



Saõ Paulo - Friday 26 – Saturday 27 April 2013

Seminar on Mechanized Tunnelling



Co-organized with Herrenknecht Company

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Friday 26 April 2013

Welcome and Opening

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

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

Session I: Introduction and Overview

09.15 - 09.45: **Advantages & Disadvantages of Mechanized Tunnelling & Potential Market in Brazil** - Hugo Rocha

09.45 – 10.30: **State of the Art by ITA WG-I4 (Mechanized Tunnelling)** - Markus Thewes

09.45 – 10.30 **Design criteria of TBMs** - Markus Thewes

11.00 – 11.45 **Soil Conditioning & Slurry Operation** - Markus Thewes

11.45 – 12.30 **Selection criteria for TBMs according to Project Conditions** - Markus Thewes

Session 2: Advantages and Disadvantages / Sustainability and Need for Planning

14.00 – 14.45 **Segmental Lining – General** - Fritz Gruebl

14.45 – 15.30: **Design of Segmental Lining (Mechanized Tunnelling)** - Fritz Gruebl

16.00 – 16.45 **Backfilling Grouting** - Markus Thewes

16.45 – 17.30 **Risk & Safety Management** - Andre Assis

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Session 3: Operation

09.45 – 10.30: **Cutting Tools & Cutterhead Design** - Werner Burger

09.45 – 10.30 **Chamber Access & Compressed-Air Works** - Werner Burger

11.00 – 11.45 **Soil Conditioning & Slurry Operation** - Markus Thewes

11.45 – 12.30 **Environment: Mucking, Water, Chemistry & Noise. Speciality Chemicals for TBMs**
Jamie Ibarra, Mauricio Luiz Grochoski Garcia, Lars Langmaack

Session 4: Management and Examples

14.00 – 15.30 **Selection of TBMs – Case histories**

Part I - Soft Ground & Heterogeneous Conditions - Karin Böppler

Part II - Hard Rock - Karin Böppler

16.00 – 16.45 **Example on Brazilian Tunnelling** - Edson Peev

16.45 – 17.30 **Tunnel & Site Logistics** - Werner Burger

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



Hugo Cássio Rocha >> Civil Design Department Chief- São Paulo- Subway Company- Metrô Experience of more than twenty five years in project Engineering Geology, Civil design, geotechnical engineering and environment of the various São Paulo subway lines, such as Line 1 Blue Line 2 – Green, Line 3 – Red 4 - Yellow, 5 - Lilac, 6 – Orange, 15 white, and several other ongoing studies.

President of the Brazilian Tunnelling Committee – CBT from ITA. Vice President of the Organizing Committee of the WTC- 2014 (World Tunnel Congress 2014) in Brazil.



Markus Thewes >> Full professor at the Institute for Tunnelling and Construction Management since 2005. Before joining Ruhr-University Bochum in Germany, he was a design engineer for tunnels, a geotechnical engineer for a TBM manufacturer, a jobsite manager for large tunnel projects, and a senior researcher at private tunnel research foundation.

He teaches the topics of Tunnel Construction and Operation at the graduate level as well as Construction Technologies and Construction Management issues at the undergraduate level. Markus Thewes has some 120 publications and presentations on tunnelling issues. He is Vice President of the International Tunnelling and Underground Space Association.



Fritz Gruebl >> Born: 1956/09/23 in Munich, Germany
1979-1983 University Studies Civil Engineer at Technical University of Munich
1983 - 1989 Project engineer, Philipp + Schütz, Munich
1989 to now: Managing Director PSP Consulting Engineers GmbH, Munich
2001 to now Professor for Tunnelling at University of Applied Sciences, Stuttgart
Since 2001 Member of DAUB (German ITA)
From 2003 to 2006 Member of the Executive Council of ITA



Andre Assis >> Full Professor of the Department of Civil & Environmental Engineering at the University of Brasilia (UnB), Brazil. His research interests and consulting are on tunnelling, rock mechanics and rockfill dams. He has already supervised 40 MSc and fifteen PhD theses, and published around 180 papers in international and national journals, congresses and symposia.

He was president of the International Tunnelling Association (ITA), from 2001 to 2004, and of the Brazilian Tunnelling Committee (1998-2002). Presently, he is an expert member of the ITA Executive Council and chairperson the ITA Committee on Education and Training, and consultant of the Sao Paulo Metro Co., hydroelectric projects in Brazil and Ecuador, and technical advisor of the Herrenknecht Co.

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Werner Burger >> Head of engineering and design department Herrenknecht AG. Responsible for all big sized tunnelling machines. Technical development of new Mixshield and EPB machine generation, Hard Rock and convertible TBMs including high pressure applications. Technical development of machinery for mechanized mine development including blind shaft excavation machines, raise drills and slot hole machines. Handling of patents
Member of CEN safety standards working group TC 151. Member of ITA-working groups. Member of SME. Numerous technical publications for tunnelling and mining



Mauricio Luiz Grochoski Garcia >> Consultor Técnico BASF: UGC
2001: Graduated Civil Engineer, University of São Paulo - Brazil
2008: PhD Civil Engineer, University of São Paulo - Brazil
2008 - now: BASF: UGC Coordinator - Brazil



Lars Langmaack >> Lars Langmaack graduated in 1994 as a Chemical Engineer from the Technical University Dortmund in Germany. He then joined the Rhone-Poulenc in 1996 in the development of shotcrete accelerators & TBM additives. He became the TBM project manager Europe in 2000 & from 2006 he is the technical manager TBM, worldwide for BASF.

Karin Bäßler>> Head of the Geotechnical and Consulting department for the business unit Traffic Tunnelling at Herrenknecht AG, Prior to her current position, Karin was a Civil Engineer in Schwanau in the sales, research & development and geotechnical department of Herrenknecht AG - Tunnelling Systems. PhD studies at the Colorado School of Mines in the United States and the topic of her thesis was the development of a two-component dynamic grouting system for tailskin injected backfilling of the annular gap for segmental concrete lining in shielded tunnel boring machines. She has also lectured for Master Courses at the University of Texas, the École polytechnique fédérale de Lausanne (EPFL), Stuttgart University of Applied Sciences and the Politecnico di Torino.



Edson Peev >> Graduated in Mechanical Engineering from FEI – Faculdade de Engenharia Industrial in 1983, has acted as project engineer and project manager in the oil, chemical, automobile, personal care and food segments in engineering companies, and in industries such as General Motors and Unilever. Has been working for the TBM manufacturer Herrenknecht AG in Brazil for more than 16 years as sales manager as well as after sales support. Has been actively engaged in the CBT – Brazilian Tunnelling Committee as part of its board of directors.