



Tunnel Boring  
Machines in Difficult  
Grounds  
4th International Conference  
November 14 – 15, 2019  
Golden, Colorado USA

# TBM-DiG 2019 Conference Program

Wednesday Nov. 13<sup>th</sup>,

Time	Activity	Location	Note
800-1500	Registration for the conference	Sheraton Hotel	
800-1400	Site visit to Eisenhower Tunnel and Loveland Pass	Leaving Sheraton Hotel and returning back to hotel	For guests registered for the site visit
1400-1500	Meeting time at Hotel Lobby	Rest for participants of the Eisenhower tour, preparation for campus tour	
1500-1800	Tour of Campus, Colorado School of Mines Earth Mechanics Institute	Leaving Hotel at 3 pm to CSM campus	Bus will be provided to CSM campus
1800-20:00	Dinner Reception at Mines Geology Museum	Geology Museum	Bus will be provided to return to hotel

Thursday Nov. 14<sup>th</sup>

Time	Session	Speaker	Title
Thursday Nov. 14 <sup>th</sup>	8:30-10:00 Opening and Keynote Session I Moderator: Robert Galler (Austria) Alan Howard (USA)	Jamal Rostami (CSM)	Welcome and introduction
		Jian Zhao, Monash Univ., Australia	TBM-DiG trilogy and history
		Lok Home, President, The Robbins Company	
		Wang Dujuan, Chief Technical Officer, China Railway Equipment Group (CREG)	
10:00-10:30	Break	Conference Lobby and Exhibition Area	
10:30-12:10	Technical Session 1: Mixed Ground 1	Chairs: Brian Fulcher (USA), Dae Yong Kim (Korea)	
Thursday Nov. 14 <sup>th</sup>	20 Minute presentations	Del Nero, Hunt	Two Decades of Advances Investigating, Baselineing and Tunneling in Bouldery Ground
		Baeppler	VARIABLE DENSITY TBM – latest state of technology
		Gonzalez	Challenge in determining natural stress in hard soil soft rock (HSSR): An Example in the project of extension subway tunnels in Toronto.
		Nilsen	Significance of Mixed Face Conditions in hard rock TBM-tunneling
		Fang	FIELD PERFORMANCE AND NUMERICAL SIMULATION OF SPB TBM TUNNELLING IN SANDY COBBLE SOILS
10:30-	Technical Session 2: New Technology	Chairs: Dean Brox (UK), Yong Fang (China)	

Thursday Nov. 14 <sup>th</sup>	12:10			
		20 Minute presentations	Nix	Magnetic Seal for High Angle Conveyor Belting
			Bianchi	Assessing rock mass conditions by mean of TBM excavation parameters: some case studies
			Kawano	Jamming Mechanism on Shield Tunnel Boring Machine
			Meschke	Computational analysis of cutting-disc-rock interaction in heterogeneous ground conditions
			LI	Dynamic TBM Performance Prediction Method Based on Machine Learning and Advance Geological Evaluation
	12:00-13:30	Launch & Poster session 1		
	13:30-14:30	Keynote Session II Moderator: Jian Zhao	Ulrich Maidl, Maidl Tunnelconsultants	
			Brian Fulcher, Jacob MCMillan, consulting, Chair of WG-14 of ITA	
	14:30-15:00	Break		
	15:00-17:00	Technical session 3: Mixed Ground II conditions (Room)	Chair: Bjorn Nilsen (Norway) , Ahmadreza Hedayat (USA)	
Thursday Nov. 14 <sup>th</sup>		20 Minute presentations	Duhme	Lessons learned from TBM tunneling in Singapore tropical weathered rock formations
			Firouzei	Tunneling with a soft rock EPB machine in hard rock conditions, the experience of Tehran metro line 6 southern expansion sector
			Jeong	Linear cutting tests for assessment of cutting performance of a disc cutter in gravel ground conditions
			yang	Effect of water content on hydrothermal alteration of mudstone during the TBM tunneling
	15:00-17:00	Technical session 4: New Technology and Extreme Tunneling (Room)	Chair: Benno Ring (Germany), Hoyoung Jeong (Korea)	
		20 Minute presentations	Willis	Effective design and assembly of a large diameter slurry TBM in hard rock conditions
			Zhang	Application of shield tunneling method for cross passage of urban subway tunnels
			Chen	Preliminary study on shield steering along a sharp "s" curve
			Khetwal	Sensitivity analysis of effect of

				tunneling activities on TBM utilization factor using discrete simulation approach
			KO	[Characteristics of TBM utilization factor and its estimation
	17:00-18:00	Break, preparation for banquet		
	18:00-20:00	TBM-DiG 2019 Banquet Dinner. MC: Jamal Rostami	Herbert Einstein,	Title:
Friday Nov. 15 <sup>th</sup>				
	<b>Time</b>	<b>Session</b>	<b>Speaker</b>	<b>Title</b>
	8:30-10:00	Opening and Keynote Session III Moderator: Lars Longmaak (Germany)	Werner Burger, Chief Engineer, Herrenknecht AG	
			Brian Russell, HNTB	SR- 99 Viaduct Replacement tunnel in Seattle.
	10:00-10:30	Break	Conference Lobby and Exhibition Area	
	10:30-12:00	Technical Session 5 : Long and Squeezing tunnels (Room)	Chairs: Xiao-Ping ZHANG (China), Gabriel Walton (USA)	
Friday Nov. 15 <sup>th</sup>		20 Minute presentations	Ring	DESIGN OF SEGMENTAL LINING IN DIFFICULT ROCK CONDITIONS
			Peach	TBMs meeting the challenge of soft ground faults and rock bursts in the Himalayas
			Arora	A miniature tunnel boring machine for simulating tunnel excavation in squeezing ground conditions
			Hinton	Comparison of look-ahead probe drilling, TBM data, and probe-hole geophysics at the Rondout West-Branch Bypass Tunnel
			Feng	Application of Two Types of Cutter Rings with Different Materials in Gaoligong Mountain Project
	10:30-12:00	Technical Session 6 : Hard Rock Tunneling Challenges (Room)	Chairs: Yang Zheng (China), Hervé GOUJON (France)	
Friday Nov. 15 <sup>th</sup>		20 Minute presentations	Robert Galler	Disk cutter force measurement, face monitoring and real time analysis of excavated materials in TBM tunnelling
			Willis	TBM tunneling in extremely hard rock
			Kim	Hard rock TBM cutter life and wear evaluation: experience of new abrasion test (NAT) in Juam Hydro tunnel

			Garshol	Ground water control measures in hard rock TBM-tunneling
			Narimani Dehnavi	Evaluating the efficiency of a new cutterhead design to counteract the drawbacks of excavation through very hard rocks (presented by R. Narimani)
			Salimi	Development of a new models for prediction of TBM performance in hard rock condition based on rock type (presented by J. Rostami)
	12:00-13:30	Launch & Poster session 1		
	13:30-15:00	Technical session 7: Soft Ground Tunneling Challenges	Chairs: Garshol Knot (Sweden), Daniele Martinelli (Italy)	
Friday Nov. 15 <sup>th</sup>			Zhang	Key technologies for efficient construction of Sutong GIL Yangtze River Crossing Cable Tunnel - the first underwater 1000 kV ultra-high-voltage (UHV) power transmission line in the world
			Turner	Thames tideway central and west material handling systems from TBM to barge
			Hu	Design of a large-scale rheometer for application in EPB TBM tunneling
			Wang	Fluidity characteristics of conditioned gravely and a new evaluation method
			Fang	Study on soil conditioning for EPB shields by permeability tests
	15:00-15:30	Break		
	15:30-17:00	Keynote Session IV, Closing and Awards Ceremony Moderator: Priscilla Nelson (USA)		
			Dreyer	Tunneling on the moon by Lunar TBM,
			Rostami	Closing Remarks and Presenting the awards
				Next TBM-DiGs Conference Announcement
	17:00	Adjourned		
	16:00	Dinner Reception and Networking		

End of the Conference.