

IQPC Middle East presents:



TUNNELS & UNDERGROUND CONSTRUCTION MIDDLE EAST

Pre-conference focus day: Sunday 13 March 2011
Main conference: Monday 14 – Tuesday 15 March 2011
Post-conference workshop day: Wednesday 16 March 2011
Beach Rotana Hotel, Abu Dhabi, UAE

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Main conference day one: Monday 14th March

08.00 Conference registration

09.00 Conference inauguration and Chairman's welcome

David Ball, *President, The Concrete Society*

Designing state-of-the-art tunnels for the 21st century

09.15 Welcome address: Recent developments and future opportunities in Abu Dhabi for the tunnelling industry

- Understanding the development of tunnels in Abu Dhabi as a part of Abu Dhabi Plan 2030
- Outlining the progress of key tunnel projects in Abu Dhabi
- Identifying lessons learned and future investment opportunities

Engineer Abdulla S. Al Shamsi, *Executive Director of Municipal Infrastructure and Assets, Abu Dhabi Municipality*

09.45 Keynote presentation: Establishing best practice in tunnelling projects

- Adopting a global perspective on sustainable solutions
- Developing an environmental legacy through tunnelling
- Balancing the conflicting demands of sustainability, economics and politics

Olivier Vion, *Executive Director, International Tunnelling Association*

10.15 Sharjah Diftah to Shis highway: Entering the record books with the UAE's longest rock tunnel

- Evaluating the design process of what has been called the Middle East's most challenging road and tunnel project
- Outlining the engineering challenges which have been overcome to date; building out of wadis and tackling flash flooding
- Drilling the tunnel and utilising explosives to blast through the rock and the geological challenges that have been faced
- Constructing the tunnel using the New Austrian Tunnelling Method (NATM); stabilisation of the tunnel with rock bolts and spray concrete (shotcrete), before lining with a waterproof membrane and permanent concrete inner shell
- Analysing existing challenges and future plans for completing the second tunnel

Engineer Sulaiman Al Hajri, *Director of Roads Projects Department, Directorate of Public Works, Sharjah Municipality*

10.45 Morning coffee and networking break

Meeting the construction challenges faced across the MENA region

11.15 Analysing challenges and solution associated with underground and underwater concrete structures in mega projects

- Showcasing solutions adopted to resolve design imperfections
- Mitigating construction challenges and difficulties associated with complex projects
- Examining durability requirements for a minimum 75 year structure lifecycle

Dr. Yahia Alhassani, *Concrete Advisor and Project Manager Lusail, Qatari Diar*

11.45 Sydney desalination project- Water delivery pipeline: Tunnel drive beneath Botany Bay - marine recovery

- Outlining the Sydney desalination project and the creation of the Water Delivery Alliance (WDA)
- Detailing the 835m TBM drive under Botany Bay
- Retrieval of the 17.4 m long TBM from the ocean floor upon completion of the Botany Bay tunnel allowing for subsequent use on the project Elements covered in the paper include

Evaluating the design and construction techniques utilised to facilitate the tunnel bore and the recovery

- Installing the DN1800 water carrier pipeline

Steve Norman, Project Manager, McConnell Dowell Abu Dhabi (Tunnels and Underground Division)

12.15 Pre-lunch address: Dätwyler Rubber

12.35 Networking lunch

13.35 Tunnel sewers: Planning and concept design considerations

- Decision making; gravity tunnel or shallow pumping system?
- Tunnel sizing and selection of construction methods
- Route and shaft location selection considerations
- Operational design and HSE issues

Marwan Ghannam, Senior Technical Director, Hyder Consulting

14.05 Design challenges for cut and cover tunnel projects

- Value engineering and long term performance; influence of key design choices
- Local ground conditions and control of groundwater draw-down effects
- Cut and cover vs. top down method
- Integral diaphragm walls vs. in-situ construction within temporary walls; performance and constructability issues
- Past experiences with ground cavities in Abu Dhabi and precautions for new projects
- Approaches to articulation and joints
- Approaches to waterproofing and achievement of watertight sealant
- Mitigating risks caused by high salinity and high water table; influence on materials and construction techniques

Eur. Ing. Javad Akhtar BSc DMS CEng FICE MCMI, Technical Director, Hyder Consulting Middle East Ltd.

14.35 East Ltd. Panel discussion: Evaluating the region's ground conditions and the best methods and technologies for overcoming them

- Analysing ground conditions, surface conditions, tunnel dimensions, boring distance and construction period to determine the best tunneling methods to utilise
- EPBM vs. Slurry TBM and experiences in the Middle East
- Recent technological advances and how these might be deployed in the region

Panelists will include:

Eur. Ing. Javad Akhtar BSc DMS CEng FICE MCMI, Technical Director, Hyder Consulting Middle East Ltd.

15.05 Afternoon coffee and networking break

Transport Projects

15.35 Learning from the experiences of building the Dubai Metro

As a number of countries across the Middle East region are planning their own metro systems, lessons can be learned from Dubai's pioneering experiences:

- Tunnelling 13km of the light rail system utilising Mitsubishi EPB-TBMs
- Analysing the ground conditions found and how the challenges were overcome
- Future plans for delivering the next phases of the project and how the lessons learned to date will be incorporated

Dr. Abdulssamie Haimoni, Deputy Director Rail Projects Construction Department, Rail Agency – RTA

16.05 Evaluating the operational requirements of railway tunnels

As an increasingly large number of railways and metro systems are being developed across the Middle East, it is important to re-evaluate and assess the operational requirements of the tunnels that these plans include:

- What are the requirements for railway tunnels and how do these differ from road tunnels?
- How much input do the operators of the railway or metro system need to have in the design of tunnels?
- Designing tunnels with exceptional in-built safety features; fire protection, ventilation and ease of evacuation

Bassam Mansour, *Expert - Trains and Railway Systems*, **National Transport Authority**

16.35 End of conference day one

Main conference day two: Tuesday 15th March 2011

08.00 Networking breakfast

Transport Projects

09.00 The transport masterplan for Qatar: An example of integrated future transport system development

As the population of Qatar continues to increase and development progresses at a rapid rate, the transport masterplan has been commissioned to evaluate the best way to upgrade the road network and the public transport system:

- An analysis of the current transport conditions
- Forecasting the future land use, population growth, economic conditions and consequently future transport demand
- Developing a transport system to accommodate the future transport demand including:
 - Road system (including tunnels)
 - Public transport system (including tunnels)
 - Networks and facilities for pedestrians and cyclists
 - Transport management
 - Transport demand measures
- Analysing the impact of proposed measures in different scenarios: Financial, social, economical, environmental and land use
- Outlining the process of selecting a preferred scenario
- Designing effective transport implementation plans

Dr Uwe Reiter, *Director Project Management*, **PTV Doha**

09.30 Implementing effective asset management strategies to ensure that your transport project remains fit for purpose

- Considering the importance of asset management from the outset of the project
- Evaluating the maintenance requirements of transport tunnels
- Planning your maintenance programme to sustain the desired 100-120 years lifespan of the structure

Confirmed Senior Representative, **Atkins**

10.00 Operating a 21st Century tunnel management system: Al Salam Street case-study

As the Al Salam Street tunnel nears its opening, the focus of the project team has shifted from design and construction to the operation of the completed tunnel:

- Outlining the features of the state-of-the-art tunnel safety and management system installed in the Al Salam Street tunnel:
 - Ventilation system
 - Fire detection system
 - Lighting and electrical systems
 - Fume sensors
 - Traffic detection

- Detailing the emergency response plan and how the tunnel management system alerts multiple stakeholders for efficient response to maximise the safety of the users

Engineer Mazen Jaber, Head of Traffic Services, Abu Dhabi Municipality

10.30 Morning coffee and networking break

Tunnel operation and maintenance

11.00 Ensuring tunnel safety by maximising water tightness with innovative rubber waterstops

- Outlining the use of waterstops on a variety of tunnelling and underground construction projects
- Ensuring water tightness of underwater and immersed structures including, tunnels under rivers and canals, basements, garages, cellars, drydocks and locks
- Evaluating construction and clamping joints

André de Graaf, Sales Manager Infrastructure, Trelleborg Ridderkerk BV

11.30 A holistic approach assessing tunnel safety in the design phase

- Carrying out Quantitative Risk Analysis (QRA)
- Assessing the importance of Computational Fluid Dynamics (CFD)
- Considering behavior and perception-based Pedestrian Evacuation Simulation (PES)
- Microscopic traffic flow simulation predicting accidents (VISSIM)
- Cost-effectiveness analysis

Dr.-Ing. Rainer Schwarzmann, Vice President, PTV AG

12.00 Carrying out effective preventative maintenance projects to maximise the longevity of your tunnel assets

- Considering the key issues that need to be taken care of during the construction phase to diminish or eliminate the need for maintenance in the near future
- Evaluating the number of water stops in an expansion joint and the size and correct installation of the water stops
- Ensuring a continuity of concrete supply and pouring on site to avoid cold joints and damage from heat and sunlight
- Delivering the right finished surface with the correct elevations and no irregularities
- Selecting the right kind of expansion joints and recessing the joints below the adjacent wearing asphalt surface

Engineer Adnan Hammid, Senior Engineer Road Maintenance Division, Abu Dhabi Municipality,

12.30 LED street and tunnel lighting in the Middle East

Veeru Veeramani, Director – Sales and Marketing, Ruud Lighting Arabia

13.00 Networking lunch

Innovative Materials

14.10 New sprayed concrete linings for tunnels: Exploring the benefits of highly-durable, corrosion-resistant concrete linings which can eliminate membranes and reduce construction costs and time

David Ball, President, The Concrete Society

14.40 Panel discussion: Considering sustainability and durability during the design and construction phases

- Designing tunnels and underground structures to have a 100 year life span
- Selecting the most sustainable and durable materials
- Considering the most effective concrete additives and coverings to meet the challenges of the region's geotechnical conditions

Panelists will include:

Mohamad Nagi, *Director of Infrastructure Sustainability and Assessment Center*, **American University of Dubai**

15.10 Afternoon coffee and networking break

15.40 Developing sustainable underground construction and tunnelling projects: Exploring the re-use of excavated natural stones

- Outlining the possibilities of re-using excavated stones to create model sustainable developments
- Analysing the local soil type (material and water table)
- Evaluating different digging techniques and their environmental impact
- Re-cutting and re-shaping the natural stones so that they can be re-used

Dr. Samy Kamel, *Dean of Engineering*, **University of the Kingdom of Bahrain**

16.10 Chairman's closing comments

16.30 Close of main conference