



Tunnelling Association of Canada Association canadienne des tunnels

Tunnelling and Underground Spaces Workshop – The Urban Challenge October 12-13, 2017

École de Technologie Supérieure (ÉTS), Montréal, QC, Canada

Day 1: October 12, 2017

08.45-09.00	Introduction/Opening Remarks
09.00-9.30	Le Projet du Réseau Électrique Métropolitain CDPQinfra
9.30-10.00	The Geology of the Montréal Area André Campeau and André Rancourt
10.00-10.30	Coffee break
10.30-12.00	Practical Implementation of Risk Management in Tunnel Projects Robert Goodfellow, Aldea Services
12.00-13.00	Lunch
13.00-14.30	NATM and around Gerhard Saeur, Dr. Saeur and Partners <ul style="list-style-type: none">• TBM• Micro-TBM• Directional drilling• Trenchless solutions
14.30-15.00	Coffee Break
15.00-15.30	TBM Tunnelling – Do's and Don'ts Rick Lovat, Lovat Tunnelling Solutions
15.30-16.30	Panel Discussion – <i>Geotechnical Risk Management</i> Robert Goodfellow, Gerhard Sauer, Rick Lovat)
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16.45-17.45	TAC 2017 Annual General Meeting , (<i>open to all active TAC members</i>)
18.30-19.00	TAC Awards Banquet Cocktail Reception , ALT Hotel, 120 Peel Street
19.00-22.00	TAC Awards Banquet , ALT Hotel, 120 Peel Street



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Day 2: October 13, 2017

- 8.30-10.00 **New ASCE Guidelines on Trenchless Technologies**
David Bennett, Bennett Trenchless Engineers
- 10.00-10.30 Coffee Break
- 10.30-12.00 **Ground Stabilization**
Joe Sopko, Moretrench
- Ground freezing for excavations and cross passages
 - New techniques in Dewatering
- 12.00-13.00 Lunch
- 13.00-13.30 **The Montreal Underground**
André Rancourt, CIMA+
- 13.30-15.00 **Rethinking Design and Construction of Tunnels and Underground Spaces in the Urban Environment**
Han Admiraal and Antonia Cornaro, ITACUS
- 15.00-17.30 **Site Visits**
- The Atwater Tunnel Project, City of Montreal
 - The Côte-Vertu Underground Garage Project, STM



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Workshop Lecturers

Han Admiraal

Han Admiraal studied Civil Engineering at the University for Applied Science in Rotterdam. He worked for the national Department of Public Works and Water Management for 20 years. During that time, he was Project Manager for the first TBM driven tunnel in soft soil in the Netherlands. Han Admiraal became Executive Director of the COB, the Netherlands Centre for Underground Construction and stayed there for 10 years. At the same time, he was a part time professor of Underground Space at Zeeland University of Applied Science in Vlissingen.

In 2008 he became the Owner and Managing Director of Enprodes Management Consultancy in Rotterdam. He focuses in his consultancy on the field of underground space. As a practicing Tunnel Safety Officer, one of his specialities is Road Tunnel Safety. Han Admiraal is Chair of the International Tunnelling and Underground Space Association's Committee on Underground Space (ITACUS). He is also President of the Dutch-Flemish Pipeline Industry Guild and promotes underground freight transport in that role. As a member of the Urban Planning Advisory Group of UNISDR, he also advises the Special Representative of the Secretary General of the United Nations for Disaster Risk Reduction.

Antonia Cornaro

Antonia Cornaro, studied at New York University where she earned her Master's in Urban Planning in 1996 and later gained valuable experience working for the City of New York's Planning Department (DCP) in their Transportation Division. She has 20 years of working experience as an urban and transport planner for the public and private sectors in New York City, London, Vienna and Zurich, having worked for DCP (1995-1997), PB (1997-2001), ÖIR (2001-2006), and EBP (2006-2010).

In her current work as Business Development Manager for Amberg Engineering, an internationally active Swiss firm specializing in underground infrastructure design and management, she focuses on Urban Underground Space with the aim to increase mobility, livability and resilience of urban areas (since 2010 until today). This is also central to her work as ITACUS Vice Chair (the International Tunnel and Underground Space Association's Committee on Underground Space, <http://ita-aites.org/>).

Robert Goodfellow

Robert Goodfellow is a licensed professional engineer in more than a dozen U.S. states. Robert has 25 years of experience in the tunneling industry and currently serves on the Executive Committee for the American Underground Construction Association (UCA of SME). He is an acknowledged industry expert in risk management and is co-author of the tunnel industry guidelines for risk management on tunnel projects.

Mr. Goodfellow is a frequent invited lecturer at seminars held at the Colorado School of Mines and Colorado University where he presents a class in risk management for underground projects. He has a breadth and depth of experience with all types of tunnelling methods (including rock, soil, NATM, TBM, EPBM and microtunnelling), ground behavior analysis and contractual risk management. Robert's projects have included water and wastewater tunnels in Cleveland, Columbus, Cincinnati, Washington, D.C., Toronto, Texas, Hartford, Baltimore, Niagara Falls and Chicago; as well as transportation systems in London, New York, Washington, D.C., Copenhagen, Boston, Seattle, Los Angeles, Puerto Rico, Hong Kong and Toronto.



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Joe Sopko

Dr. Sopko has devoted his entire career of over 35 years to geotechnical engineering, specifically related to ground freezing and the mechanics of frozen earth and other methods of groundwater control for the tunneling and mining industries. He began his career with McClelland Engineers (FUGRO) in Houston, Texas before returning to Michigan State University to study frozen ground under the guidance of Professor Orlando Andersland. Dr. Sopko was Vice President of the GeoFreeze Company before joining Hayward Baker and then becoming the Director of Engineering for Layne Christensen Company. He has been the Director of Ground Freezing (Freeze Guy) for the Moretrench American and Moretrench Canada Corporations for the last 8 years.

His most notable projects include the No. 7 Line and 2nd Avenue Subways in New York City, The First Street Tunnel in Washington D.C., The York Interceptor in Toronto, and several frozen cross passages for the Port of Miami Tunnel and the Northgate Link Subway in Seattle, Washington. In addition to his civilian employment, he was a Lt. Col. in the U.S. Airforce Reserve, serving as an engineering officer. He was called to active duty with the U.S. Air Force on several occasions to work on projects including the Glacier Runway at McMurdo Station Antarctica, Impacts of Global Warming on the Runway at Thule Air Base Greenland, Arrester Barrier in Permafrost, Churchill, Manitoba, as well as serving as a squadron commander at Bagram Air Base in Afghanistan in Operation Enduring Freedom.

Gerhard Sauer

Dr. Gerhard Sauer is highly respected among professionals as an outstanding tunnelling expert. His educational background and own intensive and detailed investigations led to a remarkable assortment of publications, ranging from contributions to computation methods for underground structures (finite element methods), development of research models, studies on instrumentation and interpretation of readouts, to detailed research work on tunnels with close spacing and low overburden, and his patented tunneling techniques for tunnels in urban areas (Doorframe Slab and Barrel Vault Method) and under streams and rivers (Caisson Method). On more than hundred projects, Dr. Sauer has headed design work on tunnels in rock and soft ground, slope protection, value engineering, consulting and construction supervision, and rehabilitation of existing tunnels. His designs for underground structures have encompassed railroad tunnels for use with high-speed trains, subway tunnels in downtown areas with stations, and highway tunnels with different ventilation schemes, and consistently implement the most recent State-of-the-Art tunnelling techniques.

Dr. Sauer provided the NATM value engineering design for WMATA's section B10. The project consisted of a complex underground structure comprising a station, running tunnels, an escalator shaft, cross connections in the station, and five access shafts. The design included the use of a PVC sealing membrane for complete water tightness, which was the initiation of a new era of waterproofing methods for tunnels in the U.S. The contract won the 1987 ASCE Award for best civil engineering project from the National Capitol Section. Dr. Sauer was selected prime consultant for the cities of Los Angeles, Ottawa, and Dallas-Fort Worth to review existing designs and comment on design alternatives for subway and roadway tunnels. Major U.S. projects include the NATM Pedestrian Walkback Tunnel at the Washington Dulles International Airport, VA, the Lehigh tunnel No.2, PA, design of WMATA's section E8a in soft ground, and the design of light rail tunnels for the DART section NC1-A1/A2 in mixed face conditions and Section NC-1B including City Place Station located in Dallas, TX.



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David Bennett

Dave Bennett's engineering practice focuses on trenchless technology. He has expertise in geotechnical evaluations, microtunnelling, tunneling, HDD, and pipe bursting. His range of work includes feasibility studies, preliminary designs, design/constructability reviews, provides permit assistance, prepares plans and specifications, prequalification packages, and instrumentation and monitoring plans, and plans and supervises geotechnical investigations. Mr. Bennett also provides claims evaluation and expert witness services to Owner agencies, engineering firms, contractors, and other parties. He serves on Disputes Review Boards and served on the CalTrans Advisory Panel for the Devil's Slide Tunnel. He trains construction inspectors and develops construction guidelines and practice standards for microtunnelling, HDD, and pipe bursting.

Prior to forming BTE, Mr. Bennett was a research geotechnical engineer and Chief of the Soil and Rock Mechanics Division and Testing Laboratory for the US Army Corps of Engineers Waterways Experiment Station. Dave has authored over 60 technical papers on trenchless technology, tunnelling, and geotechnical engineering. He serves on the Editorial Advisory Board for *Trenchless Technology Magazine* and was selected by a panel of peers as "2005 Trenchless Technology Person of the Year". In 2013, he was honored by induction into the Trenchless Technology Hall of Fame.