TUNNELLING 4.0
INFORMATION TECHNOLOGY FOR THE DESIGN, CONSTRUCTION AND MAINTENANCE OF UNDERGROUND WORKS
3-4 May 2019

Naples - Mostra d'Oltre Mare

Objective: The aim of this course is to highlight some of the most advanced aspects of digital and information technology applications in the design, construction, maintenance and refurbishment of underground works.

The use of BIM in tunnelling will be presented and discussed, providing students with relevant examples from the design to the "as built" model implemented during construction, in addition to BIM use during maintenance and refurbishment of underground infrastructure.

The second key topic of the course is the use of automation and virtual and augmented reality as tools to improve the tunnel construction process.

Advanced technologies available for geotechnical mapping and exploration, surveying and monitoring will be discussed, together with automation applied to equipment used in underground construction and to quality control and assessment processes.

The course is designed to inform designers, site managers, young engineers and university students how the most recent innovations in information technology can be applied to tunnelling and be used to improve design, construction and maintenance processes.

3rd May 2019 - Building Information Modelling in design, construction, operation and maintenance

Session 1 (moderator: Keith Bannerman)

08:30 – 09:30:   Registration
09:30 – 09:45:   Opening (SIG-ITA)
09:45 – 10:30:   Information technology and digital innovation in construction (Prof. A. Ciribini)
10:30 – 11:15   Fundamentals of BIM (Prof. Markus Konig)
11:15 – 11:45:   Coffee Break
11:45 – 12:30:   BIM for underground infrastructure design (J. Karlovsek)
12:30 – 13:15:   Specific aspects to be dealt with BIM for underground infrastructure design (P. Pitolli)
13:15 – 13:30:   Q&A

13:30 – 14:30:   Lunch

Session 2 (moderator: Jurij Karlovsek)

14:30 – 15:15:   BIM for infrastructure design: Case history (Prof. S.A. Biancardo)
15:15 – 15:45:   Example of application of BIM in Great Paris Express (V. Keller)
15:45 – 16:15:   BIM application: Case Study (P. Cucino)
16:15 – 16:45:   Coffee break
16:45 – 17:15:   Use of BIM for tunnel maintenance and refurbishment (H. Berg)
17:15 – 17:45:   BIM for the management of mechanized excavation data (P. Grasso)
17:45 – 18:00:   Q&A

4th May 2019 - Automation in monitoring, surveying and supervision of works and equipment operation

Session 3: Automation in monitoring (moderator: Felix Amberg)

09:00 – 09:45:   Type of instruments, data collection, information management. (K. Rabensteiner & A. Radinger)
09:45 – 10:30:   Topographical methods to monitor deformations – GPS, Lidar, InSAR (J. Gonzalez-Marti)
10:30 – 11:15:   Survey and monitoring with radar satellites: Case history (Eng S. Cespa)
11:15 – 11:45:   Coffee break
11:45 – 12:30:   Automatic surveying of the rock mass structure in conventional tunnelling. Basic theory (Prof. A.M. Ferrero)
12:30 – 13:15:   Digitization in full face mechanized tunnelling technology (K. Bäppler - Herrenknecht)
13:15 – 13:30   Q&A

13:30 – 14:30:   Lunch

Session 4: Automation in surveying and supervision of works and equipment operation (moderator: Daniele Martinelli)

14:30 – 15:00:   Disk cutter force measurement and face monitoring in rock-TBM-tunnelling (Prof. R. Galler)
15:00 – 15:30:   Automation in drilling equipment. Key issues for choice and design (A. Laitinen - Sandvik)
15:30 – 16:00:   Automation and new technologies in steel arch assembling (K. Pini)
16:00 – 16:30:   Coffee break
16:30 – 17:00:   Robot assisted sprayed concrete technology and digital technology for shotcrete training (M. Eckstein & E. Odkrans)
17:00 – 17:30:   Use of digital technologies and augmented reality for training TBM drivers and workers (N. Ziv - Bouygues)
17:30 – 18:00:   Perspectives – Contribution of automation for efficiency and safety improvement (D. Lamont)
18:00 – 18:30   Q&A - Closing remarks