

The background features a series of concentric blue arcs that create a perspective effect, resembling a tunnel or a road curving into the distance. The arcs are composed of multiple parallel lines, with the spacing between them decreasing as they recede. The overall color palette is various shades of blue, from light sky blue to deep navy blue. The text 'Technical Sessions' is positioned in the upper right quadrant in a bold, sans-serif font.

Technical Sessions

| Time | CC201A, Hall 18 | CC201B, Hall 18 | CC204A, Hall 18 | CC204B, Hall 18 | CC207, Hall 18 |
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| Monday Apr.22 14:00-15:20 | Technical session 1.1 Planning of Tunnels and General Aspects (I) Giuseppe M. Gaspari Robert Galler | Technical session 10.1 Instrumentation and Monitoring/Testing and Inspection (I) Huang Hongwei Giovanny Alvarado | Technical session 2.1 Design and Methodology (I) Vera Nasri Bill News | Technical session 11.1 Digital and Information Technology (I) Alessandro Menozzi Florent Robert | Technical session 7.1 Guidelines, Reviews & Prospects of Mechanized Tunnelling Laurence Delplace Zaw Zaw Aye |
| | 14:00-14:20 309 Progress and prospect of urban tunnel engineering in China Chen Xiangsheng | 14:00-14:20 43 Innovative shaft inspection system for the Gotthard Base Tunnel Martina Puglia, Peter Spohn, Klaus Wachter Leandro Chelini, Xiao Shuan | 14:00-14:20 263 Development of sustainable criteria for the Italian railway tunnel design Franco Iacobini, Annalisa Pranno | 14:00-14:20 45 Intelligent technologies and applications on TBM tunnel construction Guo Weishe , Hong Kairong Gao Pan, Li Fengyuan | 14:00-14:20 392 A new AFTES guideline: Suitability and selection process of pressurized TBMs in urban contexts Magali Schivre, François Renault |
| | 14:20-14:40 453 Technical challenges and countermeasures of plateau railway tunnels Zhao Yong , Zhu Tingyu, Yan Gaoming | 14:20-14:40 50 Field measurement of pile transient lateral response to advancing tunnel Chee-Min Khoo , H. Mohamad, B.P. Tee, M.F. Ghazali | 14:20-14:40 285 Design challenges in conventional tunnelling on the Sotra Link Project in Norway Guido Barbieri, Gianluca Bella, Edoardo Trivellato, Salvatore Agrillo, Matteo Gianì | 14:20-14:40 273 Trusted elements in the digital model of the tunnel Galina Paskaleva, Patrick Beronneau , Thomas Bednar | 14:20-14:40 668 Evaluating TBM design and performance, 30 years apart: The Lesotho Highlands Water Tunnel, phase 1 and phase 2 Brad Grothen |
| | 14:40-15:00 41 Geotechnical and tunnel engineer's role on the success of major tunnel projects delivery Pan Jiping , David Och, Antoni Kuras, Geoff Bateman | 14:40-15:00 202 Using the acoustic emission and infrared thermal imager to identify the precursor of rock violent failure Zhu Shuaida , Zhang Dongming, Huang Hongwei Wang Changsong, Ouyang Linghan | 14:40-15:00 439 Design of Ontario Line South Tunnel Mehdi Bakhshi , Vera Nasri, Toufic Maalouf | 14:40-15:00 391 BIM Modelling & reality capture in underground drill and blast caverns Pedro Rey Antón , Ivo Jose Ferreira Teixeira Alessandra Barbetta, Bruna Bezerra Vieira, Fernando Abreu | 14:40-15:00 690 More efficient, cost-effective and reliable Slurry Treatment Plants (STPs) for mechanized tunnelling operations in the Asia-Pacific region Kun Bai , Gino Vogt |
| | 15:00-15:20 610 Planning, design and construction for mechanised cross passage excavation Chor Kin Tsang , Tong Joo Sia, Zhang Zhiguo, Lei Sun, Chen Kungpeng | 15:00-15:20 335 Analysis of laboratory tests for the determination of the clogging risk in mechanized tunnel excavation in fine-grained soils Diego Sebastiani , Sara Mangifesta, Armando de Lillis, Salvatore Miliziano | 15:00-15:20 681 Maungawhau mined tunnels - Collaborative design - Management of design amendments for Maungawhau mined tunnels for improved construction schedule outcomes Howard Toi , Richard Gong, Dian Wang, Geoffrey Charlesworth | 15:00-15:20 557 Bored tunnels: Automated extraction of segment edge location from scan data James Douglas , Olivier Côté, Sandeep Jain | 15:00-15:20 729 Green TBM: Design targets, features and power efficiency Andrea Petriccioli , Laura Tafuri, Remo Grandori |
| 15:20-15:50 | Coffee Break | Coffee Break | Coffee Break | Coffee Break | Coffee Break |
| Monday Apr.22 15:50-17:30 | Technical session 1.2 Planning of Tunnels and General Aspects (II) Ioannis Fikiris Michel Deffayet | Technical session 13.1 Underground Caverns/Underground Space Use (I) Raymond Sterling Abidemi Agwor | Technical session 2.2 Design and Methodology (II) Sanja Zlatanic Nasri Munfah | Technical session 11.2 Digital and Information Technology (II) Eric Leca Yu Haitao | Technical session 7.2 Innovations in Mechanized Tunnelling (I) Rick Lovat Brad Grothen |
| | 15:50-16:10 110 New chemicals with reduced carbon footprint Francois Couturier , Dimitri Matioszek, Thomas Boursier | 15:50-16:10 83 Mechanized shaft sinking with VSM: Developing underground space for U-Park® systems Peter Schmah, Stefan Frey, Marc Peters, Carter Zhang | 15:50-16:10 348 The effect of the movement joint on the seismic response of the cross-passage intersection in segmental tunnel lining Gabriele Giordano , Diego L'Amante, Giorgio Fantauzzi | 15:50-16:10 346 Intelligent tunnel asset management of CERN underground facilities Vanessa Di Murro , Quyng Aohui John Andrew Osborne, Li Zili | 15:50-16:10 Foam polymer combine N°section 1 Brad Grothen |
| | 16:10-16:30 292 TBM traffic tunnels for sustainable infrastructure Silvino Pompeu-Santos | 16:10-16:30 268 Deep powerhouse caverns design development and challenges - Snowy 2.0 experience Ivan Ching , Mark Diederichs, Ben Chapman, Giancarlo Cardone | 16:10-16:30 427 Tunnels and stations design of Montreal Blue Line Vera Nasri | 16:10-16:30 452 Demonstration of parametric analyses in ground models by applying programming logics using a digital tool named paranger Arjun Shivasami , Roshan Nair, Lachlan Dunbar | 16:10-16:30 79 Real time estimation and early warning of rock mass strength and integrity in TBM tunneling Li Qingwei , Du Lijie, Yang Yalei, Zhao Xiangbo, Zhao Yong, Quan Yongwei, Su Shan |
| | 16:30-16:50 380 Comparison of carbon footprint emissions in tunneling projects using innovative methods Jarast Pegah , Nasri Vera | 16:30-16:50 300 SMART tunnel revisited - after 15 years in operation Teik-Aun Qoi , Chee-Min Khoo | 16:30-16:50 496 Low carbon emission design concept and method for tunnels and underground engineering Lv Gang , Liu Jianyou, Zhao Yong, Shi Shaoshuai, Zhang Zhenbo | 16:30-16:50 548 Why is it worth using BIM in tunnelling? Florent Robert , Nataliya Dias | 16:30-16:50 100 A newly developed reduced CO2 backfill grout system for TBM operations Mike A. Sposetti |
| | 16:50-17:10 399 Multilateral institutions and governance of urban underground space Nikolai Bobylev , Qiao Yong-Kang, Peng Fang-Le | 16:50-17:10 332 Minimising impacts on the local habitat in relocation and construction of a large cavern for track crossover at Acharya Atre Chowk Metro Station of the Colaba-Bandra-Seepz (Line 3) in Mumbai, India Subodh Kumar Gupta , Rajeshkumar Mittal, Maheshkumar Dange, Rohit Tilak | 16:50-17:10 764 "SINTEF-TriPOD" in underground design - A demonstration for two projects in Norway Nghia Trinh, Eivind Grøv | 16:50-17:10 553 Digital strategies-driven optimization of infrastructure maintenance: The case study of the rehabilitation of a disused tunnel in northern Italy Federico Foria, Emanuele Moschetti Mario Calicchio, Vlad Grigoras , Burak Boyaci | 16:50-17:10 188 A modified foam half-life time test method for EPB shield tunnelling Chen Zhongtian , Bezuijen Adam, Fang Yong |
| 17:10-17:30 700 Challenges in the conventional tunnel mixed-face execution Thiago de Sá Lima, Bruno Scodeler, Elói Palma Filho | 17:10-17:30 688 Harnessing the potential of underground space for climate-neutral cities: Energy geostructures in metro tunnels Azad Koliji, Etienne Garin , Tohid Kazerani, Benjamin Schenk, Jade Senn | 17:10-17:30 830 The "hybrid" tunnel. An innovative solution for urban tunnel in soils. The case of Américo Vespucio Oriente AVO1, in Santiago de Chile Jose Miguel Galera , Manuel de Cabo, Guillermo Ibarra | 17:10-17:30 580 Integrated design of precast concrete linings for mechanized tunnels Alessandro Menozzi , Beatrice Tiberi Daniele Maturi, Roberto Comini | 17:10-17:30 506 Research on curved tunneling and bending angle calculation of articulated shield tunneling machine Qiao Wei , Zhou Xiangyu, Liang Xingsheng | |

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| Tuesday Apr.23 14:00-15:20 | Technical session 1.3 Planning of Tunnels and General Aspects (III) Michael Mooney Amanda Elioff | Technical session 8 Immersed Tunnels Marcel 't Hart Casper Paludan-Müller | Technical session 2.3 Design and Methodology (III) Eivind Grøv Nikolai Bobylev | Technical session 15.1 Contractual Practices and Risk Management (I) Matthias Neuenschwander Leslie Pakianathan | Technical session 7.3 Innovations in Mechanized Tunnelling (II) Brian Fulcher Gérard Seingre |
| | 14:00-14:20 93 City Rail Link – City Rail Link: Managing challenges on the pioneer underground metro project in New Zealand Francois Dudouit | 14:00-14:20 218 Key developments of world's immersed tunnel design and construction solutions Ard Doorduyn, Li Ying, Hans de Wit, Marcel 't Hart, Chen Weibin | 14:00-14:20 144 Athens metro "Piraeus" station: Numerical analysis versus observational method Konstantinos Sampsakis-Bakopoulos, Nikos Gerolymos | 14:00-14:20 177 Research on risk management and control of undersea tunnel construction based on blockchain technology Qu Liqing, Liu Sihan, Tan Minglun, Huang Hongwei | 14:00-14:20 749 Geotechnical dimensioning of TBMs and new technological challenges Giuseppe Lunardi, Giovanna Cassani, Martino C. Gatti, Andrea Zimbaldi |
| | 14:20-14:40 283 Tunnelling in a green country – Brenner Base Tunnel study case: Decision and solutions in construction lot H41 Sill Gorge-Pfons Ivan Zamberlan, Christian Schwarz | 14:20-14:40 228 Achieving sustainable immersed tunnel projects Jonathan Baber | 14:20-14:40 470 Comparative effects of twin-stacked tunnel excavation on adjacent structure using different simulation models Nattavich Sittiamornporn, Pornkasem Jongpradist, Chana Phutthananon, Arthit Chayaron, Phattarawan Malaisree | 14:20-14:40 291 SARMT-Systemic approach to risk management of tunnels Andrés Marulanda E | 14:20-14:40 243 Construction of a Horseshoe-shaped trenchless tunnel using the rectangular element propulsion method Daiya Koizumi, Tatsuya, Shimotsu, Takashi, Tanaka |
| | 14:40-15:00 390 Nuclear decommissioning in the UK: Cross-sector collaboration and learning with the tunnelling and underground space sector investigating alternative approaches to reactor dismantling and graphite retrievals Daniel Garbutt, Martin Knights | 14:40-15:00 258 Immersed tunnels – knowledge sharing in the past showing the way towards sustainable solutions in the future Tommy Olsen | 14:40-15:00 766 Application of a confinement-dependent spalling criterion for tunnels in highly stressed brittle rock Masoud Rahjoo, Erik Eberhardt | 14:40-15:00 336 A methodology of risk management to urban tunnels and its application to Bogota subway J. Esteban Alarcón G., André Pacheco de Assis | 14:40-15:00 307 Use of biomass as soil conditioner to improve clay rheology in EPB tunneling Muhammad Ishaq, Benjamin Appleby, Jamal Rostami, Joseph Samaniuk |
| | 15:00-15:20 552 Theory meets practice: Evaluating discrepancies between theoretical settlement projections and actual measurements in tunnelling projects with tunnel boring machines Elena Navarro, Eduardo Salvador, Fernando Diez | 15:00-15:20 314 Quantitative detection method and practice of voids at the interface of steel-shell concrete with complex structure Zhao Hongbo, Liu Guoqing, Fan Ziwu, Sun Long, Meng Lingchao, Wang Langlang | 15:00-15:20 780 Practical considerations of shale swelling impact on underground structures liner design for Ontario Line transit project in Toronto, Canada Masoud Rahjoo, Verya Nasri | 15:00-15:20 422 Underground risk and ESG aspects in pumped hydro and hydropower projects – what worries the lenders? Andrew Noble | 15:00-15:20 456 Automatic excavation system for directional control in shield tunneling using machine learning techniques Chen Jian, Hiroki Kamada, Naohiko Takamoto, Hirokazu Sugiyama, Shinya Yamamoto, Tetsuya Aoyama |
| 15:20-15:50 | Coffee Break | Coffee Break | Coffee Break | Coffee Break | Coffee Break |
| Tuesday Apr.23 15:50-17:30 | Technical session 6.1 Conventional Tunnelling in Challenging Conditions (I) Magali Schivre Bart De Pauw | Technical session 13.2 Underground Caverns/Underground Space Use (II) Andrea Pigorini Antonia Cornaro | Technical session 2.4 Design and Methodology (IV) Damian McGirr Per Tengborg | Technical session 15.2 Contractual Practices and Risk Management (II) Alexandre Gomes Ozturk Ozgur | Technical session 7.4 Innovations in Mechanized Tunnelling (III) Jamal Rostami Sergio Sanchez |
| | 15:50-16:10 95 Development of advanced tunnel blasting and shotcrete as automated tunnel construction system Keita Iwano, Takahiro Aoyagi, Takafumi Yamagishi, Takashi Mega, Takaaki Inuzuka | 15:50-16:10 440 Rock engineering in Sweden - Mining, hydropower and railways Per Vedin, Thomas Dalmalm, Johan Brantmark | 15:50-16:10 203 Optimizing the tunnel ventilation design related to respirable dust in tunnelling by using CFD Wei Ranzhu, Robert Galler, Christian Weiß | 15:50-16:10 32 Comparing underground construction risk for urban transportation and hydropower projects – A lender's technical advisor's perspective Andrew Noble, Richard Buckingham | 15:50-16:10 333 Bio-polymer sodium alginate application as an eco-friendly additive in slurry TBM excavation Bae Abraham, Choe, Yongjoon, Shin, Young Jin, Kim, Sangwoo, Choi, Hangseok |
| | 16:10-16:30 323 The Brenner Base Tunnel: an overview of the excavation types used in the project David Marini, Giuseppe Venditti, David Unteregger, Romed Insam, Roberta Marazzo | 16:10-16:30 462 Planning and support estimation of underground powerhouse in the Himalayas Sailesh Adhikari, Chhatra Bahadur Basnet, Krishna Kanta Panthi, Tek Bahadur Katuwal | 16:10-16:30 353 Segment design for Australia's largest diameter TBM tunnel Shu Fan Chau, Harry Asche, David Oliveira, Justin Shepherd, Christian D'Hondt | 16:10-16:30 396 Pawtucket CSO tunnel design build – From managing risk and quality to design and construction innovations Irwan Halim, Stephane Polycarpe, Vojtech E Gall | 16:10-16:30 468 Research on frontier technology of shield machine/hard rock machine selection and mode innovation Zhu Weibin, Wang Junbin, Xie Wenda |
| | 16:30-16:50 327 Design and construction optimisation of the Karanga-a-Hape Station mined tunnels and bored tunnel cross passages on the City Rail Link project Vinnathan Balakumarasingham, Pierre Daudibertières, Emmanuel Chatoux, Wataru Okada | 16:30-16:50 518 A broad review of cavern engineering approach in meta-sedimentary rock in Northern Hong Kong Jeffrey C.F. Wong, Leslie W.H. Tsang, Hermann H. M. Suen, David C.W. Mak, Franklin K.L. To | 16:30-16:50 425 How to consider the effects of longitudinal joint imperfections on internal forces in segmental tunnel linings Fabian Rauch, Oliver Fischer | 16:30-16:50 560 Development of a tunnel asset management tool from a risk-based approach C. Alessio, D. Di Fiore, L. Baccolini, B. Chiaia, M. Conte | 16:30-16:50 605 Excavation management system for mechanized tunnelling in urban areas Massimo Marotta, Jeyatharan Kumarasamy, Alvin Sim, Chee Keong Poh, Kin Boon Chang |
| | 16:50-17:10 457 Evaluation of removable time of tunnel lining formworks using surface wave techniques Kengo Kato, Chitose Kuroda, Noriyuki Utagawa, Kentaro Ohn | 16:50-17:10 805 Contract Korsvägen – part of the new Westlänken Commuter Rail Project in Gothenburg, Sweden. Challenges of drill & blast Tunnelling and cut & cover construction in heterogeneous ground conditions Klaus Rieker | 16:50-17:10 210 Large diameter slurry TBM tunnels with very low cover: A comparison of approaches Michael Mains, S. Sánchez, L. İçik, C. Mora | 16:50-17:10 849 Tunnel Euralpin Lyon Turin: The design and contract challenges for a modern Alpine base tunnel Daniele Stocker, Piergiuseppe Gilli, Matteo Falanesca | 16:50-17:10 717 Tunnel excavation with EPB: Development of new conditioning agents to reduce the amount of water required for soil conditioning Enrico Dal Negro, Alessandro Boscaro, Enrico Barbero, Carmine Todaro, Daniele Peila |
| 17:10-17:30 464 Unforeseen excavation of mixed face soil conditions in a hard rock drill and blast road tunnel Pål Drevland Jakobsen, Helle Nilsen, Alf Kristian Lund | 17:10-17:30 836 Challenges in planning, design, and construction of the underground power plant station cavern Kühltai 2 Alex Morocutti, Peter Wetzlinger, Rupert Steiger | 17:10-17:30 609 Carbon reduction in conventional tunnelling by advanced design Angelos Gakis, Petr Salak, Franz Wilhelmstoetter | 17:10-17:30 870 Strong financial and improved procurement strategies for the success of the Grand Paris Express Alexis de Pommerol | 17:10-17:30 810 Advancing mechanized tunneling through integrated digital design, simulation, and datadriven techniques Günther Meschke, Yaman Zendaki, Abdullah Alsahly, Ba Trung Cao | |

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| Wednesday Apr.24 8:30-10:30 | Technical session 14.1 Operational Safety, Maintenance and Repair (I) Nobuharu Isago Eric Premat | Technical session 3.1 Geotechnics, Geology and Geophysical Prospecting (I) Hangseok Choi Guy Bridges | Technical session 5.1 Support and Lining (I) Nick Chittenden Benoit de Rivaz | Technical session 4.1 Ground Stability and Consolidation (I) Andrés Marulanda Erik Eberhardt | Technical session 7.5 Mechanized Tunnelling in Challenging Conditions (I) Michael Halwachs Zhang Zhiguo |
| | 8:30-8:50 115 Research on information perception mechanism and evaluation method of tunnel lighting environment Liang Bo, Niu Jia'an, Qin Can | 8:30-8:50 655 Sequential 3D geological information system using re-grid of voxel model based on exploration data ahead of the tunnel face Shuro Yoshikawa, Yasuhisa Aono, Kanji Saito, Takuro Nishi | 8:30-8:50 Low carbon concrete tunnel linings Benoit de Rivaz | 8:30-8:50 97 The freezing technique for the world's longest railway tunnel A. Marottoli, M. Janeselli, R. Marrazzo, A. Gallotto, G. Vecchione, M. Cavolo, F. Gallo | 8:30-8:50 (Report 10) Guidelines for good working practice in high pressure compressed air_2023 edition (Report 20) Guide to ITA/BTS CAWG report 10 for clients and others not familiar with high pressure compressed air works Michael Halwachs |
| | 8:50-9:10 217 Concept of a thermoelectric power system in high geothermal tunnel:Preliminary design with numerical simulation Yuan Yong, Cui Pengyu, Wang Qiling | 8:50-9:10 53 Ground characterisation of the Sydney Basin for tunnelling works David J. Och, Jiping Pan, Ian T. Graham, Nicholas Walker, Antoni Kuras | 8:50-9:10 675 Numerical calculation approach for the design of segmental tunnel lining equipped with inflatable O-ring sealing Marco Bazzani, Francesco De Santis, Paolo Fantini, Daniele Maturi, Stefano Pesa | 8:50-9:10 153 Marble sludge in two-component grout applications Carmine Todaro, Andrea Carigi, Marilena Cardu, Daniele Peila | 8:50-9:10 207 TBM Sub-sea tunnelling in the Arabian Gulf Gary, Peach, H.Vigil, Khalid Saif Al-Khayareen |
| | 9:10-9:30 358 Resilience assessment of shallow-buried subway stations under earthquake disasters Zhang Dongming, Zhang Chenlong, Huang Zhongkai | 9:10-9:30 224 Correlation of empirical classification systems in squeezing anisotropic environment and optimisation of underground supports in a headrace tunnel; a case study from Tanahu Hydropower, Nepal Eirinaios Christakis, Bibash Parajuli, Yao Pengcheng, Radha Krishna Adhikari | 9:10-9:30 563 Comparative analysis of simplified solutions for the radial joint behaviour of segmental tunnel linings with finite element numerical modelling Amin Emadi, Alexandre RA Gomes | 9:10-9:30 261 Stability of portal slopes of a diversion tunnel after the Kahramanmaraş, Turkey (Türkiye) February 6, 2023 Earthquakes Ahmet Ali Mert, Fatih Caliskan | 9:10-9:30 230 Research and application of key technologies for the TBM tunnel construction under extremely complex geological conditions Feng Huanhuan, Hong Kairong |
| | 9:30-9:50 362 Approach in structural fire resistance of the existing North-South Railway Tunnel in Brussels Bart De Pauw, Carl Timperman, Sébastien Devriese | 9:30-9:50 347 Non-invasive tunnelling investigations using Muon tomography Chris Steer, Lee F. Thompson | 9:30-9:50 598 Thrust jack loading of large diameter precast segmental tunnel lining M.A. Mooney, H. Zheng, C. Naito, S. Quiel, Z. Ouyang | 9:30-9:50 295 Study of support design and construction results of unconsolidated in Aso Caldera Tepei Tomita, Tomohisa Ano, Hisataka Nagamatsu, Hiroyuki Hirano, Hiroto Tabata | 9:30-9:50 319 The mechanised excavation of the exploratory tunnel of the Brenner Base Tunnel: The major challenges David Marini, Andrea Lussu, Giuseppe, Venditti |
| | 9:50-10:10 522 Reliability study of full jet longitudinal smoke exhaust system for a road tunnel over 5 km long Zhang Xinyue, Tao Liangliang, Luo Mingrui, Zeng Yanhua | 9:50-10:10 471 Numerical simulation of the mechanism of strain rockburst under true triaxial loading and unloading conditions Xue Yadong, Tian Hengjiao | 9:50-10:10 473 Structural and sustainability requirement with high performance fibre reinforced precast segment carbon counting example Benoit de Rivaz | 9:50-10:10 558 Stability numerical investigation of laminated and randomly discontinuous flat roof Paraskevi Yiouta-Mitra, Emmanouil Vougioukas | 9:50-10:10 434 Investigation of vibration patterns generated during rock cutting tests Ugur Ates, Hanif Copur, Aydin Shaterpour-Mamaghani |
| 10:10-10:30 627 Colle Marino left tunnel renewal project: The first case-history of full lining reconstruction - from invert to crown - under difficult geotechnical conditions and future developments for working under traffic Carlo Alessio, Bruno Spigarelli, Maurizio Mazzola, Claudio Ceccarelli, Andrea Poli, Paolo Iuculano | 10:10-10:30 510 Study of microgravity survey to predict the Bukit Timah rock head for tunnelling in Singapore Tan Ekg Sze Ernest, C. Veeresh, J. Kumarasamy, K. H. Goh | 10:10-10:30 852 The mechanism, functioning and installation of reinforced ribs of shotcrete in Norwegian Method of Tunnelling (NMT) Rajinder Bhasin, Mahdi Shabanimashcool | 10:10-10:30 562 Failure mechanism of reinforced faces and design method of advanced supports for tunnels excavated by the full-face mechanized method Zhang Xiao, Wang Mingnian, Yu Li | 10:10-10:30 460 TBM design and special features for boring through highly squeezing ground Maurizio Monina, Marco D'Ambrosio, Fabio Del Rossi | |
| 10:30-11:00 | Coffee Break | Coffee Break | Coffee Break | Coffee Break | Coffee Break |
| Wednesday Apr.24 11:00-13:00 | Technical session 14.2 Operational Safety, Maintenance and Repair (II) Mike Wongkaew Roland Leucker | Technical session 3.2 Geotechnics, Geology and Geophysical Prospecting (II) Conrad W.Felice Auttakit Asanprakit | Technical session 5.2 Support and Lining (II) Jason Chin Per Vedin | Technical session 4.2 Ground Stability and Consolidation (II) Monika Mitew-Czajewska Siamak Hashemi | Technical session 7.6 Mechanized Tunnelling in Challenging Conditions (II) Peter Bent Hansen Davide Pierre Luigi Fabbri |
| | 11:00-11:20 109 Lessons learned from longitudinal ventilation worldwide and CFD-based solutions Ana Belén Amado, Zhao Yunlong, Encarnación Quesada Ruiz | 11:00-11:20 178 Experimental study of rheological characteristics of bentonite-based drilling fluids Stefano Javarone, Marta Palombini, Matilde Cinelli, Irene Bavasso, Diego Sebastiani, Anita Di Giulio | 11:00-11:20 61 Construction and applicability of using double supports in a large overburden ground conditions as a countermeasure to suppress displacements Simin Zhai, Devini Abeyawardena, Hidekazu Aoki, Sadatoshi Ohmori, Nobuharu Isago | 11:00-11:20 105 A systematic deformation control methodology for underground space construction in close proximity to an existing metro station Li Jinhua, Wen Renxue, Yang Wenwu, Mou Wingfei | 11:00-11:20 73 Design and construction excellence at Tuen Mun-Chek Lap Kok Link tunnels: An engineering marvel beyond boundaries Patrick W.H., NG, Bruno Combe, Kelvin Choi, Peter Thompson, Andy Raine |
| | 11:20-11:40 365 The impact of landscape belt design inside extra-long highway tunnel on driving comfort: A driving simulation study Ye Fei, Liu Jia, Zhu Wenhao, Su Enjie, Wen Xiaobao, Han Xingbo, Jiao Zhiwei, Sun Pu | 11:20-11:40 378 Uninterrupted continuous forecasting in mechanized tunnelling in rock Jozsef Hecht-Méndez, Thomas Dickmann, Dirk Krueger | 11:20-11:40 80 Experimental study on mechanical properties of grouted π-type SCCS arch Wang Zhichao, Cai Yuancheng, Li Wei | 11:20-11:40 310 Negligible ground surface movement with EPB TBMs in Singapore marine clay and fluvial sand Grace Christine Hangadi, Leslie Jonathan Pakianathan, Chee Keong Poh, Johnny Lim, Raymond Koh | 11:20-11:40 349 Successful steering control with partial soil excavation for station crossing of a 13.08 m diameter EPB TBM in Lodz, Poland Marcin Tomaszewski, Soren Nortoft, Fabrizio Bove, Marco D'Ambrosio |
| | 11:40-12:00 371 Italian guidelines for the risk classification, safety evaluation and monitoring of existing tunnels: An overview Andrea Carigi, Carmine Todaro, Giuseppe Silvestri | 11:40-12:00 489 Geological risks in TBM tunneling and its prediction by HSP method Lu Song, Xiao Yang, Wang Xu | 11:40-12:00 280 Large diameter surge shaft in weak foliated rock mass; excavation and support with realtime investigation and pre-excavation support strategy in the lesser Himalayan Slate Bibash Parajuli, Eirinaios Christakis, Arjun Marasini, Xing-Yi Yang | 11:40-12:00 352 Dynamic soil response around a shallow rectangular tunnel and adjacent building He Zhengyao, S.P. Gopal Madabhushi | 11:40-12:00 379 Distinctive considerations in the design and construction of large diameter TBM-built tunnels in urban environment - a UK perspective Shen Si |
| | 12:00-12:20 375 Conservative rehabilitation interventions of masonry highway tunnels along the historic Genoa-Po valley motorway in Genoa (Italy) Carlo Alessio, Roberto Pittalis, Andrea Poli, Giuseppe Attianese, Bernardino Chiaia, Daniele Ferretti, Elena Zanazzi, Lia Ferrari, Eva Coisson | 12:00-12:20 708 Limits on the estimation of the EPB face pressure. A concrete example based on Kalman filter approach Cosimo Iasiello, Alberto Flor, Paolo Fantini | 12:00-12:20 325 Comparison of structural load-bearing performance between precast and cast-in-place permanent linings Koki Kikuchi, Atsushi Kusaka, Yu Koizumi, Toshi Watanabe, Yoshitomo Tatsumi | 12:00-12:20 423 Responses of a shallow tunnel in liquefiable ground subject to multiple shakings Zhang Jinghua, Emilio Bilotta, Yang Yusheng, Yuan Yong | 12:00-12:20 393 Line 2 y Ramal - Red Básica Metro Lima y Callao - Conditioning of different types of soils encountered during the tunnel excavations with 2 TBMs (EPB and Variable Density) Juan Luis Magro, Marcos Calleja, Roberto Bono, Salvatore Iacullo |
| | 12:20-12:40 502 A computer-vision-based model updating strategy for shield tunnels with cracks Chang Xiangyu, Zhang Rui, Fu Yuguang | 12:20-12:40 742 An improved simplified solution for the characteristic line of tunnels in strain-softening rocks Anthi Maria, Pferdekämper, Anagnostou, Georgios | 12:20-12:40 331 Model experiment on load-bearing performance and failure process of newly proposed invert to reduce volume of excavation Yu Koizumi, Atsushi Kusaka, Nobuharu Isago, Kosuke Kawata, Toshiro Otsu, Naoto Mikami | 12:20-12:40 638 Excavation induced settlement in Sydney area Giovanny Alvarado, Somaye Sadeghian, Yang Dong | 12:20-12:40 514 TBM design for operation in gassy formation Laura Tafuri, Omar Bonfanti, Andrea Lisardi |
| 12:40-13:00 554 Tunnel asset management: Risk analysis through the MIRET approach Federico Foria, Gabriele Miceli, Mario Calicchio | 12:40-13:00 851 High resolution resistivity imaging for assessment of geological conditions ahead of tunnel face in a complex geology S.L. Kapil | 12:40-13:00 377 Risk assessment and large diameter segmental lining design in swelling ground Sergio Sánchez, Michael Mains, Carlos Álvarez, Emeline Barrouillet, Carlos Garrido, Mikel Ferreres | 12:40-13:00 679 A modified approach to assess tunnel excavation stability Sajjad Anwar, Geoff Charlesworth | 12:40-13:00 822 Shield self-driving technology and its application Zhou Wenbo, Hu Min, Wu Huiming, Wu Bingjian, Lu Jing | |

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| 13:00-14:00 | Lunch Break | Lunch Break | Lunch Break | Lunch Break | Lunch Break |
| Wednesday Apr.24 14:00-15:20 | Technical session 6.2 Conventional Tunnelling in Challenging Conditions (II) Roy HUNG Kin-chung Goh Kok Hun | Technical session 16 Shenzhen-Zhongshan Link Jonathan Baber Liu Jian | Technical session 5.3 Sprayed Concrete Lining Karl Gunnar David Oliveira | Technical session 17 Shenzhen Metro Line 14 Jeyatharan Kumarasamy Yan Jinxiu | Technical session 7.7 Mechanized Tunnelling in Challenging Conditions (III) Sindre Log Mike Mains |
| | 14:00-14:20 108 Experiences during tunnelling in extreme ground conditions in the Himalayas – Excavation of Rohtang Tunnel, India Radek Bernard | 14:00-14:20 222 Enhancing management and construction quality for a 5km long sandwich immersed tunnel through digital and intelligent methods Chen Weile, Liu Jian | 14:00-14:20 138 Tangential resistance between primary and secondary lining with PVC waterproofing sheet membrane Luigi Forlingieri, Carmen Hu, Mirko Morosi, Angelica Zanichelli | 14:00-14:20 49 Construction method for rapid construction of station by use of large-diameter shield tunneling machines expanding small-diameter shield tunnels and its application Huang Liping, Jia Ke, Zhang Jian, Yu Deyong, Song Tiantian | 14:00-14:20 613 Field monitoring and numerical modelling of ground heaves due to shield tunnelling in soft ground conditions Ochok Duangsano, Arthit Chayaroon, Phatharaphong Yensri, Auttakit Asanprakit, Noppadol Phienwej |
| | 14:20-14:40 171 Evaluation of impacts on existing structures induced by deep excavations in Bangkok MWA project Vonghirunyika, Phongkai, Wunchock Kroehong, Tananat Yonjoho, Kangwan Kandavorawong, Arthit Chayaroon, Ochok Duangsano, Pornkasem Jongpradist | 14:20-14:40 190 Mechanical behaviors of steel-concrete-steel immersed tunnel composite structures Song Shenyou, Nie Xin, Fan Jiansheng, Guo Yutao, Zhang Hanshuo | 14:20-14:40 406 Achieving high load-bearing capacity linings in sprayed concrete and segmental linings with high-performance steel fibres David Oliveira | 14:20-14:40 813 Gangxia North Hub innovation highlights Xu Zhuang, Qie Xuegang, Qi Liwei | 14:20-14:40 695 Is a large TBM diameter unfavourable under squeezing conditions? Alexandros N. Nordas, Thomas Leone, Georgios Anagnostou |
| | 14:40-15:00 172 Design and construction considerations for cross passages in Bangkok subsoil Ochok Duangsano, Aphichat Sramoon, Auttakit Asanprakit, Arthit Chayaroon, Noppadol Phienwej | 14:40-15:00 411 Void detection method and its application for steel shell-concrete interface of immersed tube tunnel Li Songhui, Zhang Yan, Feng Shaokong | 14:40-15:00 443 EN 14488-3 notched panel versus EN 14651 notched beam testing for pre-construction trial conformance testing of Sprayed Concrete Linings (SCL) Chris Peaston, Benoit De Rivaz | 14:40-15:00 814 Analysis of key technologies in structural design of prefabricated station of Shenzhen Metro Xu Zhuang, Meng Dong, Liu Renpu, Li Mengting | 14:40-15:00 698 JWPCP effluent outfall tunnel in Los Angeles, California – Anticipated challenges and slurry TBM performance in the soft ground section of the alignment Martino Scialpi, Miriam Piemontese, Roberto Schürch, Matt Kendall, Nicholas Karlin |
| | 15:00-15:20 193 The effect of a frictional interface in a preliminary yielding support for a deep tunnel Lorenzo Batocchioni, Valeria González, Salvatore Miliziano | 15:00-15:20 604 Fire prevention and rescue technologies used in ultra-wide cross-section immersed tunnel Yang Xiujun, Yin Ling, Zhong Maohua, Cheng Liang | 15:00-15:20 603 Singapore’s land transport authority: 25 years of sprayed concrete lining tunnelling Alvin Sim, Kin Boon Chang, Massimo Marotta, Chee Keong Poh, Mohd Mohiadeen | 15:00-15:20 816 Integration of stations and cities plan and research on technological innovation of Shenzhen Dayun comprehensive transportation Hub Deng Yongzhong, Wang Mingsheng, Liu Chang, Fei Ruizhen, Liu Wenrui, Fu Yongyu | 15:00-15:20 701 Creative design for Herrenknecht TBM used in Jiangyin Jingjiang Yangtze River crossing tunnel construction Wang Hai, Jin Renjun, Lin Guanghong, Sun Wen |
| 15:20-15:50 | Coffee Break | Coffee Break | Coffee Break | Coffee Break | Coffee Break |
| Wednesday Apr.24 15:50-17:30 | Technical session 6.3 Conventional Tunnelling in Challenging Conditions (III) Andre Assis Rakesh Kumar Khali | Technical session 10.2 Instrumentation and Monitoring/ Testing and Inspection (II) Elena Chiriotti Khoo Chee-Min | Technical session 9 Waterproofing and Drainage Petr Salak David J. Och | Technical session 12 Machine Learning Sajjad Anwar Zhang Dongmei | Technical session 7.8 Mechanized Tunnelling in Challenging Conditions (IV) Jiang Yusheng Lee Siew Wei |
| | 15:50-16:10 181 Construction of a new tunnel in proximity to an in-service tunnel by implementing measures to control blasting vibration and ground displacement Yasunori Kobayashi, Takaaki Ishii, Tadahiyo Koma, Kiyoto Nakano, Yusuke Kinomura | 15:50-16:10 In-Situ Stress Measurements Camilo Marulanda | 15:50-16:10 90 ITAtech design guidance chapter for composite Sprayed Concrete Lined (SCL) tunnels waterproofed with sprayed membranes Su Jiang | 15:50-16:10 196 Study on machine learning methods for supporting conventional tunnel engineering judgement Kazuo Sakai, Shuntaro Miyanaga, Masahito Yamagami | 15:50-16:10 744 On the interplay between face extrusion and shield loading in squeezing conditions Th. Pferdekämper, G. Anagnostou |
| | 16:10-16:30 232 Impacts of the February 2023 Kahramanmaraş, Turkey earthquakes on outlet works in rock formations Pelin Uygur, Özgür Öztürk, Erol Dumlu, Fatih Çalışkan | 16:10-16:30 66 Combination of modelling and monitoring in assessing stability of a tunnel constructed in highly deformable rock and fragilized by fire Tohid Kazerani, Etienne Garin | 16:10-16:30 150 Tunnel drainage system and the possibility of non-destructive remediation Juraj Ortuta, Viktor Tóth | 16:10-16:30 205 Investigation on surrounding rock quality prediction based on incomplete multi-source dataset and tree-augmented naive Bayesian network Wu Chen, Huang Hongwei, Tong HaiBo, Zhou Mingliang, Zhang Le, Tong Yue | 16:10-16:30 463 Developments in large diameter subaqueous tunnels Ozturk Ozgur, Terry Ma, Jackie Cheung |
| | 16:30-16:50 436 Construction of Tunnel T-49A on Dharam – Qazigund section of Udhampur–Srinagar–Baramulla New BG railway line project in highly adverse geological conditions- A case study Rakesh Kumar Khali, Sharanappa Yalal | 16:30-16:50 227 Research on integrated monitoring platform of composite steel-concrete immersed tunnel Mao Xingquan, Zhang Zhaohui, Li Longyun | 16:30-16:50 189 Analysis of viscous fingering between water and cement-based grout in tunnels Zhang Suihan, Fredrik Johansson, Zou Liangchao | 16:30-16:50 308 Machine learning-informed soil conditioning for mechanized shield tunneling feature engineering, model selection, and uncertainty quantification Yuan Xiao, Wang Shuying, Qu Tongming | 16:30-16:50 703 Development and application of supersized tunnelling technology for China’s large-scale construction of underground infrastructure Hu Shengli, Hoss, Juergen, Sun Wen |
| | 16:50-17:10 448 Deep underground mined cavern excavations in Auckland city centre, New Zealand Thomas Cheung, Wataru Okada, Shu Fan Chau | 16:50-17:10 337 Study for health monitoring of mountain tunnels operation using distributed fiber optic sensing technology Hayato Nonaka, Yasuyuki Miyajima, Noboru Sakamoto, Yohei Taira, Takuji Yamamoto, Michio Imai, Konan Koike et al. | 16:50-17:10 255 Next generation tunnel waterproofing Yves Boissonnas | 16:50-17:10 355 Segment segmentation of tunnel ring point clouds using 3D deep learning Lin Wei, Brian Sheil, Xie Xiongyao, Li Kang, Niu Gang | 16:50-17:10 768 Tunneling successes in West Los Angeles - Purple Line Project Section 3 Eleanor Sillerico, Martin Ellwood, Codie Davis, Angel del Amo, Edouard Whitman |
| | 17:10-17:30 848 Crystalline silica exposure in tunnel construction: Identifying barriers to safe practices Frederick Anlimah, Vinod Gopaldasani, Catherine MacPhail, Brian Davies | 17:10-17:30 630 Geotechnical instrumentation for road tunnels: Success cases in Colombia Victor Restrepo, Héctor Salazar, Jean Piedrahita | 17:10-17:30 586 Mitigation of the sources of infiltration in the segment sealing gasket Gustavo Bomben | 17:10-17:30 376 Assessment of TBM performance in different types of rocks using supervised learning techniques Hanan Samadi, Jafar Hassanpour, Jamal Rostami, Armin Moghbeli | 17:10-17:30 775 Three-dimensional centrifuge modelling of the effects of TBM on adjacent piles Liang Xing, Stuart Haigh |

E-Posters

The background features a series of concentric, overlapping blue arcs that create a perspective effect, resembling a tunnel or a series of arches receding into the distance. The arcs are in various shades of blue, from light to dark. Diagonal bands of blue and white stripes cut across the scene, adding a sense of movement and depth.

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ID:762 Planning and execution of horizontal directional coring method for future tunnelling works

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[Arun Sarathchandran](#), Geoffrey Charlesworth, Rhys Graaflhuis

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[Zhengjie Chen](#), Hong Chen, Ming Lu

ID:186 Design of temporary cofferdam and deep excavation for cofferdam tunnel of Shenzhen-Zhongshan Link

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ID:433 Aseismic mechanism of laminated shear energy dissipation structure in tunnels during an earthquake

[Xuepeng Zhang](#), Anting Cao, Yujing Jiang, Xingda Wang

ID:572 Study on the mechanism of tunnel structure damage under the combined effects of fault creep and earthquakes

[Zhipeng Xia](#), Sijia Jia, Jianhong Wang, Qi Wang

ID:168 Development and innovation of design method for railway tunnel support system in China

[Siming Tian](#), Dagang Liu, Yiteng Zhang, Xu Li

Topic 03 Geotechnics, Geology and Geophysical Prospecting

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Minkyu Kang, Kibeom Kwon, Sangyeong Park, Yongjoon Choe, Hangseok Choi

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ID:599 Chengdu-Guiyang High-speed railway—Yujingshan Mountain Tunnel crossing Giant Karst cave and underground river

Weichen Qing, Yu Yu, Jieyuan Zheng, Yong Zhu, Yong Wang

ID:835 Tunnelling in weak sandstone: A case study of Subansiri Lower Hydroelectric Project (2000 MW)

Mohammed Shakeel Chouhan, Sandeep Potnis

ID:241 3D geological reconstruction and application of tunnel face

Dongya Duan, Hengbin Bai, Wei Li, Wenge Qiu

ID:490 HSP method-based advanced geological prediction and tunneling parameter pre-control technology for super-large diameter pipe-jacking project

Ziyue Zhao, Fu'an Lan, Bin Wang, Lu Meng, Xu Wang, Song Lu

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Cangsong Li, Jian Wu, Qiang Li, Weigang Yu, Song Lu

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[Meimei Hao](#), Jia Zhang, Liangchao Zou, Xiaolong Li

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Pietro Lunardi, [Giuseppe Lunardi](#), Giovanna Cassani, Martino Gatti, Luca Bellardo, Carla L.Zenti

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ID:344 Experimental study of step method construction in soft and broken surrounding rock section of super-long and large section tunnels

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ID:438 Construction of desilting chambers and connecting tunnels for Vishnugad Pipalkoti He Project (444MW) in adverse geological conditions and very remote location – A case

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[Kunjie Tang](#), Junling Qiu

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Sahir N. Butt, Jamal Rostami, [Günther Meschke](#)

ID:843 Influence of TBM cutter configurations on gravel excavation characteristics revealed by discrete element method

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ID:862 Slurry treatment technology based on calcium oxide and seawater of extra-large diameter slurry balance shield machine in Zhuhai area muddy silty clay stratum

Ruiwen Dong, [Zhou Zhou](#), Wenjiang Liao

ID:194 Research on the automatic and synchronous construction technology of fully prefabricated internal structures inside large-diameter shield tunnels

Zhaoguo Ge, [Zeren Tang](#), Chen Chen, Xian Liu

ID:223 Prediction model of TBM tunneling speed based on geological parameters

[Yalei Yang](#), Lijie Du, Rong Tang, Fei Wei, Huilan Zhang

ID:242 Structural behaviour mechanism of vertical jacking method on large sections and influencing factors analysis

[Yi-min Gao](#), Xian Liu, Zhen Liu, Gonzalo Ramos, Jose Turmo

ID:288 Smarter, larger, leaner, greener – trends of the tunnelling industry towards a sustainable future in the United Kingdom

[Si Shen](#), Arabel Vilas Serin

ID:447 City Rail Link – bored tunnel challenges in Auckland city centre, New Zealand

[Thomas Cheung](#), Shu Fan Chau, Tom Ireland, Sumi Eratne

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ID:592 Study on soil discharge efficiency of earth pressure balance shield tunneling in deep buried depth sandy stratum

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ID:674 Visualization study on stability of shield tunnel face with transparent soil model

[Honghua Zhao](#), Zhi Jia, Yang Liu

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[Chengjie Zhang](#), Yixin Zhai

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Bo Zhang, [Hui Wang](#), XiaoBing Xie, YangYi Lu, Zhao Chen

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[Peng Cao](#), Shenyong Song, Mengjun Wu, Shouchao Jiang, Enlong Liu

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[Hanxin Long](#), Weiguao Rui, Yidong Xie

ID:126 Research and application of transportation and landing technology for Shen-Zhong Link super large steel shells of immersed tunnel

[Hanxin Long](#), Weiguao Rui, Guangfeng Zhang

ID:164 Key technologies of concreting construction of super-wide steel-concrete steel sandwich immersed tunnel element tubes in Shenzhen-Zhongshan Link

[Zong-xian Su](#), Xu-dong Wu, Chang-liang Zhang, Shen-you Song

ID:182 Analysis and research on seismic effects of immersed tunnel joints of Shenzhen-Zhongshan Link

[Zhi Li](#), Zheng Jie Chen, Hong Chen

ID:187 Stability and deformation analysis of dry dock slope in Haihe Tunnel.Tianjin, China

[Chun Ning He](#), Ying Qu, Er Chun Qing, Jie Qing Shen

ID:237 Structural optimization design of seamless expansion joint based on finite element analysis

Wei Jiang, [Shuangjiao Zhang](#), Yinghui Wang, Rui Bao, Jinhuan Shan

ID:606 Ventilation and smoke exhaust technical scheme of super wide section immersed tunnel

XiuJun Yang, [Liang Cheng](#), Maohua Zhong

ID:511 Research on online intelligent prediction of service status of immersed tunnel based on artificial intelligence

[Hao Ding](#), Peng Cao

ID:669 Small-scale model test for the dynamic behavior of submerged floating tunnels considering the coastal connection with subsea bored tunnels

[Joohyun Park](#), Seok-Jun Kang, Jun-Beom An, Jin Kim, Gye-Chun Cho

ID:629 Assessing the suitability of coarse sand for the sand fow method in immersed tunnel foundations

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