

Saõ Paulo, Brazil - Friday 28 – Saturday 29 November 2014

## Seminar on Conventional Tunnelling in Ground

**Friday 28 November 2014**

### Welcome and Opening

09.00 - 09.15: **Welcome and Opening.** Hugo Cássio Rocha

*Seminar Introduction and welcome to the participants and instructors of the event on behalf of the Brazilian Tunnelling Committee.*

### Session 1: Introduction & Site investigation

09.15 – 09.45: Introduction to General Tunnelling – T. Celestino

09.45 – 10.30: Principles of Conventional Tunnelling – T. Celestino

10.30 – 11.00: Coffee break

11.00 – 11.45: Layout Parameters – P. Grasso

11.45 – 12.30: Site investigation – F. Amberg

### Session 2: Design aspects

14.00 – 14.45: Design Parameters – P. Grasso

14.45 – 15.30: Design Stages – F. Amberg

15.30 – 16.00: Coffee Break

16.00 – 16.45: Geotechnical and Structural Design steps – P. Grasso

16.45 – 17.30: Tunnel Site Organization - Samuel Maimoni de Figueiredo

17.30 – 18.00: Questions/Answers

**Saturday 29 November 2014**

### Session 3: Construction and Monitoring

09.00 – 10.00: Monitoring Schemes – F. Amberg

10.00 – 10.30: Practical examples 1: Use of drilling equipment – Sandvik – A. Bernardes

10.30 – 11.00: Coffee break

11:00 – 11:30: Practical examples 2: Use of load, dump and explosives - Atlas Copco – J. Hansson & Edvaldo Santos Jr

11:30 – 12:00: Practical examples 3: Use of shotcreting equipment – Normet – I. Anabalon

12:00 – 12:30: Practical examples 4: Support: Shotcrete - BASF

### Session 4: Management

14.00 – 14.30: Practical examples 5: Support: Waterproofing–SIKA-R. Martinelli

14.30 – 15.00: Practical examples 6: Support: Chemical Grouting – MAPEI – H. Claussen

14.30 – 15.45: Risk and Safety Management – P. Grasso

15.45 – 16.15: Coffee Break

16.15 – 17.30: Round Table on Contractual Aspects – T. B. Celestino, W. Bilfinger, A. Assis, P. Grasso & F. Amberg

Saõ Paulo, Brazil - Friday 28 – Saturday 29 November 2014

## Seminar on Conventional Tunnelling in Ground

### Lecturers of the seminar *(in the order of their intervention during the training session)*



#### **Tarcísio Barreto Celestino (Themag Engenharia and São Paulo University) >>**

Professor Celestino was the past Brazilian Tunnelling President from 2006 – 2010. He earned his doctorate degree in Civil Engineering (Rock Mechanics) from the University of California, Berkeley (1981). He is currently employed by the Themag Engenharia Ltda., São Paulo (Brazil), one of the leaders in Geotechnical Engineering, Engineering Geology & Transportation Engineering Design Groups. He is also responsible for the geotechnical designs of several hydroelectric power plants, subways, highways etc., including major underground works (since 1990).

Professor Celestino continues to contribute his valuable knowledge for the graduate courses & research areas on Rock Mechanics & Underground Works, at the São Carlos Engineering School, University of São Paulo & for ITACET Foundation.



#### **Piergiorgio Grasso ( Geodata)>>**

Piergiorgio graduated from the 'Politecnico di Torino' of Italy in civil engineering. I began my engineering career in 1975 & I am the founder, President & Principal Engineer of Geodata since 1984, which is a consultancy company specialised in the design & management of underground works, both in urban environments & in mountain areas.

I was part of the ITA Executive Council member & I was the ITA past Vice President. I also served the ITA Working Group 17 on "Long and Deep Tunnels" as its animateur & tutor. Piergiorgio is one of ITA expert & is ITACET Foundation Vice President.



#### **Felix Amberg (Amberg engineering Group)>>**

Felix holds a Master of Science in Civil Engineering from the Institute of Technology, Zurich, Switzerland. He is the President of the Amberg Group (Amberg Engineering Ltd, Amberg Technologies Ltd & Hagerbach Test Gallery Ltd).

He also holds several other positions such as the treasurer & member of the ITA ExCo, Tutor of the ITA-COSUF Committee, ITA Tutor WG 12, Secretary, & Treasurer of the ITACET Foundation Council, Former Swiss Tunnelling Society President, and President of the CUC Foundation & L-SurFFoundation.

His special knowledge focuses on Road & Railway tunnel construction, Special Construction, Material Technology, Measuring Equipment for State Assessment of Tunnels, Project Management & Safe & Security



#### **Samuel Maimoni de Figueiredo (SMPlan Engenharia Ltda)>>**



#### **Armando Bernardes (Sandvik Mining and Construction) >>**

Mining engineer graduated at Escola Politécnica da Universidade de São Paulo. Working experience in underground mines and also surface operations in Brazil. Have worked with Tunneling and surface drilling applications and sales equipment for over 20 years.

Fully responsible for implementation of the Surface and Underground Product lines and other Tunneling related products for Construction Applications in South America. Including people and distribution channels management, sales volume and profitability, besides the application support for Customers.

Saõ Paulo, Brazil - Friday 28 – Saturday 29 November 2014

## Seminar on Conventional Tunnelling in Ground

**Lecturers of the seminar** *in the order of their intervention during the training session)*



**Johannes Hansson (Atlas Copco)** >> Johannes has been working for Atlas Copco Brazil since 2011 and holds a Master of Science (MSc) degree in Civil Engineering with specialization in Mining and Geotechnical Engineering. Before joining Atlas Copco Johannes worked 5 years as an engineer and has extensive design experience in the field of tunnel construction and understanding of all aspects of tunnel reinforcement and safety



**Edvaldo Santos (Atlas Copco)** >> Edvaldo holds a Bachelor of Mining Engineer and Master in Business Administration. He has been working for Atlas Copco Brazil since 2000 starting as product engineer for rock reinforcement products and afterwards taking several positions and roles in Marketing, Sales and Business Management within Mining & Construction division.

**Ismael Anabalon (NORMET Chile Ltd.)**>> Born in Santiago, Chile, with degree in Mechanical Engineering, 45 years' experience in equipment for underground construction. In 1988 started introducing the wet shotcrete (Sprayed concrete) in Chile, following with Peru and Mexico. In 1993 started operating in Chile as contractor, Concrete spraying robots for wet method, imported into the country from Norway, with the permanent advisory of the two 'Inventors' of this technology: Tom Melbye, at that time with M.B.T. and Hans Peter Torsteinsen, at that time with Robocon International. Since then, he was directly involved in thousands of job sites and lab tests, conducted to verify and certify the quality and performance of wet shotcrete for rock support, and the convenience of using the technology, also in terms of final cost. In 1998 manufactured the first concrete spraying robot, designed for the Latin American market.



**Romeu Martinelli (SIKA)** >> Civil Engineer by "Escola de Engenharia Maua" with MBA in Project Management by "FGV-Fundação Getúlio Vargas" has more than 10 years of experience in waterproofing and roofing projects. Started to work at Sika eight years ago as responsible for Roofing and Waterproofing market with experience in many projects in Brazil and Latin America, in countries such as Chile, Colombia and Peru. He has large experience in projects in Europe too, specially in Switzerland (Sika Headquarter). Romeu is professor to Waterproofing post graduate course in IDD institute.



**Hartmut Claussen (MAPEI)** >> Mining Engineer (MSc) with international experience in supervision, management and development of underground works projects (tunnels and caverns) of all kinds (subways, road and railways, mining projects, hidropower plants, etc.). MBA degree at University of Tulane (2010). Hartmut has actively participated in the development of several relevant projects in Austria, Germany, Portugal, Chile, Brazil, Ecuador, Colombia, Perú, Bolivia and Argentina Hartmut has published and presented a number of technical papers in international conferences and technical magazines and also held courses and workshops about underground works.



**Werner Bilfinger (Vector Projetos)** >> Werner graduated as a civil engineer at EPUSP, in 1991. He started his career working at Promon Engenharia with design of dams and tunnels. In 1995 he moved to Vector Projetos, where he became and is partner since 1997, working with geotechnical design and consulting. In parallel to his activities in industry, he obtained his MSc. and PhD. in Soil Mechanics also at EPUSP, respectively in 1997 and 2002. He is member of ABMS, ISSMGE, CMBR, ISRM, CBT and ITA. At ITA, he is active member of WG 19 – Conventional Tunneling.