technical program highlighting the strong link with soils mechanics specialists. The program of the ICGE'24 includes keynote lectures delivered by high selected speakers, technical-scientific parallel sessions, one-day workshops and site visits.

THEMES

Geotechnical Engineering

- Soil characterization
- Soil Behavior
- Ground Improvement
- Foundations
- Urban excavations
- Underground constructions
- Slope stability and landslides
- Unsaturated soils and hydraulic works
- Soil dynamics and earthquake engineering

Rock Mechanics

- Characterization of intact rocks and rock masses
- Computational methods for rock mechanics big data
- Constitutive models in prediction of rock behavior
- Dynamic phenomena in rock mechanics

- Fracture and damage of rocks
- Hydraulic fracturing
- Petroleum reservoir and well geomechanics
- Rock heterogeneity and multiscale approaches
- Rock slope supporting structures
- Rock tunneling
- Seismic behaviors of rock masses
- Geothermal applications

Applied geophysical engineering

- Exploration geophysics
- Characterization of sub-soil with geophysical methods
- Geophysical modelling and inversion
- Environmental geophysics
- Hydrological problems
- Numerical approaches for seismic site responsible
- Seismic risk management
- Dynamic soil-structure interaction effects
- Seismic hazard, ground motion records and prediction
- Risk management with applied geophysics

Geomatics and Environmental Engineering

- Georisk: Modelling and Monitoring
- Remote Sensing and GIS Application for Land use
- Climate change: process and impacts
- Geo-Matching : Concepts and Modelling (ACM)
- GEODESIGN: Modelling and technologies
- Architectural photogrammetry and applications to Cultural Heritage
- Smart city and environment
- Reactive-city: modelling and visualization of the city in movement
- GIS and Augmented reality

Contact: Email: contact@icge24.com



GEO AMERICAS 2024 5th Pan-American Conference on Geosynthetics Connecting State of the Art to State of Practice
April 28 – May 1, 2024, Toronto, Canada, www.geoamericas2024.org



International Foundation Congress and Equipment Expo

May 7 –10, 2024, Dallas, USA

<https://web.cvent.com/event/c42dd622-dd91-409f-b249-2738e31c9ef5/summary>

IFCEE has always been the premiere foundations event. For 2024, we are bringing it to a whole new level. We want the engineering and contracting community to dig in, see more and learn more. We're for presentations and session ideas (indoors and outdoors) that are beyond the norm. Project stories not shared anywhere else; research that is on the edge of the edge; failure stories that can inform future generations; and interesting concepts to make a better, smarter workforce. This is the place to raise eyebrows, to elicit oohs and aahs, and to **MAKE A BIG DIFFERENCE!**

Topics

• Track 1 – Drilled Foundations

- Drilled shafts/bored piles
- CFA/augered cast-in-place/drilled displacement piles
- Micropiles
- Helical piles
- Load bearing elements (LBES)

• Track 2 – Driven Foundations

- Driven piles
- Sheet piles
- Cofferdams

• Track 3 – Earth Retaining Systems

- Deep excavations
- Anchors and soil nails
- Dewatering and excavation stabilization
- Landslide and slope stabilization

• Track 4 – Ground Improvement and Seepage Control

- In situ reinforcement and treatment
- Soil mixing
- Grouting
- Densification
- Seepage control barriers (slurry walls, trenching)
- Bioremediation and bio-inspired techniques

• Track 5 – Emerging and Innovative Technologies

- Current research
- Technology development
- Applications to foundations and excavations
- Recent advancements
- Future directions

These topics serve as a first step in the process of assessing how to review the submissions and eventually sort them into conference sessions.



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





11th International Symposium of Geotechnical Aspects of Underground Construction in Soft Ground

<https://is-macau2024.skliotsc.um.edu.mo>

TC204 of the ISSMGE was first established in 1989 as TC28 and has made major commitments towards collecting information concerning the geotechnical aspects of the design, construction and analysis of deep excavations, tunnels and large underground structures in the urban environment. The first symposium was held in New Delhi in 1994 and nine more symposia were held in London (1996), Tokyo (1999), Toulouse (2002), Amsterdam (2005), Shanghai (2008), Rome (2011), Seoul (2014), Sao Paulo (2017) and Cambridge (2022). The 11th International Symposium of Geotechnical Aspects of Underground Construction in Soft Ground (IS-Macau 2024) will be held in Macao SAR, China on June 14 – 17, 2024. It is organized by State Key Laboratory of IoT for Smart City (IoTSC) and Department of Civil and Environmental Engineering at the University of Macau and TC204 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).

The theme of IS-Macau 2024 is "Tunnelling and Underground Construction for Smart Cities". This highly successful series of TC204 symposium provides a premier forum for researchers and practitioners to present and discuss new problems, solutions, and technologies in underground construction and related areas. IS-Macau 2024 will solicit high-quality original research for publication in the conference proceedings and a special issue in the journal of Underground Space.

Conference themes

The theme of IS-Macau 2024 is "Tunnelling and Underground Construction for Smart Cities". We will invite prominent scholars and experts to give keynote speeches, sharing their latest achievements in geotechnical aspects of the analysis, design, construction and maintenance of deep excavations, tunnels and large underground structures, as well as the applications of the Internet of Things (IoT) and Artificial Intelligence (AI) in smart construction and maintenance of underground infrastructures towards the development of smart cities.

TOPICS

- Basic Properties of Soft Soils
- Constitutive and Numerical Modelling
- New Technologies of Ground Improvement in Soft Ground
- Big Data, Artificial Intelligence, and Machine Learning in Tunnelling and Underground Engineering
- Sustainability and Resilience of Underground Infrastructure
- Smart Monitoring and Visualization Technologies for Tunnelling and Underground Construction
- Observation Method in Underground Construction
- Field Case Studies

Contact Us

ismacau2024@um.edu.mo



ISC'7

CONFERENCE
BARCELONA

18 - 21 June 2024

7th International Conference on Geotechnical and Geophysical Site Characterization
"Ground models, from big data to engineering judgement"

Barcelona, Spain | June 18-21, 2024

<https://isc7.cimne.com>

The ISC (International Conference on Geotechnical and Geophysical Site Characterization) conferences are regular events promoted by [ISSMGE's TC102](#) (Technical Committee for Ground Property Characterization from In-Situ Tests) to gather experts and practitioners in the areas of geotechnical characterization, with special emphasis on in situ mechanical and geophysical testing tools and procedures. Since 1998, geotechnical engineers, geologist and geophysicists from all over the world have gathered at ISCs in Atlanta (1998), Porto (2004), Taipei (2008), Recife (2012), Gold Coast (2016) and Budapest (2021) to share their knowledge and experiences.

That successful sequence will continue in Barcelona (Spain) where the **7th ISC will take place at the Campus Nord facilities of UPC BarcelonaTech** from the 17th to the 21st of June 2024. Endorsed by the Spanish Society for Soil Mechanics, ISC7 aims to be a gathering point for all professionals and experts in the field. The conference sessions will blend applications and research in the field with focal points on aspects such as the development of ground models for large and small projects, the direct application of in situ tests for design of geotechnical structures, the development of new testing apparatus and procedures, the integration of monitoring techniques in site characterization, the role of big data and machine learning in site characterization, the use of numerical simulation techniques as an aid to geotechnical and geophysical testing or the specific challenges associated with the characterization of tailing storage facilities.

Conference Themes

- Technological developments in geotechnical and geophysical field testing instruments and procedures
- Interpretation of In situ test results
- Data driven site characterization
- Ground models: procedures and results
- Direct design of geotechnical structures based on in situ test results
- Monitoring for site characterization
- Thermal and thermomechanical site characterization

- Remote sensing in site characterization
- Characterization of human-originated deposits (tailings, MSW, fills...)
- Simulation aided site characterization
- Uncertainty and variability in site characterization
- Rock and residual soil characterization
- Liquefaction risk assesment
- Sustainable site investigation
- Case histories
- Other topics

Conference Secretariat

CIMNE Congress Bureau
Campus Nord UPC
Building C1 - Office C4
C/ Gran Capità, S/N 08034 Barcelona, Spain
Tel. +34 93 405 4694

Conference Secretariat: isc2024secretariat@cimne.upc.edu



WCEE2024 18th World Conference on Earthquake Engineering, June 30 - July 5, 2024, Milan, Italy, www.wcee2024.it



Third International Conference on Press-in Engineering

3 (Wed) - 5 (Fri) July 2024 | Singapore

<https://2024.icpe-ipa.org>

Press-in engineering technique is now commonly employed in many countries to install sheet pile retaining structures, coastal protection facilities and other structures reducing noise, vibration, and time. In some cases, pipe piles have been installed by means of press-in technique for the foundations to support the buildings. The inaugural Press-in Engineering Conference (ICPE2018) was successfully completed in Kochi, Japan in September 2018, and the Second Conference (ICPE2021) was also successfully held receiving many positive feedbacks. Each of the above conferences attracted several hundred participants. As press-in technique is also commonly employed in Singapore and other Southeast Asian countries, Singapore is going to host the third international conference ICPE2024 from 3 to 5 July 2024.

Besides traditional press-in techniques, the latest development is to employ press-in technique in order to achieve carbon neutrality, environmental protection and tackling climate change issues such as protection against rising sea levels. Construction cases of the applications, which have been already constructed, are under construction or under planning, include those in the Netherlands, Egypt, Senegal, Australia, India, and the Philippines etc. As such, the theme of ICPE2024 is 'Superiority of Press-in Piling towards Sustaina-

ble Construction in Tackling Climate Change for Infrastructure Development'. In fact, ICPE2021 already held special sessions on disaster prevention and mediation and this and other related topics relevant to the conference theme will be further expanded in the course of keynote lectures presenting the latest know-how on the topics to be presented in ICPE2024. It is intended that Bulletin 2 of the conference with the details of keynote/invited lectures, conference venue and registration as well as accommodation information will be released by the end of the first quarter of 2023.

Key Theme: Superiority of Press-in Piling towards Sustainable Construction in tackling Climate Change for infrastructure development

Topics

- Pile Performance
- Piling Mechanism
- Infrastructure Development
- Disaster Prevention and Mitigation
- Climate Change
- Project Management (Intangible Benefits)
- Quality Assurance
- Case Histories
- Miscellaneous

ICPE 2024 Organizing Committee/ International Press-in Association

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IS Landslides 2024 International Symposium on Landslides "Landslides across the scales: from the fundamentals to engineering applications" & IS Rock Slope Stability 2024, July 7-12th, 2024, Chambéry, France, www.isl2024.com

EUROCK 2024 ISRM European Rock Mechanics Symposium New challenges in rock mechanics and rock engineering July 15-19, 2024, Alicante, Spain, www.eurock2024.com

ECSMGE 24 XVIII European Conference on Soil Mechanics and Geotechnical Engineering, 26-30 August 2024, Lisbon, Portugal, www.ecsmge-2024.com



ISIC 2024

4th International Conference of International Society for Intelligent Construction

10 - 12 September 2024, Orlando, United States

www.is-ic.org/conferences/2024-isic-international-conference

The 4th International Society for Intelligent Construction (ISIC) international conference (ISIC 2024) will

be held in Orlando, Florida, USA, from September 10 to 12, 2024.

Intelligent construction technologies (ICT) are combinations of modern science and innovative construction technologies. The International Society for Intelligent Construction (ISIC) provides a forum for disseminating knowledge concerning the collection, analysis, and application of ICT for infrastructure. ISIC's mission is to promote ICT applications to the life cycle of infrastructure (survey, design, construction, operation, and maintenance/rehabilitation) while adapting to environmental conditions and minimizing risk. The goals of ISIC are to improve the quality of construction, reduce costs, and promote safety. ISIC 2024's theme is "**Sustainability through Technologies**". It is organized and hosted by the [ISIC North America Chapter](#) and [National Center for Pavement Preservation \(NCPPE\)](#).

Topics

- Technology Innovations (3D designs, machine controls, etc.)
- Robotic/Automation
- Material Delivery Management System (MDMS) (expanded e-Ticketing, Digital As-Built)
- Quality Control & Monitoring (Intelligent Compaction – IC, Paver-Mounted Thermal Profiling – PMTP, Dielectric Profiling Systems – DPS, etc.)
- Data Management & Security (Veta standard software, Cloud computing, data sharing, etc.)
- Digital Twins & BIM
- Life-Cycle Assessment & Risk Management (Remote Sensing and Hazard Monitoring)
- Artificial Intelligence/Deep-Learning
- Education & Training
- Practical Implementation of Intelligent Construction Technologies

Contact

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As with these previous events, this symposium seeks to advance the objectives of TC 105 to:

- promote cooperation and exchange of information about the behavior of soil grains and granular interactions;
- promote improved modeling of soil aggregates;
- encourage a micro-structural understanding of significant macroscopic behavior;
- facilitate discussion on the use of micro-structural measurements to enhance soil characterization procedures;
- clarify the selection and use of continuum parameters in geotechnical engineering practice.

Topics

- Advances in experimental methods
- Advances in numerical methods
- Engineered geomaterials
- Laboratory and field measurements
- Interface micromechanics
- Particle and pore characterization
- Microstructure visualization
- Geomechanics below the micron
- Innovations in micro geomechanics
- Thermal effects on micro responses
- Damage and healing in geomaterials
- Field-scale behavior
- Theoretical/Analytical models
- Dynamics of Geomaterials across the scales
- Stabilization and reinforcement of geomaterials
- Unsaturated Geomechanics across the scales

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

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IS-Grenoble 2024
Geomechanics from Micro to Macro
September 23-27, 2024, Grenoble, France
<https://is-grenoble2024.sciencesconf.org>

IS-Grenoble 2024 will be the fifth quadrennial international symposium organized under the auspices of Technical Committee 105 (Geomechanics from Micro to Macro) of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).

The preceding symposia were held at Yamaguchi University, Japan in 2006, Tongji University, China in 2010, Cambridge University, England in 2014, and Georgia Tech, USA in 2018.



**5th International Conference
on Transportation Geotechnics 2024
Sustainable and Evolving Technologies for
Urban Transport Infrastructure”
20 – 22 November 2024, Sydney, Australia
www.ictg2024.com.au**

Welcome by the Chair of 5th ICTG

It is my absolute pleasure to welcome you to the 5th ICTG (International Conference on Transportation Geotechnics) following the previous successful events at Nottingham (UK), Minho (Portugal), Hokkaido (Japan) and Chicago (USA). The 5th ICTG is hosted by the Transport Research Centre of University of Technology Sydney (UTS-TRC) and warmly co-hosted by the International Society of Soil Mechanics & Geotechnical Engineering (ISSMGE) and the Australian Geomechanics Society (AGS). The 5th ICTG has also received further support through the memberships of the International Geosynthetics Society (IGS), Transport Research Board (TRB), Geo-Institute and USUCGER, Japanese Geotechnical Society (JGS), and the Southeast Asian Geotechnical Society (SEAGS). The conference is proactively sponsored by numerous national and international transportation and geotechnical firms. This is indeed a rare conference where three technical committees of the ISSMGE (TC202-Transportation Geotechnics, TC211-Ground Improvement and TC307-Sustainability) have joined hands to launch an impactful event encompassing the challenges facing the transportation infrastructure worldwide.

Throughout the world, the accelerated post-COVID infrastructure boom has reflected the need for extensive expansion of roads, rail and ports planning and development, as well as the implementation of ground improvement schemes for sustainable mega-construction projects which encompass soft and unstable subsoil conditions and highly fractured and weathered rock mass. In this context, the launching of the 5th ICTG in Sydney is crucial and timely. The idea of hosting this forthcoming major event in the dynamic and stunning city of Sydney follows the successful 4th ICTG held in Chicago as a hybrid event in 2021, and the substantial contributions to advancing the field of transportation infrastructure and ground improvement that the Transportation Research Centre (TRC) of University of Technology Sydney (UTS) has made through rigorous design and real-life applications.

The Conference will aim at promoting concepts and applications predominantly in the fields of transport infrastructure design, ground improvement, sustainability and circular economy perspectives, and natural hazards mitigation. This major event will act as a platform to disseminate the most recent research and field advances to the geotechnical community around the globe through active pathways of academia and practice. Outstanding Keynote lectures and State-

of-Practice presentations, and brain-storming technical discussions will contribute to three days of scientific and technical discourse, followed by attractive excursions encompassing the awesome natural landscape of the state of New South Wales (NSW).

On behalf of the Organising Committee, I look forward to welcoming you to the iconic city of Sydney for the 5th ICTG.

Yours sincerely,
Buddhima Indraratna

Welcome by the ISSMGE President

Many countries in the world now have transportation infrastructure as a high priority in their socio-economic strategies. The geotechnical problems facing the design and construction of roads, railways, harbours, and airports have exacerbated over the year with our growing populations and the inevitable demand for more efficient passenger mobility as well as freight and supply chain efficiencies.

The series of ICTG (International Conference on Transportation Geotechnics) is among the most influential gatherings in the field of road and infrastructure hosted by the Technical Committees of ISSMGE. Indeed, it is my pleasure to welcome you to the 5th ICTG-Sydney (International Conference on Transportation Geotechnics) hosted by the Transport Research Centre of University of Technology Sydney (UTS-TRC) in close collaboration with the ISSMGE's Technical Committee TC202 (Transportation Geotechnics) and the Australian Geomechanics Society (AGS). Moreover, the themes of the 5th ICTG have warmly embraced the related roles and activities of Ground Improvement (TC211) and Sustainability in Geotechnical Engineering (TC307), thus expected to attract a large cross section of our international geotechnical community.

The 5th ICTG to be held in the heart of the beautiful City of Sydney hopes to congregate many academics, practitioners, and students in a warm and welcoming atmosphere to disseminate their contributions, engage in productive dialogue and to share insightful solutions to address the current challenges of transportation infrastructure. I have no doubt that the 5th ICTG will also represent the latest innovative developments and timely extensions to the state of practice in transportation geotechnics.

On behalf of the ISSMGE, I encourage you all to join me, so I would welcome you in person in Sydney Australia at the 5th ICTG.

Marc Ballouz

The program will feature presentations from the following themes:

- Mechanistic-empirical design (road, railways, airfields, waterways and harbor facilities)
- Optimized characteristics of geomaterials (e.g. hydraulically bound materials & asphalt mixtures)
- Recycled materials in road and rail embankments and sub-structural layers
- Sustainability in transportation geotechnics
- Fundamentals of road and rail geotechnics
- Offshore soil improvement, port development and harbour geotechnics
- Dynamics of transportation infrastructure and numerical modelling
- Soft Subgrade Instability including yielding and fluidisation (experimental and numerical)
- Behaviour of airfields and pavement structures

- Transition zones for railways
- Applied ground improvement methods for transportation infrastructure
- Stabilisation and reinforcement of geomaterials and waste materials
- Geosynthetics in transportation applications
- Geotechnics in underground transportation including tunnels
- Use of rigid inclusions and retaining structures for enhanced stability
- Pile-supported transport infrastructure
- Geotechnical-seismic vulnerability of transportation infrastructures
- Subsurface sensing for transportation infrastructure
- Intelligent construction in earthworks technology and management
- Climatic effects on the behavioral transformation of geomaterials
- Properties and behavior of Unsaturated subgrade and compacted fills
- Slope stability and risk management in relation to transport corridors
- Transport asset management
- Planning and design of mega transport projects

The following awards will also be presented at the conference:

- Best THEMATIC Paper Award
- ISSMGE Bright Spark Award – *for a presenting author who must be aged 36 or under on the last day of the conference*
- Best Young Professional Engineer Paper Award – *for a Practitioner*
- Best Poster Award



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

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

Organisers:

Austrian Geotechnical Society and Austrian Society for Geomechanics

Contact person: Prof. Helmut F. Schweiger

Email: helmut.schweiger@tugraz.at



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

Scope

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

- Fundamental rock mechanics
- Laboratory and field testing and physical modeling of rock mass
- Analytical and numerical methods in rock mechanics and rock engineering
- Underground excavations in civil and mining engineering
- Slope stability for rock engineering
- Rock mechanics for environmental impact
- Sustainable development for energy and mineral resources
- Petroleum geomechanics
- Rock dynamics
- Coupled processes in rock mass
- Underground storage for petroleum, gas, CO2 and radioactive waste
- Rock mechanics for renewable energy resources
- Geomechanics for sustainable development of energy and mineral resources
- New frontiers & innovations of rock mechanics
- Artificial Intelligence, IoT, Big data and Mobile (AICBM) applications in rock mechanics
- Smart Mining and Digital Oil field for rock mechanics
- Rock Engineering as an appropriate technology
- Geomechanics and Rock Engineering for Official Development Assistance (ODA) program
- Rock mechanics as an interdisciplinary science and engineering
- Future of rock mechanics and geomechanics

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

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

Torkham – a large rockslide in Pakistan

On 18 April 2023, a large rockslide occurred at Torkham in Pakistan, very close to the border with Afghanistan. The landslide, which occurred in the early hours of the morning, struck a line of trucks waiting to cross the border. It is thought that about 20 trucks were buried in the accident. At the time of writing, three people are known to have been killed and a further eight people have been injured. Rescue operations continue, led by the army.

The best image that I have found of this landslide has been tweeted by Pakistan Armed Forces News:-



The 18 April 2023 landslide at Torkham in Pakistan. Image tweeted by [Pakistan Armed Forces News](#).

The image shows a rockslide – based upon the scar it appears that the landslide has mobilised a set of discontinuities inclined parallel or sub-parallel to the slope. The debris appears to have bulldozed the trucks, and there is some evidence of the aftermath of a fire. Rescue operations will be very challenging as the boulders are large and of course removal of debris at the toe risks creating instability in the debris pile.

The location of the landslide is [34.115, 71.102]. This is a Google Earth image of the landscape, collected in October 2021:-



Google Earth view of the site of the 18 April 2023 landslide at Torkham in Pakistan.

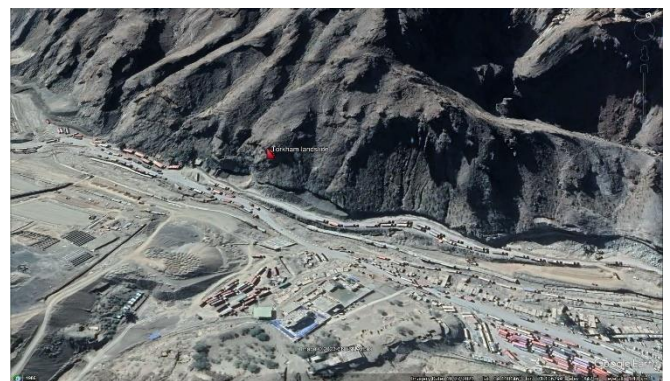
Of interest here is the indication that the toe of the slope has

been cut as part of construction works. By comparison, here is an image from 2016:-



Archive (2016) Google Earth view of the site of the 18 April 2023 landslide at Torkham in Pakistan.

I have created a slider to allow the two images to be compared:-



[JuxtaposeJS](#)

It is unclear as to what has happened at the site since 2021 – there may be some evidence of the creation of concrete structures for the road – but a reasonable starting hypothesis could be that the cutting of the toe has enabled the instability.

News reports indicate that the landslide was triggered by a lightning strike. In most cases, such reports are erroneous, with the actual trigger being the very rainfall that accompanies the thunderstorm.

(Dave Petley / THE LANDSLIDE BLOG, 19 April 2023, <https://blogs.agu.org/landslideblog/2023/04/19/torkham-1>)

The 26 November 2022 Casamicciola landslide on the island of Ischia in Italy

On 26 November 2022, a substantial debris flow, now termed the Casamicciola landslide, was triggered by heavy rainfall on the island of Ischia in Italy. This landslide, which killed 12 people and injured several more, has been described in an initial but rigorous analysis (Romeo *et al.* 2023) published in the journal *Landslides*.

The analysis shows that the landslide had a volume of about 40,000 cubic metres, which is very large for a landslide through an urban area. There is excellent data on the landslide, including field mapping, remotely sensed data, high quality rainfall records from nearby and a seismic record that has captured the landslide movement. The authors have analysed 16 years of rainfall records, from 2006 to 2022. The rainfall event that triggered the landslide, was 176.8 mm in 24 hours, the highest total in the record. The second highest value, 111 mm in 24 hours in 2009, also triggered extensive landslides on Ischia.

There is a very interesting [drone video on Youtube that shows the track of the landslide](#):-

This video includes this still, which captures the track of the landslide through the upper part of the town:-



https://www.youtube.com/watch?v=ekM_WQ1VJiI



The track of the 26 November 2022 Casamicciola landslide on the island of Ischia in Italy. Still from a drone video posted to Youtube.

The authors conclude that the failure occurred in saturated debris high on the slope, with contributions from rockfalls and smaller debris flows along the track. The landslide turned into a classic channelised debris flow. Unfortunately deposition did not start until Casamicciola had been reached, meaning

that the buildings took the full force of the flow. The peak velocity was in the range of 20 metres per second.

The timing of the landslide, which was one of several that occurred that day, may well have played a role in the loss of life. The landslide was triggered at about 5 am, when most people would have been asleep. Given the highly destructive nature of the landslide, there was little chance of escape.

Reference

Romeo, S., D'Angiò, D., Fraccica, A. *et al.* 2023. [Investigation and preliminary assessment of the Casamicciola landslide in the island of Ischia \(Italy\) on November 26, 2022](#). *Landslides* <https://doi.org/10.1007/s10346-023-02064-0>

(Dave Petley / THE LANDSLIDE BLOG, 20 April 2023, <https://blogs.agu.org/landslideblog/2023/04/20/casamicciola-landslide-1>)

Post-seismic evolution of landslides in the Wenchuan earthquake area

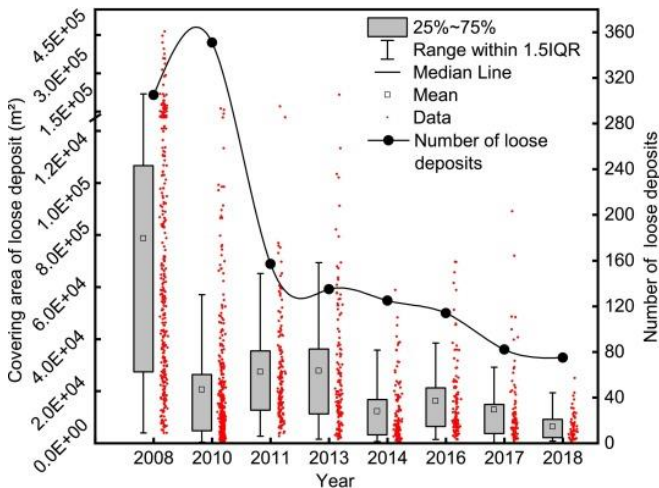
An area of great interest in landslide research in recent years has been the ways in which landslides evolve in the aftermath of earthquakes. It's well-known that earthquakes trigger many landslides in mountain areas – sometimes tens of thousands of them. We also know that in some circumstances the number of landslides subsequently increases, most notably in the first very heavy rainstorm after the earthquake, as weakened slopes fail under conditions of high pore water pressure. What happens after this is less clear, and is probably dependent on the combination of topography, geology, earthquake magnitude and climate, amongst other factors.

The most spectacular coseismic landslide event of which I am aware was the 2008 Wenchuan Earthquake in China – we will reach the 15 year anniversary of this event next month. Landslides have been a very major issue in that area since the earthquake, most notably in the form of debris flows. A new paper published in the journal *Engineering Geology* (Zhang *et al.* 2023) has examined the evolution of debris flows in one area of the 2008 Wenchuan earthquake zone over a ten year period after the earthquake. Mapping was undertaken with multiple epochs of satellite data, allowing characterisation of 25 areas that have loose deposits present, and the determination of the [normalized difference vegetation index](#) (NDVI), which is a well-established way to assess the density of vegetation. The assumption was that the vegetation density is a proxy for landslide activity.

There is a lot of detail in the paper, but this diagram (ερόμενη σελίδα) is worth highlighting:-

This is an imperfect diagram, with both grammatical errors and, more importantly, real problems with the scaling of the x-axis. But the results are really interesting. Loose deposits are the source of the debris flows that has affected this area since the earthquake. The black line indicates the number of areas of loose deposits that were mapped, and the red dots indicate the surface area of each of those areas, with the box and whiskers summarising the latter data. The large number of loose deposits in the immediate aftermath of the earthquake is clear. In the first epoch after the earthquake this number increased, but the mean area of each area reduced. By 2011 the number had reduced dramatically whilst

the mean area increased slightly. Thereafter, there was a steady decline in both indicators that continued throughout the remainder of the ten years.



Graph indicating landslide activity in the area of the Wenchuan earthquake over time. Graph from [Zhang et al. \(2023\)](#).

The results support previous observations – the earthquake triggers many landslides, but that this subsequently gets worse due to heavy rainfall. The situation starts to recover thereafter – the data indicates that after three years the landslide sources have reduced significantly, perhaps in part because debris had been mobilised and removed, and in part because vegetation is recovering. However, the amount of landsliding remained elevated ten years after the earthquake – longer than was observed in Taiwan after the 1999 Chi-Chi earthquake for example – albeit on a declining trend.

Reference

Zhang, S., Peng, J.Y., Zhang, M.P. et al. 2023. [Evolution of debris flow activities in the epicentral area, 10 years after the 2008 Wenchuan earthquake](#). *Engineering Geology*, **319**, 107118. <https://doi.org/10.1016/j.enggeo.2023.107118>.

(Dave Petley / THE LANDSLIDE BLOG, 21 April 2023, <https://blogs.aqu.org/landslideblog/2023/04/21/wenchuan-evolution-1>)

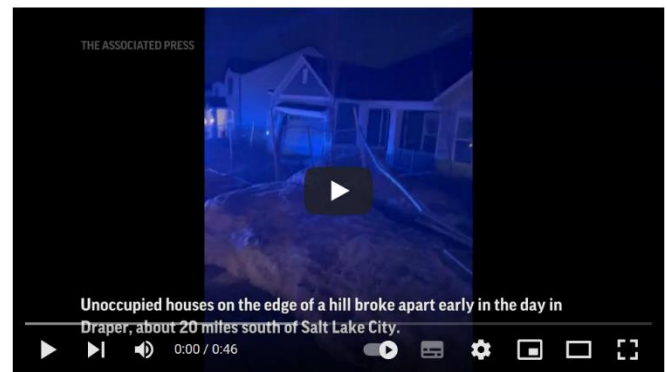


The 22 April 2023 landslide in Draper in Utah

Last week, the State Geologist of Utah, Bill Keach, warned of landslides in Utah this year. He made a prescient observation:

"We hope our engineering is better. But our urban sprawl has pushed us into areas where we weren't built before."

A few days later, on 22 April 2023, his warning came to pass when a landslide occurred in the town of Draper in Utah, destroying two houses. The event was captured on video that has been posted to Youtube:-



https://www.youtube.com/watch?v=PhBw_dvnt-M

The landslide occurred on the Hidden Canyon Subdivision. There is some good drone footage of the aftermath of failure. KUTV has a good gallery of images, which includes this view of the upper-reaches of the landslide:-



The aftermath of the landslide at Draper in Utah. [Image from KUTV](#).

And this image looking down the landslide track:-



The aftermath of the landslide at Draper in Utah. [Image from KUTV](#).

The second image shows a quite mobile landslide, presumably associated with the fine grained soils and the steep terrain.

The two destroyed houses were completed in December 2021 by a developer. Problems emerged in early 2022, as described in a news report on KSL TV from December 2022, which highlights the development of cracks in the structure and in the surrounding ground. Attempts were made to stabilise the properties, but in October 2022 the owners were forced to vacate the buildings. The same report has a video about the site, which includes this still:-



The site of the landslide at Draper in Utah. [Still from a drone video posted by KSL TV.](#)

It appears that the location of the landslide is [40.486, -111.824]. The image above appears to show cracking of the engineered slope, most notably on the left hand side at the top of the slope. Google Earth imagery from 2020 hints at the reason for this slope – it appears to suggest that a large amount of fill has been emplaced to create the platform for the houses:-



Google Earth image showing the site of the landslide at Draper in Utah.

Whilst the time of the Draper landslide might indicate that the snowmelt has played a role, the underlying cause will lie in the slope itself. There are two obvious possibilities – first, that the failure has developed in the fill slope itself; second, that the materials upon which the fill has been emplaced, which is likely to have had a volcanic origin, have failed.

Looking at the shape of the landslide I would tend towards the latter explanation, but a proper investigation is needed to verify the cause.

Clearly, this is a devastating event for the owners of the lost houses, and for the owners of the other two that have been evacuated. They are entirely blameless.

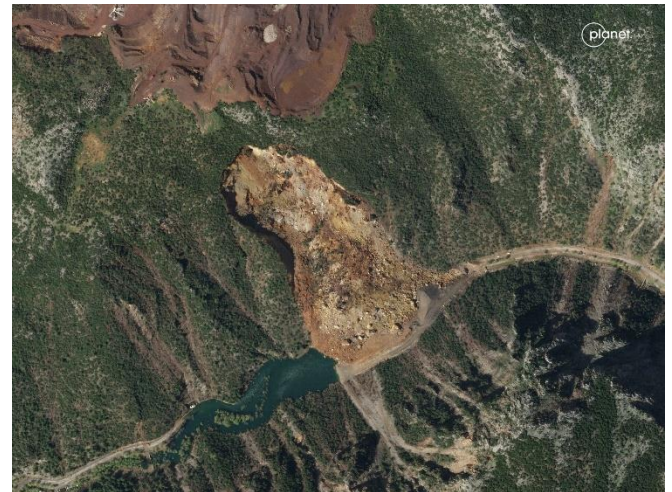
(Dave Petley / THE LANDSLIDE BLOG, 25 April 2023, <https://blogs.agu.org/landslideblog/2023/04/25/draper-landslide-1>)



Planet Labs image of the coseismic landslide near Islahiye in Turkey

There has been considerable interest in the landslides trig-

gered by the 6 February 2023 Turkey-Syria Earthquake, and by its aftershocks. Analysis of these events continues. One of the more interesting landslides was triggered near to Islahiye in Turkey. This is a cloudy area, so obtaining a good quality image of it has been a challenge, but Planet succeeded in capturing a high resolution Skysat image earlier this month. This is the image:-



Satellite image of the valley-blocking landslide near Islahiye, Turkey. Image copyright [Planet](#), used with permission. Image dated 5 April 2023.

As the image above shows, this is a large rockslide – it is about 500 metres from the crown to the toe and about 220 m wide. The location is 37.004, 36.592. This is how it looks in Google Earth:-



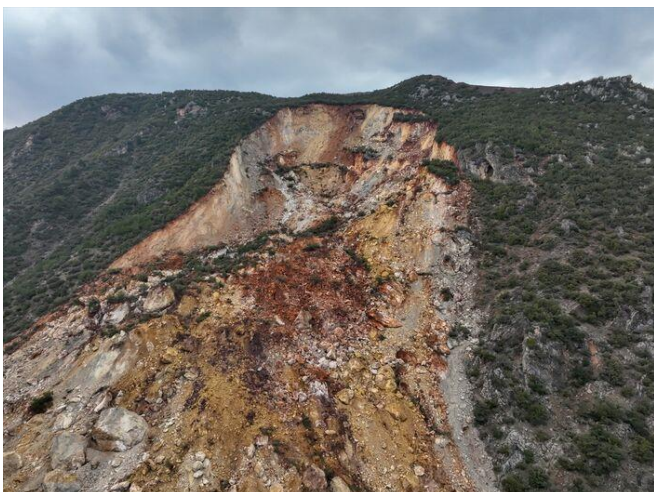
Satellite image of the valley-blocking landslide near Islahiye, Turkey, draped onto the Google Earth DEM. Image copyright [Planet](#), used with permission. Image dated 5 April 2023.

As the image shows, the landslide is valley-blocking., and a small lake has developed (this is about 400 metres long). There has been a little bit of coverage of this landslide in the Turkish media, for example Pusula has a short article from late March that includes this image:-



The valley-blocking landslide near Islahiye, Turkey. [Image via Pusula.](#)

Meanwhile, [an article in Ensonhaber describes the work that has been undertaken](#), which can be seen in the image, to create a spillway. It includes this image of the crown of the landslide:-



The crown and upper reaches of the valley-blocking landslide near Islahiye, Turkey. [Image from Ensonhaber.](#)

The satellite images appear to indicate that the water level had not reached the spillway when the image was collected, but these prompt actions should ensure that an outburst flood, should it occur, will be manageable.

Acknowledgement and reference

Thanks as always to the great people at Planet for collecting this excellent image.

Planet Team (2023). Planet Application Program Interface: In Space for Life on Earth. San Francisco, CA.
<https://www.planet.com/>

(Dave Petley / THE LANDSLIDE BLOG, 26 April 2023,
<https://blogs.agu.org/landslideblog/2023/04/26/islahiye-1>)



The 25 April 2023 landslide Bukit Tunku in Malaysia

On 25 April 2023 a landslide occurred at the site of the Malaysian Anti-Corruption Academy (MACA) at Persiaran Tun-an-ku Syed Sirajuddin, in Bukit Tunku, a part of Kuala Lumpur, in Malaysia. JBPM (the Fire and Rescue Department of Malaysia) has posted a gallery of image of the aftermath of this landslide onto their Facebook page, which includes these two images of the failure:-



The 25 April 2023 landslide at Bukit Tunku in Malaysia. [Image posted to the JBPM Facebook site.](#)



The 25 April 2023 landslide at Bukit Tunku in Malaysia. [Image posted to the JBPM Facebook site.](#)

Fortunately there was no loss of life, although a security post was destroyed. I think the location of this landslide is [3.1677, 101.6722]. The Google Earth image below (επόμενη σελίδα), which shows the site, displays no evidence of distress in the structures and roads:-

The Slopes Division of the Public Works Division (JKR) is investigating the landslide. The Malay Mail reports that:

"Public Works Minister Datuk Seri Alexander Nanta Linggi said based on preliminary investigations by the Public Works Department (JKR) slope department, a leak in the underground water pipe most likely caused the landslide."

However, there is also a suggestion that pooled water following recent heavy rainfall may have played a role. The site has now been covered in tarpaulins to prevent water ingress dur-

ing further heavy rainfall, and piling is underway to stabilise the site – presumably to prevent expansion of the landslide area.



Google Earth image of the site of the 25 April 2023 landslide at Bukit Tunku in Malaysia.

Once again, this landslide has led to calls for greater capacity in Malaysia to deal with landslides, most notably in the Kuala Lumpur area. There is considerable expertise in slope management and engineering in Malaysia, but the observation that the risk is high is well made. This event highlights the critical importance of the management of drainage systems on slopes, especially when the materials are weak.

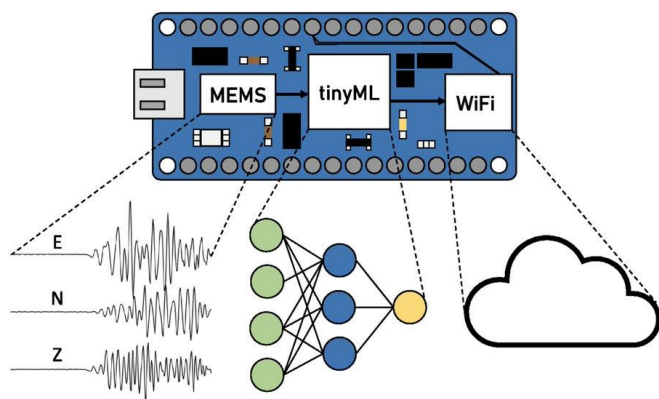
(Dave Petley / THE LANDSLIDE BLOG, 27 April 2023, <https://blogs.aqu.org/landslideblog/2023/04/27/bukit-tunku-landslide-1>)

Earthquake Detection with tinyML

Timothy Clements

Abstract

Earthquake detection is the critical first step in earthquake early warning (EEW) systems. For robust EEW systems, detection accuracy, detection latency, and sensor density are critical to providing real-time earthquake alerts. Traditional EEW systems use fixed sensor networks or, more recently, networks of mobile phones equipped with microelectromechanical systems (MEMS) accelerometers. Internet of things edge devices, with built-in tiny machine learning (tinyML) capable microcontrollers, and always-on, internet-connected, stationary MEMS accelerometers provide the opportunity to deploy ML-based earthquake detection and warning using a single-station approach at a global scale. Here, I test and evaluate tinyML deep learning algorithms for earthquake detection on a microcontroller. I show that the tinyML earthquake detection models can generalize to earthquakes outside the training set.



(Research Article| April 24, 2023, Seismological Research Letters (2023), <https://doi.org/10.1785/0220220322>, <https://pubs.geoscienceworld.org/ssa/srl/article-abstract/doi/10.1785/0220220322/622679/Earthquake-Detection-with-tinyML>)

Geomechanical Modeling of Ground Surface Deformation Associated with Thrust and Reverse-Fault Earthquakes: A Distinct Element Approach

Kristen Chيامa, Benjamin Chauvin, Andreas Plesch, Robb Moss, John H. Shaw

ABSTRACT

We seek to improve our understanding of the physical processes that control the style, distribution, and intensity of ground surface ruptures on thrust and reverse faults during large earthquakes. Our study combines insights from coseismic ground surface ruptures in historic earthquakes and patterns of deformation in analog sandbox fault experiments to inform the development of a suite of geomechanical models based on the distinct element method (DEM). We explore how model parameters related to fault geometry and sediment properties control ground deformation characteristics such as scarp height, width, dip, and patterns of secondary folding and fracturing. DEM is well suited to this investigation because it can effectively model the geologic processes of faulting at depth in cohesive rocks, as well as the granular mechanics of soil and sediment deformation in the shallow subsurface. Our results show that localized fault scarps are most prominent in cases with strong sediment on steeply dipping faults, whereas broader deformation is prominent in weaker sediment on shallowly dipping faults. Based on insights from 45 experiments, the key parameters that influence scarp morphology include the amount of accumulated slip on a fault, the fault dip, and the sediment strength. We propose a fault scarp classification system that describes the general patterns of surface deformation observed in natural settings and reproduced in our models, including monoclinical, pressure ridge, and simple scarps. Each fault scarp type is often modified by hanging-wall collapse. These results can help to guide both deterministic and probabilistic assessment in fault displacement hazard analysis.

Research Article| April 26, 2023, Bulletin of the Seismological Society of America (2023), <https://doi.org/10.1785/0120220264>

Bungle Bungle Range

The world heritage listed **Bungle Bungle Range** is located within Purnululu National Park in the Kimberley region of Western Australia.

The Bungle Bungle range is renowned for its striking banded domes. They are made of sandstone deposited about 360 million years ago. Erosion by creek, rivers and weathering in the past 20 million years has carved out these domes, along with spectacular chasms and gorges creating a surreal landscape. The domes' striking orange and grey bands are caused by the presence of cyanobacteria, which grows on layers of sandstone where moisture accumulates. The orange bands are oxidised iron compounds that have dried out too quickly for the cyanobacteria to grow. Western Australia, East Kimberley, Purnululu National Park (Bungle Bungles).



Layered sandstone domes beside Piccanniny Creek, dawn.

[Geology WORLD](#) · [Robert MacFarlane](#) · Facebook 11 Ιουβιου 2023



The Frank Slide

Prof Dan Shugar

Yesterday, Apr 29, was the 120th anniversary of the deadliest landslide in Canadian history. A short thread about the Frank Slide.



[Geological Survey/Commission géologique Canada](#)

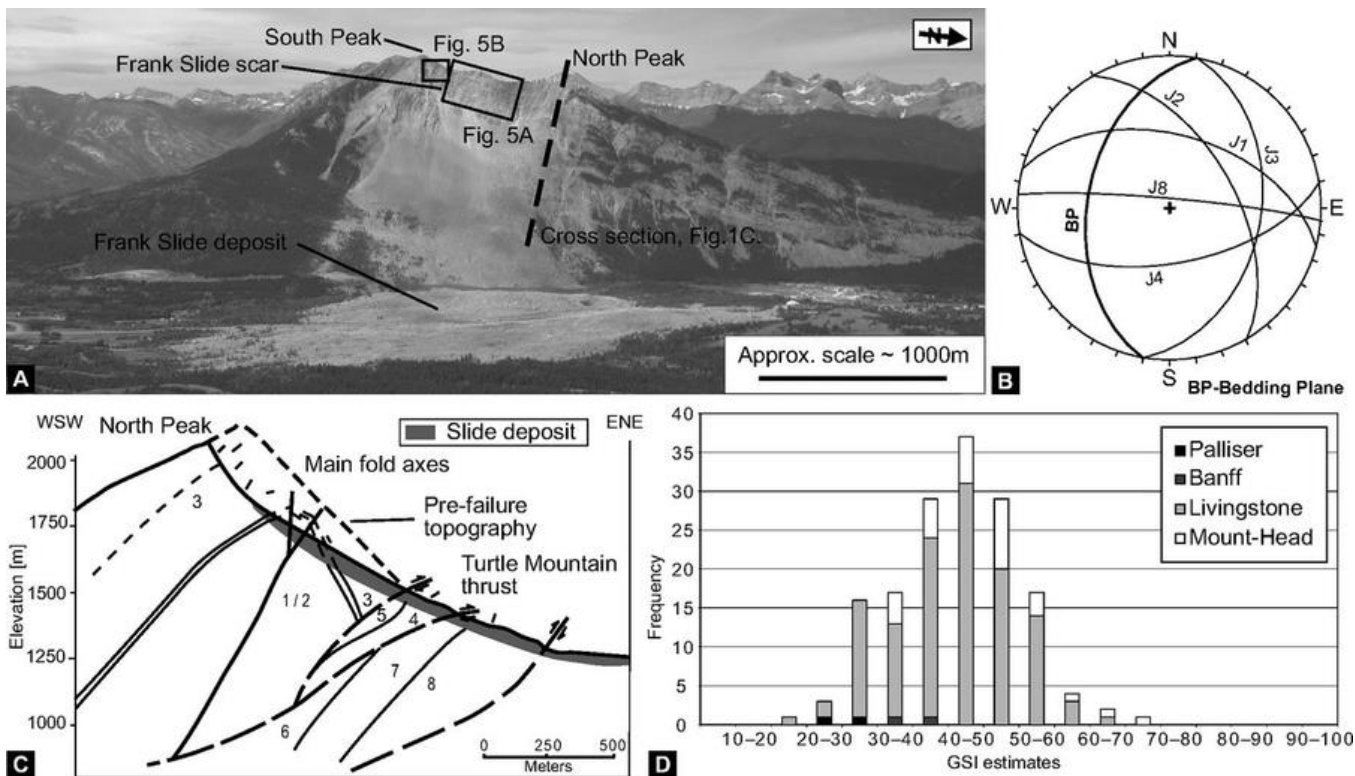
The town of Frank was incorporated in 1901 to mine coal in Turtle Mountain in the Crowsnest Path region of southwest Alberta. Most of town was situated in the flat valley bottom immediately north of the mountain, and a CP rail track passed through.

At 4:10am, Apr 29, 1903, approximately 100 million tonnes (~36 million m³) of fossiliferous limestone rock (and other rock types) collapsed in moments, destroying some of the mine infrastructure, and burying some houses and between 70-90 inhabitants.

The exact causes of the slide are hotly debated in geological circles - did the mine play a role? Did the mountain's structure lead to the failure? Did freezing and thawing of snow and ice in the massive cracks at the top of the slide trigger the failure? Was it just bad luck?

The rubble that comprises the Frank Slide debris sheet in the valley bottom is pretty amazing - here John Clague from [@SFUEarthScience](#) is showing some samples to field trip participants.





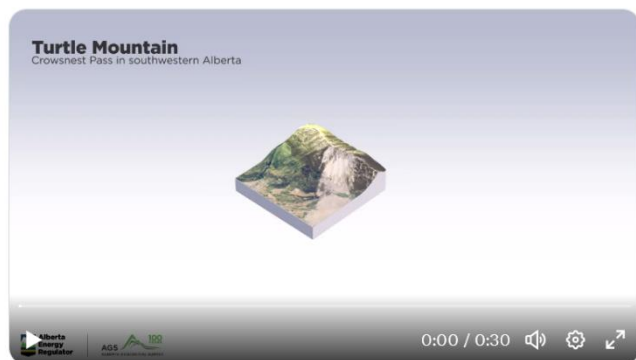
What's certain is that Turtle Mountain is still moving. The Alberta Geological Survey

[@AER_news](https://ags.aer.ca/research-initiatives/turtle-mountain-monitoring-campaign) has a monitoring campaign to assess ongoing motion and the potential threat posed to the inhabitants and infrastructure below. Find out more at <https://ags.aer.ca/research-initiatives/turtle-mountain-monitoring-campaign>.

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5:09 PM · Apr 30, 2023 · 2,332 Views

<https://twitter.com/WaterSHEDLab/status/1652676498321739776?s=20>

20 years ago, Dave Cruden, Willem Langenberg, and myself ran a field trip to celebrate the 100th anniversary, and published a field guide. It remains one of my most read publications on ResearchGate:

Roger C. Paulen @Roger_Paulen · 5h

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https://twitter.com/Roger_Paulen/status/1652884588056698880

Geology of the Frank Slide and southwestern Alberta. Edmonton Geological Society – Geological Association of Canada annual field trip celebrating the 100th anniversary of the Frank Slide Disaster, 2003

https://www.researchgate.net/publication/270396046_Geology_of_the_Frank_Slide_and_southwestern_Alberta_Edmonton_Geological_Society_-_Geological_Association_of_Canada_annual_field_trip_celebrating_the_100th_anniversary_of_the_Frank_Slide_Disaster_2003

Digital twin of German bridge to help develop maintenance and operation

The Hamburg Port Authority (HPA) has utilised two Nemetschek Group solutions, Allplan and Solibri, to create a digital twin of the Köhlbrand Bridge in Hamburg, Germany.



Multiple BIM applications were utilised to create a BIM model of the bridge from scratch (Photo: Nemetschek Group)

The smartBRIDGE Hamburg project aimed to maintain and operate the bridge more effectively and implement predictive maintenance instead of reactive maintenance.

Allplan and Solibri were used to create a detailed model of the bridge that enabled continuous real-time monitoring to identify repairs and minimise disruption to traffic.

Multiple BIM applications were utilised to create a BIM model of the bridge from scratch, which required a BIM Execution Plan and agreement between all parties on the element taxonomy and Level of Detail requirements.

The use of OPEN BIM, a core functionality of Allplan, made managing and exchanging data between different parties and applications possible and efficient says Nemetschek Group. Solibri added value by ensuring that models complied with the requirements outlined in the BEP and other quality standards, giving the Hamburg Port Authority the assurance that the model was correct before being used as a digital twin.

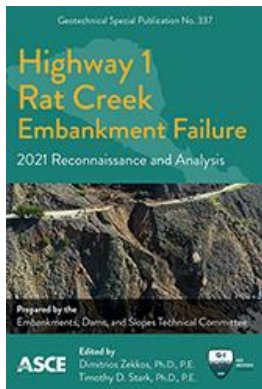
The Hamburg Port Authority integrated IoT sensor data and traditionally collected bridge inspection and maintenance data with their bridge model.

Over 500 IoT sensors were connected to a digital sensor in the bridge model, providing real-time monitoring and automatically issuing alerts if problems are detected. Both sets of data were made available to the asset management system of the bridge, enabling predictive maintenance to be better planned and executed.

The digital twin also enables various simulations to be undertaken, allowing the Hamburg Port Authority to test different solutions and scenarios and assess the results prior to implementation.

(Catrin Jones / construction TECHNOLOGY, 26 April 2023, [https://www.constructiontechnology.media/news/digital-](https://www.constructiontechnology.media/news/digital-twin-of-german-bridge-to-help-develop-maintenance-and-operation/8028554.article?)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Highway 1 Rat Creek Embankment Failure: 2021 Reconnaissance and Analysis

**Embankments, Dams, and
Slopes Technical Committee;
Edited by [Dimitrios Zekkos](#),
Ph.D., P.E. and [Timothy D.
Stark](#), Ph.D., P.E.**

Prepared by the Embankments, Dams, and Slopes Technical Committee of the Technical Coordination Council of the Geo-Institute of ASCE

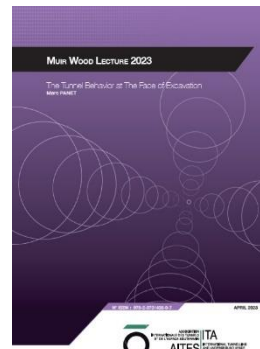
Highway 1 Rat Creek Embankment Failure: 2021 Reconnaissance and Analysis, GSP 337, provides an overview of the embankment failure in Big Sur, California, and details the investigation performed by the team mobilized by the Embankments, Dams, and Slopes Technical Committee. It further expands on the team's subsequent radiocarbon dating, data analysis, and recommendations for reducing future failures.

Topics include

- Overview of Big Sur Highway 1 including the history, geological context, and description of the embankment failure;
- Specific data collection activities such as terrestrial LiDAR and unmanned aerial vehicle (UAV) data acquisition, exposure mapping and sampling, radiocarbon dating of soil samples, precipitation and geospatial analyses, and satellite-based assessments;
- Repair of the roadway; and
- Recommendations to avoid embankment erosion that may potentially cause similar failures

GSP 337 details a valuable case study regarding the failure of US infrastructure in the face of climate change, cascading natural disasters (e.g., wildfire and rainfall, and reconstruction activities) and will appeal to civil engineers who are interested in designing and constructing resilient infrastructure to accommodate future extreme events.

(ASCE, 2023)



The Tunnel Behavior at the Face of Excavation

Marc Panet

Muir Wood Lecture 2023

Tunnels are obviously among the most difficult civil works to design because of the many uncertainties to deal with and their three-dimensional character. A comprehensive evaluation of the ground behavior at the excavation face of is highly important for the design and for the selection of the excavation method. It is the subject of this lecture, based on the experiences from various works in France and abroad.

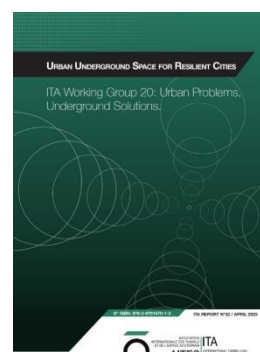
I shall mainly consider deep tunnels driven in difficult ground conditions, I mean tunnels with an overburden such that the initial stresses may bring about failures or large displacements at the excavation wall.

As a guideline I shall refer to the Convergence-Confining Method (CV-CF Method) which has become very popular at least at a preliminary stage of design analysis. The CV-CF Method stems from former studies of the interaction between the ground and the support conducted by Fenner and Pacher, but it became operational in considering the displacement which occurs before the installation of the support at some distance from the face (M. Panet, P. Guellec, 1974). The CV-CF Method was first codified by the French Tunneling Association (AFTES) in 1979.



Download document [MUIRWOOD-2023-BD.pdf](#)

(ITA / AITES 2023)



Urban Problems, Underground Solutions

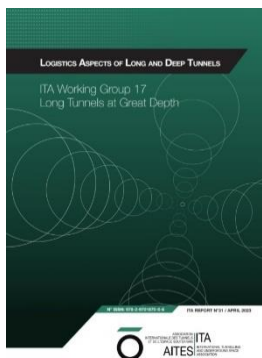
[Working Group 20](#)

As the world's population continues to grow, an ever-increasing number of people will live and work in urban areas. The UN's 2017 World Population Report predicts that 2.5 billion inhabitants will be added to the world's cities by 2050 – with almost 90% of this growth taking place in Asia and Africa.

By 2060, the global population will break the 10 billion mark, and a further billion will be added by the year 2100. Most people will live in cities, which will grow into mega-cities, where surface space will be at a premium, and underground space can help make a city more resilient and sustainable.

Download document [WG20_Urban Underground Space for Resilient Cities-BD.pdf](#)

(ITA / AITES 2023)



Logistics-aspects-of-long-and-deep-tunnels

Working Group 17

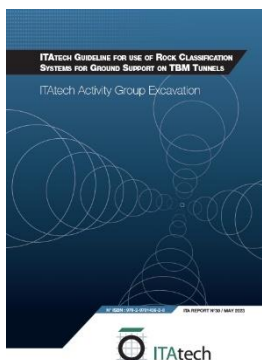
Long and deep tunnels allow humanity to overcome natural obstacles, thus allowing efficient and environmentally friendly transportation of goods, resources, and people. As highlighted in the previous Reports from Working Group 17 (thereafter referred as "WG17"), large underground projects, such as long and deep tunnels, are unique in terms of complexities and uncertainties and often face enormous challenges, among which logistic aspects.

Effective management of key logistical aspects of long and deep tunnels is essential for the success of the project; it impacts, among others, safety, performance (and so construction time and costs), environment and acceptance. As the saying goes, management of logistics is « the art of never stopping a construction site, it is like an umbilical cord ». Logistics has to ensure that the right material, in the right condition, at the right time, at the right place, is available to the right person. Therefore, understanding the logistical constraints and anticipating the contractors' needs is crucial to create the best possible working environment and a solid construction contract.

The importance of this topic, combined with the lack of literature dedicated to the specific logistic aspects of long and deep tunnels, has led WG17 to focus on developing a recommendation to guide Owners and Designers in understanding the impact and complexity of the logistics of these extraordinary projects. The aim is that those reading the guidelines will be able to address key aspects in the early design phase. The recommendation summarizes the experience of Owners, Designers and Contractors from worldwide projects, and is based upon the experience of the WG17 members on projects excavated at great depth.

Download document  [WG-17-Logistics-aspects-of-long-and-deep-tunnels.pdf](#)

(ITA / AITES 2023)



ITAtTech Guideline for use of Rock Classification Systems for Ground support on TBM Tunnels

ITAtTechGroup Excavation

Rock support is arguably one of the most important aspects of any tunneling operation.

Historically, the decision about which rock support to use was made by tunnellers on a case-by-case basis.

Over the last 50 years, however, various rock classification systems have been developed to assist in selecting rock support type and quantity based on empirical data.

When these systems are applied to rock support in mechanized tunneling it becomes a problem that the empirical data is obtained almost exclusively from the drill and blast tunneling method.

This approach has two major shortcomings when applied to the requirements of bored tunnels:

- The rock support methodology is not optimized for efficient TBM operation, which involves installing rock support while boring.
- The rock support schemes needed for a relatively smooth cylindrical TBM tunnel require less rock support as there is no blasting damage to the rock mass.

This guideline suggests a modified rock support selection methodology adapted to bored tunnels using both the Q (Barton, Lien, & Lunde, 1974) and/or RMR (Bieniawski, 1989) rock classification systems.

Download document  [ITAtTech Rock Support for Mechanically Bored Tunnels BD.pdf](#)

(ITA / AITES 2023)



ITAtTech Guideline for Radially Installed Bolts in Tunneling

ITAtTechSubgroup Bolts & Arches

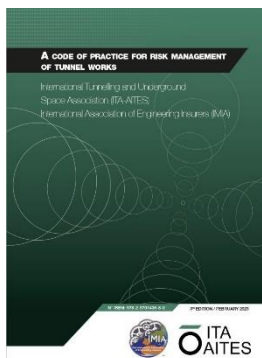
The excavation in conventional tunneling is typically supported by radial bolts, reinforced shotcrete and if required by steel arches or lattice girders. Radially installed bolts reinforce the surrounding ground and create a so-called supporting arch around the excavation. Thus, radial bolts are an essential part of the primary support in tunnel construction and must be chosen carefully to suit the expected ground conditions.

There is no bolt covering all demands and therefore decision criteria are necessary to define the most suitable bolt type(s) at the design stage. This requires knowledge about various characteristics of bolt types, installation methods, areas of application, ground conditions and activation modes. After the selection, individual types must be clearly defined in tender documents, so that both the contractor's offers are comparable, but also the originally designed measures are installed during construction to ensure safe, stable, and cost-optimized excavation processes.

To enable this process, this document describes common radial bolt types, their characteristics and properties, advantages, and disadvantages as well as safety and quality concerns.

Download document [ITAtTech radially Installed bolts BD.pdf](#)

(ITA / AITES 2023)



A code of practice for risk management in tunnel works

ITA:IMIA

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

This 3rd Edition follows an industry-wide survey that canvassed opinions on the application of the Code to date and any necessary updates. The main areas of revision include adding a list of the principal attributes expected in the Code, addressing competence and culture, differentiating between risk management and management of risk, a new section on digital modelling, improved language on both instrumentation and monitoring and emergency response plans, and clarification of the importance of managing high consequence events.

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

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

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

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

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

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

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

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

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

(ITA / AITES 2023)



Τεχνική Γεωλογία (2η Έκδοση)

Κούκης Χρ. Γεώργιος, Σαμπτακάκης Στ. Νικόλαος

Η "Τεχνική Γεωλογία" αναφέρεται στις εφαρμογές της γεωλογίας στο πλαίσιο της μελέτης, κατασκευής και λειτουργίας των τεχνικών έργων και της επίλυσης περιβαλλοντικών προβλημάτων.

Το βιβλίο αυτό αποτελεί τον πρώτο από τους δύο τόμους της σειράς "Τεχνική Γεωλογία και Γεωλογία Τεχνικών Έργων" και καλύπτει διεξοδικά όλα τα θέματα που έχουν σχέση με τη φυσική και μηχανική συμπεριφορά των εδαφικών και βραχωδών γεωλογικών σχηματισμών. Αναλύονται αρχικά οι θεμελιώδεις θεωρητικές αρχές που οριοθετούν τις επί μέρους φυσικές και μηχανικές ιδιότητες των εδαφών-βράχων και στη συνέχεια περιγράφονται οι τεχνικές δειγματοληψίας καθώς και οι μεθοδολογίες της εργαστηριακής και επί τόπου διερεύνησης, όπως αυτές προδιαγράφονται διεθνώς στα πλαίσια των γεωτεχνικών μελετών για τις απαιτήσεις των διάφορων τεχνικών έργων. Το βιβλίο κυκλοφορεί σε 2η έκδοση (2019) με τις απαραίτητες διορθώσεις, βελτιώσεις, συμπληρώσεις και βιβλιογραφικές αναφορές στα επί μέρους κεφάλαια.

Πρόκειται για σύγχρονο επιστημονικό βιβλίο που ο κάτοχός του θα το χρησιμοποιεί διαρκώς αφού περιέχει συγκεντρωμένη και σε εύχρηστη μορφή όλη τη σχετική πληροφόρηση. Ιδιαίτερη έμφαση δίνεται στην εμπειρία και γνώση που έχει αποκτηθεί τα τελευταία χρόνια σε σχέση με τη σύνθετη δομή και ιδιόμορφη τεχνικογεωλογική συμπεριφορά των γεωλογικών σχηματισμών του Ελληνικού χώρου.

Το βιβλίο απευθύνεται σε όλους εκείνους που ενδιαφέρονται ή και έμμεσα σχετίζονται με το αντικείμενο της Τεχνικής Γεωλογίας, δηλαδή προπτυχιακούς και μεταπτυχιακούς φοιτητές όλων των συναφών κλάδων καθώς και επαγγελματίες γεωλόγους, μηχανικούς κ.τλ.

(Εκδόσεις ΠΟΛΙΤΕΙΑ, 2019)



Γεωλογία Τεχνικών Έργων (2η Έκδοση)

Κούκης Χρ. Γεώργιος, Σαμπτακάκης Στ. Νικόλαος

Το βιβλίο αυτό αποτελεί το δεύτερο από τους δύο τόμους της σειράς Τε-

χνική Γεωλογία και Γεωλογία Τεχνικών Έργων και καλύπτει διεξοδικά ειδικά κεφάλαια του αντι-κειμένου που έχουν σχέση με τους γεωλογικούς παράγοντες που επηρεάζουν το σχεδιασμό, την κατασκευή και τη λειτουργία των διάφορων τεχνικών έργων καθώς και την εκδήλωση καταστροφικών γεωλογικών φαινομένων, όπως οι κατολισθήσεις.

Αναλύονται αρχικά τα συστήματα ταξινόμησης βραχομάζας (RMR, Q, GSI κ.λπ.) καθώς και η εφαρμογή τους στα τεχνικά έργα ενώ στη συνέχεια εξετάζονται διεξοδικά τα κατολισθητικά φαινόμενα και η ευστάθεια των πρανών, με βάση τη Διεθνή και Ελληνική εμπειρία, όσον αφορά στις βασικές αρχές, τα συστήματα ταξινόμησης, τα αίτια, το μηχανισμό εκδήλωσης, τις επιπτώσεις και τα μέτρα αντιμετώπισης. Επίσης εξετάζονται λεπτομερειακά οι τεχνικογεωλογικές συνθήκες που οριοθετούν το σχεδιασμό φραγμάτων και σηράγγων ενώ δίνονται χρήσιμα στοιχεία για τα χαρακτηριστικά και τον τρόπο κατασκευής των μεγάλων αυτών τεχνικών έργων. Τέλος, περιγράφονται η καταλληλότητα και οι χρήσεις των γεωϋλικών και κυρίως των αδρανών υλικών στα τεχνικά έργα ενώ δίνονται σημαντικά στοιχεία σχετικά με τις χρήσεις και τον ποιοτικό έλεγχο των γεωσυνθετικών υλικών.

Σκόπιμα παραλήφθηκαν κάποια σημαντικά κεφάλαια όπως π.χ. έργα οδοποιίας πλην σηράγγων, οι γεωλογικές – τεχνικογεωλογικές χαρτογραφήσεις κ.λπ. δεδομένου ότι τα αντικείμενα αυτά αναλύονται λεπτομερειακά στις σχετικές οδηγίες του ΥΠΕΧΩΔΕ, όπως ΟΜΟΕ: Τεύχος II, Γεωλογικές και Γεωτεχνικές Έρευνες και Μελέτες (www.ggde.gr) και Τεχνικές Προδιαγραφές Γεωλογικών Εργασιών στα πλαίσια των Μελετών Τεχνικών Έργων Ε104 - 85, που συντάχθηκαν με την καθοριστική συμβολή των συγγραφέων και είναι εύκολα διαθέσιμες σε κάθε ενδιαφερόμενο. Το βιβλίο κυκλοφορεί σε 2η έκδοση με την προσθήκη νέου κεφαλαίου για την εκτίμηση κινδύνου των κατολισθήσεων καθώς διορθώσεις, βελτιώσεις και συμπληρώσεις στα επιμέρους κεφάλαια με τις απαραίτητες βιβλιογραφικές αναφορές.

Πρόκειται για σύγχρονο επιστημονικό βιβλίο που περιέχει πλούσια, συγκεντρωμένη και σε εύχρηστη μορφή όλη τη σχετική πληροφόρηση, βιβλιογραφικά τεκμηριωμένη. Δίνεται ιδιαίτερη έμφαση στην εμπειρία και τη γνώση που έχει αποκτηθεί στον Ελληνικό χώρο από την κατασκευή των μεγάλων αναπτυξιακών έργων που ολοκληρώθηκαν την τελευταία δεκαετία.

Το βιβλίο απευθύνεται σε όλους εκείνους που ενδιαφέρονται ή και έμμεσα σχετίζονται με το αντικείμενο της Τεχνικής Γεωλογίας, δηλαδή προπτυχιακούς και μεταπτυχιακούς φοιτητές όλων των συναφών κλάδων καθώς και επαγγελματίες γεωλόγους, μηχανικούς κ.λπ.

(Εκδόσεις ΠΟΛΙΤΕΙΑ, 2019)

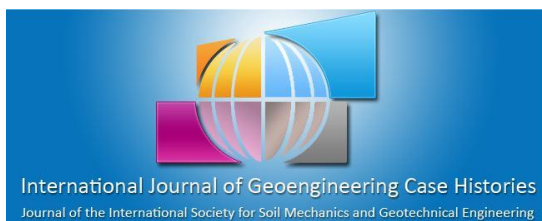
ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



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[Moisture uptake and loss of GCLs subjected to thermal cycles from silty sand subgrade](#), R.K. Rowe, J. D.D. Garcia, R.W.I. Brachman, M.S. Hosney, 30(2), pp. 113–128

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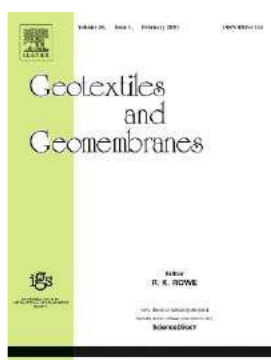
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[Seismic behavior of tiered geogrid reinforced soil \(GRS\) using treated backfill soil](#), A.M. Safaei, A. Mahboubi, A. Noorzad, 30(2), pp. 200–224



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Κυκλοφόρησε το Τεύχος 2 του Τόμου 51 (Απριλίου 2023) του περιοδικού Geotextiles and Geomembranes της International Geo-synthetics Society με τα ακόλουθα περιεχόμενα:

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