

WTC2020 TECHNICAL PRESENTATION

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1	6	Harvinder Rana, Alvaro Casaus, Leonid S. Troitski and Eshita Mishra	Kolkata EW Metro – Removal of Abandoned H-Piles Using NATM in Soft Ground to Facilitate the TBM Operations in Package UG02	India	15
2	8	Helen Baxter-Crawford, Ceinwen J. Mackay, Kimberley Saffian and Trevor G. Carter	Modelling the Palaeotopography of Bedrock Hidden by Urban Development	Australia	5
3	11	Karin B�pppler, Michael Str�sser and Fr�d�ric Battistoni	Advantages of Mechanized Tunnelling in Confined Urban Area Using the Example of Grand Paris Express	Germany	9
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5	13	Shijie Liu and David Oliveira	Design of Large Span and Shallow Ramp Tunnels	Australia	5
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7	15	Yuki Murata, Tetsuo Ito, Shinobu Kaise, Hitoshi Katoh and Hiroyuki Oneyama	Comparison of Interior Structures in Expressway Tunnels	Japan	12
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10	25	Alessandro Rama, Matteo Ceccarelli, Matteo Iacrossi and Rob Harding	Influence of Radial Joints in Segmental Lining 3D Modelling	United Kingdom	5
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12	35	Mohd Yusri Bin Mustafha, Ray Mun Chin, Reynaldo Lamson, Hazwan Arif Bin Hamzah and Logesan Ranjeevan	Innovations in the Use of Fibre Reinforced Precast Segmental Tunnel Linings in Klang Valley Mass Rapid Transit Project	Malaysia	2
13	36	John Lim Ji Xiong, Sam Liew Kit Shen, Russell Jon Batty and Justin Chin Jing Ho	The Pursuit of an Autonomous Tunnel Boring Machine	Malaysia	1
14	38	Shu Fan Chau, Chor Kin Tsang and Jessica Sun	An Overview of TBM Tunnels in Hong Kong	Hong Kong SAR, China/New Zealand/Australia	9
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25	73	Kokichi Kabuki, Mitsuo Takeda and Yukinori Koyama	A STUDY OF EXCAVATION PERFORMANCE OF DONUT-SHAPED TUNNEL BORING MACHINE BY EXCAVATION TESTS ON HIGH STRENGTH MORTAR SPECIMENS	Japan	9
26	78	Marco Bettelini, Alberto Arigoni and Catalin Boroianu	Fire Safety Strategy in Metro Projects – The Case of the "Metro Bucharest Line 4 Extension" Project	Switzerland	13
27	79	Ivan Haryono, Phil Woodmansey and Szymon Kowalczyk	Support Design for the Largest Cavern in Hong Kong and Thoughts on Improved Design and Construction Approaches for Future Large Caverns	Hong Kong SAR, China	5
28	81	Andrew Wilson	Effectiveness of Early Contractor Involvement (ECI) in Procurement of Underground Works Projects	Australia	6
29	83	Hiroki Nitta, Tsutomu Otsuka, Shinji Konishi, Takeshi Seto, Kohei Koshiba, Yuto Aso, Kiwamu Tsuno, Satoshi Tsuchiya and Koichi Maekawa	Investigation of the Seismic Performance of the Tunnel Sections with Non-Uniform Heights	Japan	5
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31	85	Ali Aslanbas and Nuh Bilgin	Excavating Metro Tunnels with an EPB TBM under Risk of Methane Explosion	Turkey	6
32	86	Shu Fan Chau, Roque Alea and Mark Stocks	Earthquake Impacts to A Tunnel at Fault Zone and Its Repair	New Zealand	12
33	88	Sinan Acun and Nuh Bilgin	The Effect of Rock Weathering on the Performance of an EPB TBM in a Complex Geology in Istanbul	Turkey	9
34	90	Ulas Erboylu, Sinan Acun, Turker Senyurt and Dogancan Bayram	TBM Hyperbaric Intervention Beneath a Highway in New Istanbul Airport Metro Project	Turkey	9
35	94	Ivan S. Haryono, J.N. Shirlaw, T.O. Henderson, F. Dudouit and D. Salisbury	TBM Cutting Performance in Hard and Abrasive Granite in Hong Kong	Hong Kong SAR, China	9
36	97	Keisuke Okanoya, Yasushi Arai, Tsutomu Otsuka, Tadashi Nishimura and Shinichi Watanabe	The Project which Uses an Innovative Construction Method to Expand an Operating Subway Tunnel Built by the Caisson Method under the Soft Ground	Japan	1

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38	101	Aydin Shaterpour-Mamaghani, Hanifi Copur, Deniz Tumac, Cemal Balci, Ergun Altintas and Tayfun Erdogan	Performance of Raise Boring Machine (RBM) in Low to Moderately Hard Hornfels Rocks: A Case Study of Efemcukuru Gold Mine in Turkey	Turkey	9
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40	103	Sabrina Kost and Sang Chun	Tunnel Shotcrete Linings – Recent Experiences from Design and Certification of Tunnels in Sydney, Australia	Australia	8
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42	106	Mutlu Demir, Ugurhan Akyuz and Gokhan Erkus	A Method for the Design of FRC Tunnel Linings Reinforced with GFRP Bars	Turkey	2
43	109	Marco Bettelini and Amanda Bettelini	On the Safety Requirements for Persons with Disabilities in Underground Infrastructures	Switzerland	6
44	111	Bair Jin Yueih	Is a Full Face Drive Safer and More Effective Than Sequential Excavation in Mixed Ground?	Chinese Taipei, China	5
45	114	Wiwat Phukamchat, Thanu Harnpattanapanich, Kompanart Kwansirikul and Jitaphol Rodploy	Some Double Shield TBM Behaviours Tunnelling through Rock Fault in Water Diversion Project in Northern Thailand	Thailand	9
46	116	Laurence Delplace, Anne Caroline Kiekens and Morgan Laitat	Brussels Metro North: Design and Technical Challenges	Switzerland/Belgium	5
47	120	Thomas Friedl, Nay Lin Maung and Chandrasegaran Sundararaju	LTA Contract T219: Platform Link between TEL Orchard Station and NSL Orchard Station	Singapore	5
48	121	Deniz Tumac, Mirali Seyedrezaei, Aydin Shaterpour-Mamaghani, Enver Koc, Hanifi Copur and Emre Avunduk	Effect of Soil Conditioning on the EPB-TBM Excavation Performance: A Case Study of Dudullu-Bostanci Metro Project, Turkey	Turkey	10
49	123	Rolando Justa Camara	Innovations Introduced in the Mechanized Excavation of the Tunnel Included in the Extension Project of the Dubai Metro	Spain	1
50	124	Rolando Justa Camara	Positive Experiences Obtained in the Execution of the Quito Metro	Spain	9
51	126	Marte Gutierrez and Guowen Xu	Study on the Damage Evolution in Secondary Tunnel Lining under the Combined Actions of Corrosion Degradation of Preliminary Support and Creep Deformation of Surrounding Rock	United States	5
52	128	Rakesh Kumar Khali	Ventilation System in Large Hydro Projects in India: A Case Study of Successful Implementation of Effective Ventilation System at Tehri Pump Storage Project	India	13
53	129	Brian Adjetey Boye	Accurately Assessing the Effects of Build Tolerances and Friction on Stress Distributions at the Longitudinal Joints of Precast Tunnel Linings	United Kingdom	5
54	130	Federico Foria, Riccardo Giordano, Davide Tommasi and Gabriele Miceli	Galleria Olmata, from Survey to Construction: an Integrated Design Approach for the Renewal of Railway Tunnels	Italy	14
55	132	Penglu Gan, Zihai Yan, Yanwei Zang and Xiaochun Zhong	Analysis on Floating Mechanism of Shield Tunnel in Liquefied Foundation using Shaking Table Test	China	10
56	133	Peter Schmäh and M. Lübbers	Progress in Small Diameter Tunnelling: Challenges and Technology	Germany	1
57	136	Joss Plant, Alastair Smith, Jesper Heick Thyme, Henrik Jensen, Bo Tvede-Jensen and Jakob Badsberg Larsen	Streamlined Stormwater Conveyance Tunnel Planning and Design for Flood Control in Central Copenhagen	United Kingdom/Denmark	5
58	137	Binod L. Amatya and Alan G. Bloodworth	Tunnelling and Underground Metro Stations in the Ground Condition of Kathmandu Valley, Nepal	United Kingdom	5
59	138	Okan Su, Xiang Wang and Y.P. Liang	Experimental Approach to Testing the Vibration on Excavation Machines	Turkey	7
60	139	Chawalit Tanomtin, Koson Kongdang and Jitaphol Rodploy	Unexpected Cavern in Double Shield TBM Water Transfer Tunnel Construction Project in Northern Thailand	Thailand	11
61	142	Yutaka Okuda, T. Ozeki, Yoshimasa Kyoya, Masanobu Nagai and Shoji Yoshida	Mountain Tunneling Method of Excavation Work between Two Shield Tunnels in Permeable Sandy Soil	Japan	11
62	152	Verya Nasri, Xavier De Nettancourt, Philippe Patret and Thomas Mitsch	Design and Construction of the Montreal Largest Transit System	United States	5
63	154	Xue Li, Qi Huang, Peng Huo, Weiming Hu and Dapeng Zhu	Present Status and Technology of Shield Tunneling Method of Urban Railway System in Chengdu, China (2005-2019)	China	9
64	159	Dongmei Zhang, Song Chen, Ruichuan Wang, Jie Zhang and Shijin Feng	Robust Design Method of Large-diameter Shield Tunnels Through Multiple Strata	China	5
65	160	Takeshi Seto, Masumi Taguchi, Hiroki Nitta, K. Sato, Shinji Konishi, Satoshi Sakata, Yukihiro Ishikawa and Toshiharu Kishi	Study on Section Repair Method for Cut and Cover Tunnels	Japan	12
66	162	Wen-Chieh Cheng, Ge Li and Wengang Zhang	Lubrication of Pipejacking in Soft Alluvial Deposits under Impacts of Misalignment, Geology and Lubricant Injection Mode	China	15
67	164	Artem Syomik and Georg Anagnostou	Investigation into the Stabilizing Effect of Pipe Umbrellas	Switzerland	11
68	166	Christoph Budach and Eugen Kleen	Shield Machines in Fine Grained Soils: Results from Laboratory Research to Reduce the Clogging Potential	Germany	9
69	167	Feng Qingyuan, Du Zhiyun, Huang Bing and Cheng Yuan	The Challenge of TBM Push-through and Mine-through in Malaysia MRT Line 2	China	9
70	170	Yuki Minamiguchi, Masaaki Isa, Kazuhisa Jinno, Satoshi Ishihara, Tomoyoshi Idei and Takahiro Konda	Behavior of Parallel Shield Tunnels Lining with a Large Cross-section and High-proximity	Japan	7

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72	194	David J. Och, Sven Thorin, Ian T. Graham, Robert S. Nicoll and Geoff Bateman	Identification of a Fine 'Tuff' Lamination in the Rouse Hill Siltstone Member of the Ashfield Shale, Sydney Basin, Australia and Its Implications	Australia	10
73	197	Yibo Ma, Yongchang Cai and Pengfei Yan	Criteria for Describing the Arch Effect of Weak Surrounding Rock in Super-large-section Tunnels	China	5
74	201	Michael Straesser, Britta Schoesser and Markus Thewes	Potential of the Newly Developed High Density Support Medium (HD SM) for the Application of Variable Density (VD)-TBM in Highly Permeable Ground	Germany	1
75	202	Xufeng Ai, Wenge Qiu, Yuchao Zheng and Mei Zhang	A Case Study on Construction Technology of Large Section Horseshoe-Shaped EPB-TBM Tunnel	China	1
76	203	Lars Moormann, Patrick Maessen, Martijn A. Goorden, Joanna van de Mortel-Fronczak and Jacobus Rooda	Design of a Tunnel Supervisory Controller Using Synthesis-based Engineering	Netherlands	13
77	204	Satoshi Ito, Shinji Konishi, Naoya Imaizumi, Yuki Enokidani, Junichi Nagaya, Yuichi Machijima, T. Masumoto and Shinichi Akutagawa	Monitoring and Characterization of Water Leakage Behavior for Aged Concrete Lining of Urban Metro Lines by using Plastic Optic Fiber Sensor	Japan	7
78	205	Xue Yadong, Zhou Jie and Wang Jiaxu	Research on Vibration Characteristics of TBM Disc Cutters Based on DEM	China	5
79	206	Atsushi Kusaka, Satoshi Morimoto, Tomoya Yoshioka and Yoshihiko Hasegawa	A Current State of Defects Due to Material Degradation on Road Tunnels in Japan	Japan	12
80	207	Kun-Hsien Chou and Wen-Long Wu	Discussion on Engineering Treatment Consideration for Encountering Gas in New Wu-shan-ling Divert Water Tunnel	Chinese Taipei, China	6
81	208	Goetz Vollmann, Eugen Kleen, Anna-Lena Hammer, D. Uhlmann, Thorsten Weiner, Joachim Budnik, Markus Thewes, Christian Thienert, Frank Leismann and Christoph Klapproth	KOINOR - Development of a Sprayable Geopolymer Concrete for Fire Protection Improvement and Upgrading of Underground Traffic Structures	Germany	8
82	210	Vladimir A. Maslak, Mikhail O. Lebedev and Kirill V. Romanevich	Risk Level Control by Geotechnical Monitoring on Different Tunnel Projects Stages	Russia	6
83	211	Mikhail O. Lebedev and Kirill V. Romanevich	Geomechanical and Geophysical Investigations in Repaired Underground Structures	Russia	10
84	212	Mikhail O. Lebedev, Maxim A. Karasev and Roman I. Larionov	Design of a Tunnel Face Reinforcement for Underground Structures in Geological Condition of Saint-Petersburg	Russia	11
85	213	Michael Mains, Nomiki Kottaki and Eric Mathieu	Definition of Confining Pressure for Large Diameter EPB Tunnels in the Parisian Basin	France	7
86	216	Theodora Vovou, Kiseok Jeon and VERA Nasri	BIM-based Design of Underground Works for the Réseau Express Métropolitain (REM) Project in Canada	United States	14
87	221	Ashton Krajnovich, Wendy Zhou and Marte Gutierrez	Uncertainty Assessment of Fault Zones in 3D Geologic Models of Mountain Tunnels	United States	10
88	222	Marco Bettelini, Michael Rehbock and Antonia Cornaro	Strategic Underground Space and Cavern Development	Switzerland	3
89	225	Chee Min Khoo, Thanath Gopalan, Nurfatim Afifah Abdul Rahman and Alexander William Terry	Effects of EPB Shield Tunnelling on Ground Surface Settlements: A Case Study in Kenny Hill Formation	Malaysia	7
90	227	Noboru Hasegawa, Masaharu Nishikino, Hajime Okada, Shuji Kondo, Toshiyuki Kitamura, Masamichi Abe, Kazuhisa Masuzoe and Shigeru Kogure	Demonstration of High-Speed Laser Hammering System for the Lining Concrete Inspection	Japan	12
91	232	Naotaka Kikkawa, Shinya Ito, Kikuo Sakai and Nobutaka Hiraoka	Experimental Study on Strength and Deformation of Fiber Blended Drymix Mortar Sprayed In Order To Prevent a Rockfall From Cutting Face	Japan	2
92	233	Fauzan Reza Maulana, Rasa Rasanavaneethan, Nikolaos Gklotos and Chris Knight-Hassell	Evaluation of Slurry TBM Performance Through Challenging Rock Conditions in Singapore	Singapore	9
93	235	Julian S. H. Kwan, Don T. C. Sum, Fred H. Y. Ng, Clayton Y. K. Chan, Leo K. W. Lo, Gary G. H. Au and Marco S. G. Bettelini	Conceptual Scheme for Accommodating Rock Processing, Concrete Batching and Asphalt Production Plants in Caverns	Hong Kong SAR, China	3
94	236	Rasanayagam Rasanavaneethan, Hing Yang Wong, Nikolaos Gklotos and Chris Knight Hassell	Singapore North-South Tunnel Contract NS2- Construction Challenges Met in Tunnelling and Mitigation Measures Adopted to Deliver on Time	Singapore	6
95	238	Benny Chen, David Mares, Nick Carter, Peter Ayres and Greer Voysey	Leveraging Super-computing and High-density LiDAR Technologies for Real-time Verification and Rectification of Tunnel Construction Against Design	Australia	7
96	253	Koshiro Kakeya, Hisashi Hayashi, T. Otsuka, K. Nakamura and Masato Shinji	Study on Application of Simple Dust Sensor to Tunnel Construction Site	Japan	6
97	254	Keiki Urakawa, Hisashi Hayashi and Masato Shinji	A Study on the Criteria for Rehabilitation of Old Mountain Tunnels Considering the Risk on Damages by Big Earthquake	Japan	6
98	255	Dongya Duan, Wenge Qiu and Yunjian Cheng	Research and Application of BIM in Mountain Tunnel by Shielded TBM	China	14
99	256	Ralf Winterberg and Mike Garbeth	New Development in Durable Segments for Utility Tunnels	Japan/United States	2
100	257	Dong-Mei Zhang, Bing- Li Zhang, Tai-Lai Luo and Jie Zhang	Numerical Modelling of Bolt Corrosion Impact on Performance of Segmental Shield Tunnel Lining	China	5
101	263	Qian Bai, Wen Zhao, Xin Wang and Zhiguo Wang	Study on Construction Feature of Key Technology for Reconstruction and Extension of Existing Nanling Tunnel	China	11
102	266	Enrico Maria Pizzarotti, Maura Rivoltini, Matteo Moja, Santina Bellini and Antonio Voza	Brenner Base Tunnel, Italian Side, Lot Mules 2-3: Monitoring, Surveys, Investigations and Checks during Construction	Italy	7
103	269	Agustin Guastavino, Bruno Vicente and Ramón Solá	Innovations Applied in the Design and Construction of the Arroyo Vega Flood Relief Tunnel	Argentina	1
104	272	Mizuki Nishiuchi, Hisashi Hayashi and Masato Shinji	Proposal of Tunnel Excavation Analysis Considering the Effect of the Ground Weight	Japan	5

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105	274	Saddy Ahmed, Takuya Kobata and Ying Cui	Experimental Study on the Effect of Localized Weak Zones on the Seismic Behavior of Shallow Tunnels	Japan	5
106	280	Paola Castillo and Germán Pardo	Overcoming the Ethical and Engineering Challenges in the Planning, Design and Construction of "La Línea" Tunnel (8.6 km) in the Central Andean Mountain Range, Colombia	Colombia	16
107	282	Doug Harding and Yunus Alpagut	Tunneling through 48 Fault Zones and High Water Pressures on Turkey's Gerede Water Transmission Tunnel	United States	1
108	283	Kimihiro Hashiba, Katsunori Fukui, Ryujiro Kiyama and Kentaro Okutsu	Estimation of Rock Mass Conditions at Ten Shafts Excavated with the Raise Boring Method	Japan	10
109	284	Brad Grothen, Missy Isaman, Prajwal M. Shrestha, Tianran Hu, Hua Chai and Fengfan Liu	TBM Excavation in Himalayan Geology: Over 1,200 Meters per Month at the Bheri Babai Diversion Multipurpose Project	United States	9
110	286	Alistair D. Green	Implementation of a Geotechnical Instrumentation and Monitoring Scheme within Sensitive Urban Environment – A Case Study	Singapore	7
111	291	Phichet Morya, Kuo Chieh Chao and Noppadol Phien-Wej	Evaluation of Multi-Standpipe Grouting Technique for Mae Ngad - Mae Kuang Water Diversion Tunnel Project	Thailand	11
112	293	Geoffrey Charlesworth, Ken Bagget, Ian Whitton, Daniel Armstrong and P. Greatorix	Adding to the Busiest Railway Station in Australia – Design and Construction Planning to Insert Sydney Metro's Proposed Station Box Into Sydney's Existing Central Station	Australia	5
113	294	Paul Hewitt and Visvalingam Suthagaran	Dealing with the Challenges of Ground Response on Deep Urban Excavations Adjacent to Underground Transport Infrastructure in Australia	Australia	10
114	298	Chee Min Khoo, Alan Chiew Soon Teoh, Alexander William Terry and Kong Fuat Yau	Challenges of Tunnelling below the Operating Pasar Seni LRT Station, Kuala Lumpur	Malaysia	15
115	299	Nik Sokol, Mike Jaeger and Jack Sucijsky	Progressive Design Build Tunnel Procurement in Silicon Valley	United States	6
116	302	Detlef Jordan	Overcoming Multiple Caverns: Successful TBM Tunneling in Karstic Geology at Galerie des Janots	Germany	9
117	305	Enrico Maria Pizzarotti, Maura Rivoltini, Gloria Ciceri and Santina Bellini	The S. Caterina Road Tunnel in Sicily (Italy): Intensive Use of Jet-Grouting Stabilization	Italy	11
118	309	Shunhui Tan and Heng Sun	Technology and Application of Large Diameter Slurry Shield Machine for Qiantang River Bo'ao Tunnel Project	China	1
119	312	Akira Sezaki, Koichi Sugioka, Toru Takaiso, Tetuya Hoshizumi, Osamu Kamada and Toshio Nakamura	Application of Porous Concrete to Pavement Base Course at the Cut and Cover Tunnel for Countermeasure of Water Leaking	Japan	8
120	320	Xin Hui Poon and Guofeng Zhang	Ground Improvement for Shallow Overburden of Bored Tunnels: Case Study of 8th Drive in Klang Valley MRT Line 2	Malaysia	11
121	321	Björn Stille, Francisco Ríos Bayona, Fredrik Johansson, Louise Sjölund, Rocio Batres Estrada and Mattias Roslin	Strategy for the Permanent Technical Solution Under the Lake Mälaren in the Stockholm Bypass Project	Sweden	1
122	323	Chuchai Sujivorakul and Isaac Ching Ngew Hoe	The Use of Polymer Fibre Reinforced Concrete in Underground Construction Projects in Asia	Malaysia	2
123	329	Jose Manuel Baraibar, Jose Luis Garcia Mochales, Iñigo Escobal, Johnatan Gonzalez, Manuel Arlandi and Alberto Bernardo	Stabilization of the Occidental Sector of the Ancient Quarry of Punta Lucero in the Port of Bilbao (Spain)	Spain	11
124	333	Fauzan Reza Maulana, Rasa Rasanavaneethan, Nikolaos Gklotzos and Chris Knight-Hassell	Fissure Grouting for the Design and Construction of the North-South Cable Transmission Tunnel	Singapore	11
125	334	Dongmei Zhang, Jie Liu, G. Yang, Y. Jiang and K. Jia	Experimental and Numerical Study on Waterproof Behavior of Segmental Joints in Hydraulic Shield Tunnels	China	2
126	338	Chuan Deng, Shuan Xiao and Oliver Schneider	ZhangJiHuai Railway project – The Use of a New Innovative System for Scanning in A Drill & Blast Excavation	China/Switzerland	8
127	344	Mitsutaka Sugimoto, Jian Chen, Y. Souma, Katsutoyo Yasui and Ryoma Takemoto	Simulation on Shield Behavior at A Sharp Curve by Kinematic Shield Model	Japan	5
128	347	Allan Beeston	Road Tunnel Fire Safety: Developments in Standards and Fire Protection Technologies	United Kingdom	13
129	353	Chia Weng Boon	Rock Reinforcement Mechanisms in Horizontally Layered Jointed Rock: Reinforced Rock Unit, Beam Building and Suspension	Malaysia	10
130	358	Zhen Liu, Xian Liu and Zipeng Zhao	Local-stiffness-modified Beam Spring Model Simulation on Column-free Quasi-Rectangular Segmental Tunnel Lining	China	5
131	359	Paolo Perazzelli, Roberto Schuerch, Giuseppe Moranda, M. Piemontese, Ludovica Pizzarotti and Emidio Tamburri	The Three Rivers Protection & Overflow Reduction Tunnel (3RPORT) – Slurry TBM Operation in Difficult Ground Conditions	United States/Switzerland	9
132	361	Xin Hui Poon, Guofeng Zhang and Howie Ho	Construction Challenges of Urban Tunnelling in Klang Valley, West Malaysia: Case Study of 8th Drive in SSP Line	Malaysia/Hong Kong SAR, China	15
133	367	Andrea Oss, Paolo Cucino and Luca Schiavinato	Case Studies of Jammed TBM in Rock Tunnels	Italy	9
134	368	Rajat Gangrade, Whitney Trainor-Guitton and Mike Mooney	An Integrated Framework to Optimize Site-Investigations for Tunneling Applications	United States	6
135	369	Jacob Grasmick, Angus Maxwell, Rajat Gangrade and Michael Mooney	Probabilistic Subsurface Modelling in Tunnelling Applications: Suggestions for Use in Practice	United States	6
136	373	Jacob Grasmick, H. Yu, Angus Maxwell, Michael Mooney, Hau Wei Ng, Gusztav Klados and Paul Trevisin	Tunnel Process Control for Klang Valley Metro Phase 2 using Machine Learning and Artificial Intelligence	Hong Kong SAR, China/United States	14
137	374	Michael Rehbock-Sander and Romed Insam	The Brenner Base Tunnel, Selected Aspects of Tunnelling Works at the Austrian	Switzerland/Austria	15
138	376	Rakesh Pandita and Michael Rehbock-Sander	Selected Aspects and Comparison of Metro Projects in Europe and Asia	Switzerland/India	15
139	377	Ivan Trabucchi, Antonio Mudadu, Giuseppe Tiberti, Antonio Conforti, Giovanni Plizzari and Ralf Winterberg	An Experimental Study on the Behavior of Precast Tunnel Segments Reinforced by Macro-synthetic Fibers During Temporary Loading Stages	Italy	2

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140	384	Virginie Urli, Verya Nasri and Agustin Rey	Design and Construction of the Deepest North American Underground Station - Station Édouard-Monpetit, Montreal, Canada	Canada	5
141	390	Zipeng Zhao, Zhen Liu and Xian Liu	Full-scale Experimental Investigation on Influence of Active Temporary Column on Column-free quasi-rectangular Shield Tunnel During Construction Period	China	2
142	391	Frankie Peng Leong Cheah, Teik Aun Ooi, Chee Min Khoo, Law Kim Hing and Mohd Ashraf Mohd Ismail	Finite Element Evaluation of Tunnel-Piled Structure Interaction in Complex Ground Conditions	Malaysia	5
143	394	Peng Ding, Lianjin Tao, Peng Lin, Xiuren Yang, Pengcheng Wei, Cheng Shi, Weisheng Du and Ji Zhao	Study on the Working Mechanism of Prefabricated Subway Station Structure under Earthquake	China	5
144	395	Luis Eduardo Sozio, Argimiro Alvarez Ferreira and Hugo Cassio Rocha	1989 Tunnel Collapse Revisited: New Findings from 3D Finite Element Back Analyses	Brazil	15
145	397	Masumi Taguchi, Yuji Morohashi, Takeshi Seto, Shinji Konishi, Kazumi Nomoto, Masaru Kameyama and Toshiharu Kishi	Study on Maintenance System for Cut and Cover Tunnels Showed Signs of Deterioration by Chloride Attack	Japan	12
146	402	Mehdi Bakhshi and Verya Nasri	New ACI 533 Guide - Design, Manufacturing, Construction and Durability Aspects of Precast Tunnel Segments	United States	2
147	404	Navid Allahverdi, Verya Nasri, Mehdi Bakhshi and Maziar Partovi	3D-Nonlinear Finite Element Analysis of Staged Shield-driven Tunnel Excavation with a Focus on Response of Segmental Tunnel Linings	United States	5
148	410	Georgios Anagnostou and Erich Pimentel	Swelling Control in Tunnelling by Heating	Switzerland	12
149	413	Chao He, Peijun Guo and Shunhua Zhou	The Effect of Tunnel Ring Joints on the Dynamic Responses from Underground Tunnels	Canada	5
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