

# Tunnel Design & Construction

SUMMIT | 2-3 MARCH 2017 | BERLIN, GERMANY

## SUMMIT SPEAKERS



**Jonathan Gammon**  
Technical Director,  
Tunnelling and Earth  
Engineering & Sciences  
CH2M HILL / HALCROW



**Marcel Winter**  
Managing Director  
Pöry Schweiz AG



**Gabriele Eccher**  
R&D Manager  
SWS Engineering S.p.A.



**Rolf Katzenbach**  
Director of the Institute  
and Laboratory  
of Geotechnics  
Technische Universität  
Darmstadt



**Pekka Nieminen**  
VP Tunneling,  
Underground Drilling  
Sandvik Mining  
and Rock Technology



**Michela Chiorboli**  
Head of Inspection Unit  
(Design and Construction)  
ICMQ S.p.A.



**Benjamin Truchot**  
Head of Fire Safety Department  
INERIS



**Alun Thomas**  
Tunnels Head  
of Department  
Ramboll



**Andrew  
McNaughton**  
Technical Director  
High Speed Two (HS2)



**Ilias Michalis**  
Associate  
Technical Director  
Arcadis



**Stig Ravn**  
Head of Section,  
Mechanical & Electrical  
Infrastructure Systems  
COWI



**Fathi Tarada**  
Managing Director  
Mosen Ltd



**Krishna Neupane**  
Associate Director |  
Environment and  
Ground Engineering  
AECOM



**Marko  
Žibert**  
Partner  
Elea iC



**Vicky Potts**  
Associate Director  
GCG



# Tunnel Design & Construction

SUMMIT | 2-3 MARCH 2017 | BERLIN, GERMANY

**We are pleased to announce the launch of the Tunnel Design & Construction Summit, which will take place on 2-3 March 2017 in Berlin, Germany.**

The European Tunneling market keeps growing and we will see new innovative ways of using the underground space in a smart manner.

This summit will delve into the latest advances and future challenges in Tunnel and Underground Space Technology and Construction. The summit will offer deeper insights into issues related to Design, Analysis and Construction of Tunneling Projects, and it will provide an excellent opportunity to learn more about the recent projects and innovations from the inspirational speakers. Besides the keynotes, networking breaks will give the possibility for the industry leaders to gather together and discuss about potential ideas which will take tunnel design and construction to new levels in the near future.

**Tunnel Design & Construction Summit has been designed to address the following key issues:**

- > Geotechnical Challenges and Risks
- > BIM Technology in Different Stages of a Tunneling Project
- > Safety Design and Excavation Process Safety
- > Permanent sprayed concrete linings for tunnels
- > Latest Developments in Tunnel Construction Methods
- > Critical Design and Construction Requirements
- > Safety and Approval Process of Tunnel Delivery
- > Tunnel Design, Analysis and Information Management Systems
- > Environmental Factors to Consider when Developing Underground Structures

It is a real honor and privilege to invite you to take part in the summit. We look forward to meeting you in March!

Sincerely,  
Kalle Kekomäki, Project Director

## WHO SHOULD ATTEND

**This summit will gather together CEOs, VPs, Directors, Heads, Managers, Professors, Leads and Senior Level Executives dealing with:**

- > Geotechnical Engineering
- > Underground Space
- > Rock Engineering & Mechanics
- > Analysis, Design & Construction
- > Structural Design
- > Feasibility Studies
- > Construction Safety
- > Project Planning & Delivery
- > Construction Methods
- > Ground Support Measures
- > Public-Private Partnerships
- > Analytical Tools
- > Transportation Development
- > Engineering Geology
- > Underground Excavations
- > Slope Stability
- > Earthworks
- > BIM Design

## MEDIA PARTNERS

INTERNATIONAL  
**FIRE PROTECTION**

**FIRE SAFETY** SEARCH



**Tunnels & Infrastructures**

**08:30** Registration and Welcome Coffee

**09:00** Opening Address from the Chairman



**09:10 Speed Networking Session**

*Form those initial relationships early – exchange business cards with your colleagues and find out who is facing the same challenges as you!*

## Tunnel Construction & Transportation Systems

**09:40 Requirements for Successful Tunnelling in Urban Areas – Examples from Engineering Practice**

- > The great relevance of the soil and groundwater conditions for the design, the independent checking and the execution of urban tunnelling
- > Description and rating of feasible tunnelling technologies regarding the interaction with the soil and groundwater conditions
- > Requirements for urban tunnelling regarding safety and the serviceability/displacements of adjacent buildings/structures
- > The importance of independent checking procedures for safe and cost optimised urban tunnelling
- > Special issues: Tool wear, abrasiveness/abrasion, groundwater management, environmental aspects
- > Current practical examples from Barcelona, Copenhagen, Frankfurt and Singapore

**Rolf Katzenbach**

Director of the Institute and Laboratory of Geotechnics  
**Technische Universität Darmstadt**



**10:30 Morning Coffee and Networking Break**

**11:00 Critical Success Factors for Complex Underground Schemes**

- > Stakeholders and their conflicting needs
- > Critical factors: Type of contracts, risk sharing approach and collaboration
- > Lesson learnt from large projects: How to fail better

**Marcel Winter**

Managing Director  
**Pöyry Schweiz AG**

**11:40 Recent Tunneling Experiences in the Middle East**

- > Main recent tunneling projects in the Middle East Region
- > Main geotechnical challenges and risks
- > The application of innovative design and construction concepts
- > Safe estimates of TBM advance rates

**Ilias Michalis**

Associate Technical Director  
**Arcadis**

**12:20 HS2 – Tunnelling a New High Speed Railway in Major Cities**

- > Principles to select tunnelling
- > Permanent impact on community and environment
- > Construction impact mitigation
- > Cost, progress and logistics

**Andrew McNaughton**

Technical Director  
**High Speed Two (HS2)**



**13:00 Business Lunch**

**14:00 Urban Tunnels: An Observational Approach for the Risk Assessment of Buildings**

- > Ground movements induced by tunnels
- > Evaluation of the risk of damage of the existing structures
- > Risk assessment: management and mitigation measures

**Michela Chiorboli**

Head of Inspection Unit (Design and Construction)  
**ICMQ S.p.A**

## Geotechnical Design & Ground Investigation

**14:40 Instrumentation and Monitoring for Tunnelling Projects**

- > Instrumentation and Monitoring (I&M) is one of the fastest developing areas of technology in the construction industry; this Keynote Speech, by reference to Case Studies, will identify the range of techniques now available and describe their application to bored, mined, and cut-and-cover tunnels
- > Current I&M research and development will also be described
- > Satellite-based technology, for example, permits ground movements at the magnitude of single-digit millimetres to be mapped over large areas
- > Often subject to Government scrutiny and Public Inquiries, tunnelling projects generate concern arising from potential ground movement and noise and vibration, during and after construction. Suitably comprehensive I&M forms a vital part of the strategy to address those areas of concern. Building, Infrastructure, and Buried Asset owners – and often society as a whole – demand that I&M be implemented on tunnelling projects.

**Jonathan Gammon**

Technical Director, Tunnelling and Earth Engineering & Sciences  
**CH2M HILL / HALCROW**



**15:20 Afternoon Tea and Networking Break**



**15:40 Panel Discussion**

**Highly Technical Underground Projects**

- > Supporting existing structures
- > Ensuring operational continuity of the site
- > Building underground pedestrian connections

**16:20 Assessing and Monitoring Movements during Railway Tunnel Track Lowering**

- > Introducing Box Tunnel
- > Geotechnical design considerations
- > Structural assessment and FE numerical analyses
- > Development of monitoring system
- > Wireless tilt sensors

**Krishna Neaupane**

Associate Director | Environment and Ground Engineering  
**AECOM**

**17:00** Chairman's Closing Remarks and the End of the Day One



**Social Agenda – Complimentary Brewery Tour**



**20:00–22:00 Networking Dinner**

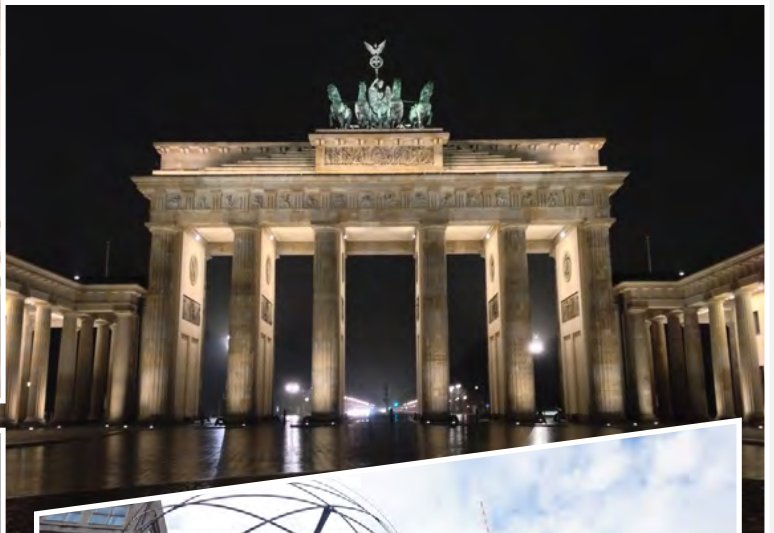
*Meet and confer with colleagues in a relaxing atmosphere during the networking dinner which will provide a great opportunity to discuss the first day of the summit and socialize.*

## Complimentary Brewery Tour

After a busy first day at the **Tunnel Design & Construction Summit** a bus will be waiting for us in front of the conference venue, to take us to the **Brauhaus Lemke am Hackeschen Markt** brewery, nearby Alexanderplatz.

The story of Berlin's first craft brewery began here, in the atmospheric S-Bahn-Bögen, and this is where the beer is still being brewed today.

All the participants are invited to take part in the complimentary tour.



## Gala Dinner

Right after our tour, the networking opportunities will continue at the summit's Gala Dinner.

Meet and confer with colleagues in a relaxing atmosphere during the gala dinner, which will provide an excellent opportunity to discuss about the first day of the summit and to socialize with the others.



**08:30** Registration and Welcome Coffee

**09:00** Welcome and Day Two Opening Remarks

## Modern Technology

### **09:10 BIM and Digital Project – New Approaches to Design, Construction and Management of Challenging Infrastructural Project**

- > Digital Project is the name given by SWS Engineering to the digitalization of civil infrastructures design processes
- > Digitalization of design processes is a relatively new and revolutionary concept for civil infrastructure engineering, and clears the air to computer aided design approaches traditionally belonging to the mechanical engineering disciplines: multi-objective optimizations, sensitivity analyses, statistical analysis, process optimization
- > BIM and GIS technologies are the key technological tools that, combined with robust procedures, allow to digitalize conventional civil engineering design, i.e. convert design input and output in 3D geo-referenced parametric geometries and store non-geometric information in databases. Furthermore, IT technologies are nowadays accessible at a civil engineering design company level and boost conventional design processes and approaches
- > The presentation will illustrate the latest application of SWS Digital Project to large underground works where BIM, GIS and IT technologies have been leveraged to optimize Tunnel Boring Machine performance and minimize risk during construction

**Gabriele Eccher**

R&D Manager

**SWS Engineering S.p.A.**

### **09:50 Permanent Sprayed Concrete Linings for Tunnels**

- > A review of the state-of-the-art in this field
- > Covering both soft ground and hard rock applications
- > Composite lining action with spray-applied waterproofing membranes

**Alun Thomas**

Tunnels Head of Department

**Ramboll**



**10:30 Morning Coffee and Networking Break**

### **11:00 Modern Drill and Blast in Tunneling**

- > Drill and blast design
- > Hardware
- > Process data analyses

**Pekka Nieminen**

VP Tunneling, Underground Drilling

**Sandvik Mining and Rock Technology**

### **11:40 Keeping TBM Drives on Target**

- > Monitoring with the use of real-time GPS systems
- > Information and monitoring systems
- > Local differences in soil density
- > Sensor Systems and new technologies
- > Pre-planned routes and challenging tunneling projects

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## Tunnel Design & Safety Issues

### **12:20 BIM Technology in Different Stages of Tunnel Construction Projects**

The presentation will focus on information modelling in Tunneling as a whole process not as a stand alone process involving just the tunnel structure. It will include parts of geological modelling as well as optimizing construction sequencing and costs. We will use Karavanke tunnel as a reference case to show the complexity of working with a large group of consultants on a single model. The challenges of implementation of BIM for all stakeholders will be presented in detail. As well as the benefits through all construction stages.

**Marko Žibert**

Partner

**Elea iC**



**13:00 Business Lunch**

### **14:00 The Interest of Modelling for Fire Safety Design during Excavation Process**

- > Safety design: key criteria for ensuring evacuation
- > From analytical approaches to computational Fluid Mechanics, an analysis of available tools for modelling
- > The interest of recent experimental campaign for excavation process safety

**Benjamin Truchot**

Head of Fire Safety Department

**INERIS**

### **14:40 MEP Design (Safety Critical Systems) in Tunnels**

- > Development of a safety case for tunnels
- > MEP Systems as part of the safety case
- > Approval of the tunnel

**Stig Ravn**

Head of Section, Mechanical & Electrical Infrastructure Systems

**COWI**

### **15:20 Is It Safer to Switch Ventilation Off in a Tunnel Fire?**

- > Directly addresses a controversial issue regarding the operation of tunnel ventilation systems
- > The influence of fire suppression and traffic operation
- > World Road Association (PIARC) and metro tunnel guidance
- > Different approaches adopted, and some experiences regarding their effects
- > Future developments

**Fathi Tarada**

Managing Director

**Mosen Ltd**

**16:00** Chairman's Closing Remarks and the End of the Summit



**16:10 Post-Summit Refreshments and Networking**



### Rolf Katzenbach

Director of the Institute and Laboratory of Geotechnics

**Technische Universität Darmstadt**

Professor Dr.-Ing. Rolf Katzenbach is Director of the Institute and Laboratory of Geotechnics of Technische Universität Darmstadt, Germany, and CEO of his Consulting Office "Ingenieursozietät Professor Dr.-Ing. Katzenbach GmbH". He is Past-Chairman of TC 212 – Deep Foundations – of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) and Board Member of several other international and national organizations.

He is member of the Chamber of Engineers and publicly certified Expert of Geotechnics and Independent Checking Engineer working with his expertise for national and international courts of justice, the International Chamber of Commerce (ICC, Paris) arbitration committees, insurance companies, state ministries, building authorities and big national and international financial institutions and investors.

Professor Katzenbach is involved in a lot of national and international projects, regarding value engineering and the safety and serviceability of buildings and structures. Due to his outstanding expertise and knowledge Professor Katzenbach was appointed by the Building and Construction Authority (BCA) Singapore to carry out the independent Peer Review for the new Metro Line DTL3 in Singapore. The Kingdom of Saudi Arabia appointed Professor Katzenbach to check the safety of the foundation of the 1,007 m high Kingdom Tower in Jeddah which is currently the highest high-rise building of the world.



### Andrew McNaughton

Technical Director

**High Speed Two (HS2)**

Since 2009 Andrew has been Chief Engineer and Technical Director of High Speed Two Ltd, developing the principles, network and specific route design for high speed rail in Great Britain. Prior to that, from 2001 he was Chief Engineer of Network Rail responsible for the specification and development of the GB rail network, investment authorisation and overall system safety management. His career in the rail sector spans 40 years.

He is Honorary Professor of Rail Engineering at Nottingham University and a Visiting Professor of Engineering at both Imperial College London and Southampton University.

Andrew is a Fellow of the Royal Academy of Engineering, the Institution of Civil Engineers, the Royal Geographical Society and the Chartered Institute of Logistics and Transport.

Andrew has been Vice Chair of the EU Transport Advisory Group, Chair of the UIC Infrastructure Commission and Chair of the EU Rail Research Council. He has lectured on the transport, land use and economic planning effects of regional, freight and long distance rail developments world-wide.

Andrew chairs the World Intercity and High Speed Committee.



### Ilias Michalis

Associate Technical Director

**Arcadis**

Ilias Michalis is leading the Geotechnical and Tunneling Design Team of Arcadis in the UAE and in Oman, holding the position of the Associate Technical Director, since December 2015.

He has 23 years of experience, working as a Tunneling and Geotechnical expert in major infrastructure projects, including among others Athens and Thessaloniki Metros in Greece and Doha Metro in Qatar.

Ilias holds MSc in Soil Mechanics & Engineering Seismology from the Imperial College of the UK, and has authored his PhD thesis on the topic of Tunnelling in Weak Rocks at the National Technical University of Athens.

Ilias is an author of more than 25 technical publications and has delivered until now 12 invited lectures to International and Middle East Regional Conferences on Tunneling, Soil Mechanics and Geotechnical Engineering.



### Gabriele Eccher

R&D Manager

**SWS Engineering S.p.A.**

SWS is an engineering company active in infrastructure construction, offering specialist engineering, project management and risk management services. For over thirty years, SWS has been helping clients build works which form the infrastructural backbone of local communities. We are committed to designing and building works with a sustainable economic, environmental and social footprint. As a leader in tunnelling, SWS prides itself for working on the world's most important projects where we were able to offer the same level of technical expertise and efficiency for projects constructed in geologically complex or congested urban areas. SWS has offices in Trento, Torino, Roma (Italy), Ankara (Turkey), London (UK) and Toronto (Canada).

Gabriele Eccher graduated as a structural engineer from University of Trento, Italy and completed post graduate studies with PhD in computational mechanics for coupled instability of thin-walled steel structures at the University of Sydney, NSW, Australia. He joined SWS Engineering in 2010 and since then has specialized in tunnelling and underground technology, research and development. Since 2014 Gabriele has managed the Research and Development department at SWS's headquarter in Trento, Italy. His main areas of interest are related to data collection and analysis, integration of design processes, BIM technologies and coordination of IT projects supporting underground engineering.



**Alun Thomas**  
Tunnels Head of Department  
**Ramboll**

Dr. Thomas has a broad experience of many types of tunnelling methods from immersed tubes to segmental linings, from closed face TBMs to hand excavation under compressed air. He is a specialist in sprayed concrete lined (SCL/NATM) tunnels and numerical modelling. He has been involved in promoting the use of permanent sprayed concrete, fibre reinforcement and spray-applied waterproof membranes. Over the last 20 years he has been involved in many of the recent major UK tunnelling projects such as the Jubilee Line Extension, Heathrow Express, Terminal 5 and Crossrail, as well as working on design and construction of tunnels internationally. Notably he has worked in Denmark, Russia, USA, Iceland, Hungary, Singapore, Qatar, India and Hong Kong.

Dr. Thomas has given lectures at the British Tunnelling Society course, the Budapest Technical University and the Danish Technical University. A regular contributor to magazines and conferences with more than 50 publications, he has written articles on subjects ranging from sustainability to user-friendly contracts. His book, "Sprayed concrete lined tunnels", has been published in English and Chinese and a Turkish version is under preparation. Dr Thomas is a member of the ITA's Working Group 12 on Sprayed Concrete which is currently producing a guide on permanent sprayed concrete linings. He was the chairman of the ITAtech group for Precast Fibre Reinforced Concrete Segments which published design guidance on this subject in 2016.



**Michela Chiorboli**  
Head of Inspection Unit  
(Design and Construction)  
**ICMQ S.p.A.**

Civil engineer (since 1990), M.Sc. in Mechanized Tunnelling, member and auditor of Italian Tunnelling Association (SIG), Co-founder and President of IN.BE.CO Association, lecturer at Polytechnic of Milan and deeply trained in Management of process of Public Infrastructures Construction (SDA Bocconi), has more than 25 years of experience in design and construction of Transportation Infrastructures (railways, metro-line, roads).

She has been involved in the projects of several transport infrastructures including 6 underground metro lines and a total of 45 underground stations, railway and motorway projects. She has acquired considerable expertise in the management of projects from preliminary design studies to the final testing procedures, working, in the first ten years for Private Engineering Companies, with technical roles, and for more than 10 years in Public Engineering Companies with manager roles (Italferr and Metropolitana Milanese). She has worked through all project phases and has gained a familiarity with Public and Private Client. She has also a sound technical background in the field of geotechnical and tunneling engineering and she has curated geotechnical and tunneling courses; is author of many papers on tunneling and geotechnical aspects and, from 2003, lecturer at Polytechnic of Milan for geotechnical items.

Currently she is geotechnical and tunnelling consultant and Head of Inspection Unit (Design and Construction) at ICMQ S.p.A.



**Jonathan Gammon**  
Technical Director, Tunnelling and Earth  
Engineering & Sciences  
**CH2M HILL / HALCROW**

Jonathan Gammon is Technical Director of CH2M's Tunnels and Earth Engineering Practice, which forms part of CH2M's Global Project Services Group.

He is a Chartered Civil Engineer (CEng, MICE) and Chartered Geologist (CGeol, FGS) with more than forty years of international construction experience working for consultants and contractors. A Member of the British Tunnelling Society, his engagement on projects extends from planning and concept design through to construction and maintenance.

Jonathan's experience encompasses the specification and implementation of instrumentation and monitoring, together with the acquisition, management and interpretation of data from both temporary and permanent works and its integration into the AGS Data Format and BIM.

He was Design Manager and Resident Engineer for West Rail in Hong Kong and Sub-Surface Design Manager for the Reference Design of Dublin Metro North in Ireland. His experience in London includes Crossrail, Thameslink (Blackfriars Station Redevelopment), Tideway Tunnels, and the Northern Line Extension (for which he was the Expert Witness, Engineering at the Public Inquiry). He was Design Project Manager for the Bond Street Station Upgrade in Central London before working for more than two years on Phase One of the High Speed Two (HS2) railway between London and Birmingham.

In 2010, Jonathan was responsible for introducing an annual international Instrumentation & Monitoring event to the Workshop and Conference Calendar in London and will again be Conference Chairman in late March 2017.

He is currently a member of the Senate Committee for the Association of Geotechnical and Geoenvironmental Specialists (AGS), Chairman of the UK Branch Committee for the Institution of Professional Engineers, New Zealand (IPENZ), and Deputy Chairman of the UK Chapter Committee for the Hong Kong Institution of Engineers (HKIE).



**Pekka Nieminen**  
VP Tunneling, Underground Drilling  
**Sandvik Mining and Rock Technology**

Work:

- > VP, Tunneling Drills in Sandvik Mining and Rock Technology
- > MSc, Rock Excavation Helsinki University of Technology
- > Working in Sandvik (Tamrock) since 1987

Associations: ITA Expert

Family: Wife and two grown up daughters

Hobby: Marathon running



**Krishna Neaupane**  
Associate Director |  
Environment and Ground Engineering  
**AECOM**

Krishna is a Chartered Civil Engineer (CEng, MICE) with over 20 years of experience in academic, research, design and construction aspects of Geotechnical Engineering. He has a wide range of experience with Railways, Highways, Tunneling and Deep Excavations schemes. Krishna is an expert in Analytical and Numerical Geo-mechanics specialising in Finite Element methods applied to flow-deformation coupled problems. Specialties: Numerical and Analytical Geotechnics, Expert user of PLAXIS 2D/3D, PHASE2/RS2, UDEC, WALLAP, REPUTE, LPILE, GRLWEAP, etc.



**Marko Žibert**  
Partner  
**Elea iC**

Practicing tunneling engineer, researcher and geotechnical engineering professional with more than 15 years of experience on large infrastructure projects at home and abroad. Actively involved in developing innovative use of 3D geological, geotechnical and BIM modelling tools as well as development of risk assessment methods for various infrastructure applications.

Currently he is heading a group of young tunneling, geotechnical and geological experts actively involved on numerous projects around most European countries, Turkey and Middle East. He is keen to work with professionals from different engineering fields transferring the knowledge to tunneling industry.

He is a partner at Elea iC, part of iC group of companies, a multiengineering global firm supporting public & private clients as well as contractors on projects on all continents.



**Benjamin Truchot**  
Head of Fire Safety Department  
**INERIS**

Born in 1980, he is an engineer in mechanics with a specialisation in fluids mechanics and thermo chemistry (INSA Rouen and CORIA). He also has a PhD in Energy and reactive flows (IFP and INP Toulouse). Since 2006, he worked as an engineer in the Accidental Risk Division of INERIS in the field of Fire and Ventilation. He uses both experimental approach and numerical simulation. He was the manager of different national research projects dedicated to underground safety (fire, explosion, toxic gas dispersion). He also achieves studies in the field of fire and ventilation for different underground infrastructures: storage, mines and tunnels. Since 2011, he is in charge of the Fire and Dispersion unit in INERIS.

During last years, he was in charge of leading the French national working group on 3D models for dispersion and he was also working on the impact of new energy carriers on tunnel safety.



**Stig Ravn**  
Head of Section, Mechanical & Electrical  
Infrastructure Systems  
**COWI**

Mr. Ravn is heading COWI's section for M&E infrastructure systems and is a tunnel ventilation expert and fire, life & safety specialist. He has been involved with numerous international tunnel and Metro projects. Among his activities in ventilation and safety aspects are various challenging projects such as the longest rail tunnel (Gotthard base tunnel), the most complex road tunnel (Cross City Tunnel) in the world and the innovative high-speed magnetic levitation train line in Munich as well as the famous London Underground metro system.

Mr. Ravn is an active member of the international tunnel community and is co-leading the activity group "Regulations and best practice" in COSUF (Committee on Operational Safety of Underground Facilities) under the International Tunnelling Association (ITA).



**Fathi Tarada**  
Managing Director  
**Mosen Ltd**

Dr Fathi Tarada is a leading expert in fire safety engineering, tunnel ventilation and Computational Fluid Dynamics, with design, review and operations experience in tunnels and buildings worldwide. Fathi is the inventor of the patented MoJet® tunnel ventilation system, and has submitted a dozen patent applications in the field of mechanical engineering. Fathi is the UK Representative of the World Road Association (PIARC) Technical Committee on Road Tunnel Operations, the past Chairman of BHR's International Symposium on Aerodynamics, Ventilation and Fire in Tunnels, the past Chairman of the Fire Protection and Safety in Tunnels Conference and the past Chairman of the Middle East FireSafe Conference.

