ECCOMAS
European Community on Computational Methods in Applied Sciences

ECCOMAS

Thematic Conference

PROGRAM

EURO:TUN 2013

III International Conference on

Computational Methods in Tunneling and Subsurface Engineering

2013 April 17th - 19th, Bochum, Germany

An IACM Special Interest Conference

www.eurotun2013.rub.de

Supported by:

INTERACTION MODELING MECHANIZED TUNNELING

RUHR UNIVERSITÄT BOCHUM

RUB

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Preface

Computational models and methods, together with advanced exploration and monitoring techniques are, by now, established tools in underground engineering. While numerical methods are nowadays regularly applied in the design, construction and maintenance of underground structures, thus evolving from a pure research state to a vivid and practically used technology of highly innovative potential, the conference aims to discuss the latest advances and challenges connected with computational prognosis models and methods to generate safe, economic and environmentally friendly solutions in subsurface engineering and tunneling.

The ECCOMAS Thematic Conference EURO:TUN 2013 is the third event of a series of successful conferences started in 2007 in Vienna. EURO:TUN 2013 expands the range of topics from the specific area of simulation models for tunneling towards computational models and methods for related areas of subsurface engineering such as mining, caverns and subsurface storage facilities. Like the previous conferences, EURO:TUN 2013 aims to provide a forum for the discussion, assessment and review of latest advancements in research, new developments and applications of computational models and methods in tunneling and subsurface engineering. Furthermore it will provide an overview of the current state of the research and future perspectives of numerical modeling and computational technologies in underground construction.

We would like to express our sincere thanks to the members of the Scientific Advisory Committee and the Industrial Advisory Committee as well as to all supporting organisations for their continuous support and helpful suggestions. Also, we thank all plenary speakers for accepting our invitation and for their efforts in preparing plenary presentations. Special thanks are due to the members of the local organizing committee of EURO:TUN 2013 (T. Barciaga, J. Stascheit and G. Vollmann) as well as to Ms S. Schützner and Ms M. Breyer for their great and competent assistance in the preparatory phase of the conference.

Finally, we thank all participants of EURO:TUN 2013. Needless to say, that their papers and their contributions to the discussions will be the basis of the success of EURO:TUN 2009, as we are hoping for.

G. Meschke, J. Eberhardsteiner, T. Schanz, K. Soga, M. Thewes
Conference Chairmen

Chairmen & Commitees

Conference Chairmen

G. Meschke	Ruhr University Bochum, Germany
J. Eberhardsteiner	Vienna University of Technology, Austria
T. Schanz	Ruhr University Bochum, Germany
K. Soga	University of Cambridge, UK
M. Thewes	Ruhr University Bochum, Germany

Local Organization Committee

T. Barciaga	Ruhr University Bochum, Germany
J. Stascheit	Ruhr University Bochum, Germany
G. Vollmann	Ruhr University Bochum, Germany

Scientific Advisory Committee

G. Anagnostou	Federal Institute of Technology Zurich, Switzerland
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H. Huang	Tongji University, China
H. Konietzky	TU Bergakademie Freiberg, Germany
H. A. Mang	Vienna University of Technology, Austria
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E. Onate	Universitat Politècnica de Catalunya, Spain
K. K. Phoon	National University of Singapore, Singapore
B. Schrefler	University of Padua, Italy
H. Schweiger	Graz University of Technology, Austria
S. Sloan	University of Newcastle, Australia
P. Vermeer	University of Stuttgart, Germany
A. Whittle	Massachusetts Institute of Technology, USA
W. Yuan	Tongji University, China
J. Zhao	École Polytechnique Fédérale de Lausanne, Switzerland

Conference Venue Information

Conference Venue

The conference will be held at the conference center („Veranstaltungszentrum“) of the Ruhr University Bochum, Germany. To reach the „Veranstaltungszentrum“ from the metro station „Ruhr University“ turn right towards the university campus. Then pass the library and the „Audimax“ on the right side. You are now directly facing the mensa/cafeteria building. Enter the building and take the elevator to floor number 04.

If you arrive by car take the exit „Uni-Mitte“ and choose the parking site P9. Take the elevator to floor number 04. See map at the back of this program.

How to get to Ruhr University Bochum by metro and bus

The Ruhr University can easily be reached by public transport. Metro line U35 connects the University to Bochum‘s city center and the main station (Bochum Hauptbahnhof). From the metro station at Bochum Hauptbahnhof take line U35, direction „Ruhr-Universität / Hustadt“ and leave the train at „Ruhr-Universität“ metro station. Going back to the city center or main station, take line U35, direction „Herne Schloss Strünkede“ or „Riemke Markt“ and leave the train at „Bochum Hauptbahnhof“ for the main station and at „Bochum Rathaus“ for the city center. For the 10-min trip to and from the University, a ticket „Preisstufe A“ (2,50€) is needed. It is available at vending machines at each metro station. On weekdays the metro line U35 leaves every 5 minutes.

From the Ruhr University bus terminal, several bus lines leave that connect other parts of Bochum and neighbouring cities to the University. Local and long distance trains, connecting Bochum to other cities in the Ruhr Area and also to Düsseldorf, Cologne, Frankfurt and their airports leave at „Bochum Hauptbahnhof“.
The schedule of all public transport in the Ruhr Area can be found online at: www.vrr.de. For long distance trains, consult the website of Deutsche Bahn www.db.de.

How to get to Ruhr University Bochum by car

The Ruhr University is located south-east of the city center of Bochum (Universitätsstr. 150, 44780 Bochum). To get there by car, the most convenient route is the A43 motorway (Münster-Wuppertal). Leave the motorway at exit 19 („Bochum-Querenburg / RuhrUniversität“) and take the express way towards „Ruhr University / BO-Zentrum“. After about 2 km, leave the express way at Uni-Mitte and follow the directions to parking site P9.

Conference Information

Lunch

Lunch is served in the „Mensa“ of the University. Just take the elevator to Floor 02. The „Mensa“ is a self-service restaurant. Please feel free to choose from the variety of meals and drinks offered. The offerings include a vegetarian meal as well as a meal without pork. Please use one of the lunch coupons included in your conference badge at the counter.

Internet

Access to the internet is provided at the conference venue via a secured WiFi connection using your own notebook. Please find an instruction as well as an individual password in your conference bag.

Welcome reception

A welcome reception will be held after the last conference session on Wednesday, April 17th at the Bistro (Mensa Foyer). Just take the elevator to Floor 01.

Visit Henrichshütte

Prior to the conference banquet a guided tour of „Henrichshütte“, a former industrial site, will be offered at 18:00 h on Thursday, April 18th. A bus transfer has been organized starting from the main bus station of Ruhr University Bochum at 17:15 h. Meeting point is the foyer of the conference center at 17:00 h from where you will be guided to the bus station.

Banquet

The conference banquet will be held on Thursday, April 18th from 20:00 h at „Henrichshütte“, following the guided tour. After the banquet, bus transfer has been organized to Bochum central station (Hauptbahnhof, close to your hotels) at 23:00, 23:45 and 0:30 h.

Delegates not participating in the guided tour of the „Henrichshütte“, may take a taxi to the venue of the banquet:
Henrichshütte Hattingen – Werksstraße 31-33 – 45527 Hattingen.

Plenary Lectures

Wednesday, 2013 April 17th:

FULLY COUPLED FE SIMULATION OF FIRE IN TUNNELS: FROM FIRE SCENARIO TO STRUCTURAL RESPONSE

9:20 - 10:20 h
Location: Room 2a

Bernhard A. Schrefler

University of Padua, Italy

ADVANCES IN THE MODELING OF TUNNELING AND EXCAVATION PROBLEMS USING A BLENDING OF PARTICLE-BASED AND FINITE ELEMENT METHODS

Eugenio Oñate

International Center for Numerical Methods in Engineering (CIMNE), Spain

BRENNER BASE TUNNEL: ARE EXPLORATION AND COMPUTATIONAL MODELING USEFUL?

14:00 - 14:40 h
Location: Room 2a

Konrad Bergmeister

University of Natural Resources and Life Sciences, Austria

Thursday, 2013 April 18th:

INTERFACE MODELLING BASED ON LEVEL SETS

14:00 - 14:40 h
Location: Room 2a

Hans Muhlhaus

The University of Queensland, Australia

Friday, 2013 April 19th:

INNOVATIONS IN TUNNELLING CONSTRUCTION MANAGEMENT: APPLICATIONS OF SIMULATION

9:20 - 10:20 h
Location: Room 2a

Simaan AbouRizk

University of Alberta, Canada

A COUPLED DISCONTINUUM-CONTINUUM NUMERICAL MODEL FOR THE ANALYSIS OF FACE INSTABILITIES IN BLOCKY ROCK MASSES

Jian Zhao

Ecole Polytechnique Fédérale de Lausanne, Switzerland

Minisymposia

MS-01	Numerical Modeling in Mechanized Tunnelling	K. Komiya, M. Sugimoto
MS-02	Constitutive Models for Support Materials	C. Hellmich
MS-03	Modeling of Tunneling in Squeezing Ground Conditions	G. Anagnostou, G. Barla
MS-04	Numerical Simulation in Construction Processes in Tunneling	M. König
MS-05	Back Analysis and Inverse Problems	T. Schanz, I. Dimov und M. Datcheva
MS-06	Geotechnical Models and Geostatistics	G. Exadaktylos
MS-07	Coupled Problems in Subsurface Engineering and Tunneling	G. Hofstetter
MS-08	Computational Failure Analysis in Subsurface Engineering	C. Callari
MS-09	Damage Analysis and Risk Assessment for Existing Buildings	J. Rots
MS-10	Advanced Multiphase Models for Grouting Materials	H. Steeb
MS-11	TBM-Ground Interactions	A. Bezuijen
MS-12	Computational Models for Safety and Security	G. Vollmann
MS-13	Numerical Modeling of Segmental Tunnel Lining and Grouted Anchors	P. Mark J. Stascheit
MS-14	Risk and Reliability Analysis	T. Vrouwenvelder

Program Overview

Time	Wednesday 17.04.2013			Thursday 18.04.2013	
8:00 - 8:20	Registration				
8:20 -8:40					
8:40 - 9:00				**MS-01d** Location: Room 2a	**MS-08a** Location: Room 1
9:00 - 9:20	**Welcome Session** - Location: Room 2a				
9:20 - 9:40	**Bernhard A. Schrefler & Eugenio Oñate** Location: Room 2a				
9:40 - 10:00					
10:00 - 10:20					
10:20 - 11:00	Coffee Break			Coffee Break	
11:00 - 11:20	**MS-01a** Location: Room 2a	**MS-03** Location: Room 1	**MS-09a** Location: Seminar Room	**MS-02a** Location: Room 2a	**MS-05a** Location: Room 1
11:20 - 11:40					
11:40 - 12:00					
12:00 - 12:20					
12:20 - 12:40					
12:40 - 14:00	Lunch Break			Lunch Break	
14:00 - 14:20	**Konrad Bergmeister** Location: Room 2a			**Hans Muhlhaus** Location: Room 2a	
14:20 - 14:40					
14:40 - 15:00	**MS-01b** Location: Room 2a	**MS-04** Location: Room 1	**MS-11a** Location: Seminar Room	**Case Studies A** Location: Seminar Room	**MS-02b** Location: Room 2a
15:00 - 15:20					
15:20 - 15:40					
15:40 - 16:00					
16:00 - 16:40	Coffee Break			Coffee Break	
16:40 - 17:00	**MS-01c** Location: Room 2a	**MS-06** Location: Room 1	**MS-09b** Location: Seminar Room		
17:00				**Bus to Henrichshütte** - Meeting point: Foyer	
17:20 - 17:40					
17:40 - 18:00					
18:00 - 18:20				**Tour Henrichtshütte**	
18:30 - 20:30	**Welcome Reception -** Location: Bistro				
20:30 - 00:30				**Conference Dinner**	

Keynote Lecture Session

<table>
<tr><td></td><td colspan="3">Friday 19.04.2013</td><td>Time</td></tr>
<tr><td rowspan="4"></td><td colspan="3" rowspan="4"></td><td>8:00 - 8:20</td></tr>
<tr><td>8:20 -8:40</td></tr>
<tr><td rowspan="4">MS-11b
Location:
Seminar Room</td><td>8:40 - 9:00</td></tr>
<tr><td>9:00 - 9:20</td></tr>
<tr><td colspan="3" rowspan="3">Simaan AbouRizk & Jian Zhao
Location: Room 2a</td><td>9:20 - 9:40</td></tr>
<tr><td>9:40 - 10:00</td></tr>
<tr><td>10:00 - 10:20</td></tr>
<tr><td></td><td colspan="3">Coffee Break</td><td>10:20 - 10:40</td></tr>
<tr><td rowspan="5">MS-08b
Location:
Seminar Room</td><td rowspan="5">Case Studies B
Location:
Seminar Room</td><td rowspan="5">MS-07/10
Location: Room 2a</td><td rowspan="5">MS-14
Location:
Room 1</td><td>11:00 - 11:20</td></tr>
<tr><td>11:20 - 11:40</td></tr>
<tr><td>11:40 - 12:00</td></tr>
<tr><td>12:00 - 12:20</td></tr>
<tr><td>12:20 - 12:40</td></tr>
<tr><td></td><td colspan="3">Lunch Break</td><td>12:40 - 13:00</td></tr>
<tr><td rowspan="2"></td><td rowspan="5">MS-12
Location: Room 1</td><td rowspan="5" colspan="2">MS-13
Location: Room 2a</td><td>14:00 - 14:20</td></tr>
<tr><td>14:20 - 14:40</td></tr>
<tr><td rowspan="4">MS-05b
Location:
Room 1</td><td>14:40 - 15:00</td></tr>
<tr><td>15:00 - 15:20</td></tr>
<tr><td>15:20 - 15:40</td></tr>
<tr><td colspan="3">Closing Session - Location: Room 2a</td><td>15:40 - 16:00</td></tr>
<tr><td></td><td colspan="3" rowspan="10"></td><td>16:00 - 16:20</td></tr>
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<tr><td></td><td>18:30 - 20:30</td></tr>
<tr><td></td><td>20:30 - 00:30</td></tr>
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Wednesday, 2013 April 17th

8:00 - 9:00	Registration	Foyer
9:00 - 9:20	Welcome Reception – Chairman: Günther Meschke	Room 2a
9:20 - 10:20	Keynote Lecure 1 & 2 Chairman: Günther Meschke	Room 2a
0 min	**Fully coupled FE Simulation of Fire in Tunnels: from Fire Scenario to Structural Response** Francesco Pesavento[1], Bernhard Aribo Schrefler[1], M. Antonello[1], Javier Principe[2], Ramon Codina[2],[1]University of Padua, Italy; [2]CIMNE, Bargelona, Spain	
30 min	**Advances in the Modeling of Tunneling and Excavation Problems using a Blending of Particle-Based and Finite Element Methods** Eugenio Oñate, Josep Maria Carbonell, M.A. Celigueta, International Center for Numerical Methods in Engineering (CIMNE), Spain	
10:20 -11:00	Coffee Break	Foyer
11:00 - 12:40	Parallel Sessions	
MS-01a	Numerical Modeling in Mechanized Tunnelling Kazuhito Komiya	Room 2a
0 min	**Shield Tunneling Advancement Simulation Using 3D FEM Considering Distance Factor and its Validation** Alireza Afshani[1], Hiroshi Dobashi[2], Shinji Konishi[3], Kazuhito Komiya[4], Hirokazu Akagi[1], Kaho Orihara[1], [1]Waseda University, Tokyo, Japan; [2]Metropolitan Expressway Company Limited, Tokyo, Japan; [3]Tokyo Metro Company Limited, Tokyo, Japan; [4]Chiba Institute of Technology, Chiba, Japan	
20 min	**Geotechnical Calculation and Process Controlling Approach for Shield Tunnelling Settlement Minimisation in Urban Areas** Inacio Fernandes[1], Ulrich Maidl[2], Marc Comulada[2], Stefan Hintz[2], [1]Construtora Norberto Odebrecht, Brazil; [2]Maidl Tunnelconsultants GmbH & Co. KG, Germany	
40 min	**Finite Element Simulation of Ground Behaviour due to Modular Approached Tunnel Work** Kazuhito Komiya[1], Ken Utsugi[2], Takashi Nakayama[3], [1]President, Professor, Chiba Institute of Technology, Japan; [2]Graduate Student, Chiba Institute of Technology, Japan; [3]Reseacher, Railway Technical Research Institute, Japan	
60 min	**Enhanced Monitoring and Simulation Assisted Tunnelling (EMSAT)** Ba Trung Cao[1], Klaus Chmelina[2], Janosch Stascheit[1], Günther Meschke[1], [1]Ruhr University Bochum, Germany; [2]GEODATA, Leoben, Austria	
MS-03	Modeling of Tunneling in Squeezing Ground Conditions Georg Anagnostou	Room 1

Wednesday, 2013 April 17th

0 min	**A Closed-Form Solution for the Ground Response Curve of Circular Tunnels Considering Large Deformations** Apostolos Vrakas, Georgios Anagnostou, ETH Zurich, Switzerland	
20 min	**Evaluation of a Modified Hardening Model for Squeezing Rocks in Tunneling** Weijie Dong, Georgios Anagnostou, ETH Zurich, Switzerland	
40 min	**Time Dependent Numerical Analysis for Investigation of Entrapment Risks in DS-TBM Tunneling in Squeezing Grounds** Rohola Hasanpour[1], Bahtiyar Ünver[2], Jamal Rostami[3], [1]Hacettepe University, Turkey; [2]Hacettepe University, Turkey; [3]Pennsylvania State University, USA	
60 min	**Tunnel Behavior Subjected to Repeated Shear Deformation – Model Test and Finite Flement Analysis** Md Shahin Hossain, Teruo Nakai, Sho Kuroi, Nagoya Institute of Technology, Japan	
80 min	**Numerical Modeling of the Time-Dependent Interaction between Rock Mass and Lining Support** Frederic Louis Pellet, France	
MS-09a	Damage Analysis and Risk Assessment for Existing Buildings Jan Rots	Seminar Room
0 min	**3D Numerical Analysis of Tunnelling Induced Damage: The Influence of the Alignment of a Masonry Building with the Tunnel Axis** Jori Kappen, Giorgia Giardina, Max A.N. Hendriks, Jan G. Rots, Delft University of Technology, The Netherlands	
20 min	**Evaluation of Building Stiffness in the Risk-Assessment of Structures Affected by Settlements** Steffen Schindler, Peter Mark, Ruhr University Bochum, Germany	
40 min	**Numerical Modeling of the Interactions between Shield Tunneling Processes and Pile Foundations** Jelena Ninić, Janosch Stascheit, Günther Meschke, Ruhr University Bochum, Germany	
60 min	**Topography Influence on Subsidence Due to Horizontal Underground Mining Using the Influence Function Method** Yinfei Cai, Thierry Verdel, Olivier Deck, Georessources, Université de Lorraine, CNRS, GRECU, Ecole des Mines de Nancy	
80 min	**A 3D Temporal Evolutionary Numerical Model of a Masonry Building in Barcelona Subjected to Tunnelling Subsidence** Carles Camós, Climent Molins, Universitat Politècnica de Catalunya, Spain	
12:40 - 14:00	Lunch Break	Mensa

Wednesday, 2013 April 17th

14:00 - 14:40	Keynote Lecture 3 Chairman: Josef Eberhardsteiner	Room 2a
0 min	**Brenner Base Tunnel: Are Exploration and Computational Modeling Useful?** Konrad Bergmeister, University of Natural Resources and Life Sciences, Austria	
14:40 - 16:00	Parallel Sessions	
MS-01b	Numerical Modeling in Mechanized Tunnelling Mitsutaka Sugimoto	Room 2a
0 min	**Numerical Simulation of Ground Movements Due To EPB Tunnelling in Clay** Vasiliki Founta[1], Jelena Ninic[2], Andrew J. Whittle[1], Günther Meschke[2], Janosch Stascheit[2], [1]MIT, USA; [2]Ruhr University Bochum, Germany	
20 min	**Computational Framework for 3D Adaptive Simulation of Excavation and Advancement Processes in Mechanized Tunneling** Abdullah Alsahly, Janosch Stascheit, Günther Meschke, Ruhr University Bochum, Germany	
40 min	**3D Numerical Prediction for TBM-EPB Excavations under Railways Bridges in Milan (Italy)** Riccardo Castellanza[1], David Betti[2], Luca Mancinelli[3], Carlo Morerio[4], Stefano Tedesco[5], Victor Bueno[5], [1]University of Milano Bicocca, Italy; [2]SIPOS srl, Terni, Italy; [3]RockSoil Spa, Milano, Italy; [4]STAP srl, Milano. Italy; [5]Civil engineering consultant	
60 min	**Three Dimensional Numerical Analyses for Assessing Mechanized Tunnelling Impact on Existing Structures** Navid Allahverdi, Verya Nasri, AECOM, USA	
MS-04	Numerical Simulation in Construction Processes in Tunneling Markus König	Room 1
0 min	**TBM Performance Prediction by Process Simulation** Ruben Duhme[1], Kambiz Sadri[2], Tobias Rahm[3], Markus Thewes[2], Markus König[2], [1]Herrenknecht Asia Pte. Ltd. Research & Development; [2]Ruhr University Bochum	
20 min	**Process Simulation of Microtunnelling Operations for Productivity Assessment Depending on Ground Conditions** Trung Thanh Dang, Ruhr Bochum University, Germany	
40 min	**Probabilistic Assessment of Tunnel Construction Time Using Dynamic Bayesian Network** Olga Spackova, Daniel Straub, Technische Universität München, Germany	
60 min	**Interaction Modelling for Coupling Simulations Using SysML** Puviyarrasan Manickam, Felix Hegemann, Karlheinz Lehner, Christian Koch, Markus König, Ruhr University Bochum, Germany	

Wednesday, 2013 April 17th

MS-11a	TBM-Ground Interactions Adam Bezuijen	Seminar Room
0 min	**Analysis of Soil–Machine–Interactions (Part 1): Processing of TBM-Machine-Data and Extraction of excavation-specific Data** Jan Düllmann, Fritz Hollmann, Markus Thewes, Michael Alber, Ruhr University Bochum, Germany	
20 min	**Analysis of Soil-Machine-Interactions (Part 2): Influences on the Excavation-Specific Data of TBM-Machine Data** Fritz Hollmann, Jan Düllmann, Markus Thewes, Michael Alber, Ruhr University Bochum, Germany	
40 min	**Advances in the Modelling of Excavation and Cutting Tool Wear with the Particle Finite Element Method** Josep Maria Carbonell i Puigbó[1], Eugenio Oñate[1], Benjamín Suarez[2], [1]CIMNE, Spain, [2]Universitat Politècnica de Catalunya (UPC), Spain	
60 min	**Cutting and Material Transport in EPB Shield Machines: A Coupled Simulation Approach** Nicola Wessels, Thai Son Dang, Klaus Hackl, Günther Meschke, Ruhr University Bochum, Germany	
16:00 - 16:20	Coffee Break	Foyer
16:40 - 18:20	Parallel Sessions	
MS-01c	Numerical Modeling in Mechanized Tunnelling Kazuhito Komiya	Room 2a
0 min	**Numerical Analysis on Measured Pipe Behavior During Pipe Jacking** Mitsutaka Sugimoto[1], Lam Gia Le[1], Masakuza Higashikawa[1], Senji Ishizuka[2], Tatsuki Tamai[1], [1]Nagaoka University of Technology, Japan; [2]Fukuda Corporation, Japan	
20 min	**Experimental and Numerical Investigation on Shallow Tunnelling in Unsaturated Soils** Enrico Soranzo, Wu Wei, University of Natural Resources and Life Sciences, Vienna, Austria	
40 min	**In-situ Measurement and Numerical Analysis on Tunnel Lining and Ground Behaviour due to Shield Excavation** Takahiro Konda[1], Junichi Nagaya[1], Tadashi Hashimoto[1], Hossain M. Shahin[2], Teruo Nakai[2], [1]Geo-Reserach Institute, Japan; [2]Nagoya Institute of Technology, Japan	
60 min	**On the Effects of the TBM-Shield Body Articulation on Tunnelling in Soft Soil** Daniele Festa, Wout Broere, Johan W. Bosch, Delft University of Technology, The Netherlands	

Wednesday, 2013 April 17th

MS-06	Geotechnical Models and Geostatistics George Exadaktylos	Room 1
0 min	**The Influence of Soil Constitutive Model on Short- and Long-Term Behaviour of Tunnelling in London Clay** Xia Bian[1,2], Kenichi Soga[2], Zili Li[2], Zhenshun Hong[1], [1]Southeast University, China; [2]University of Cambridge, UK	
20 min	**Characterization of Rock Mass Conditions and Quality Control of Tunnel Support** Torsten Gorka, Stephan Peters, Ivo Kerosevic, DMT GmbH & Co. KG, Germany	
40 min	**Cross-Anisotropic Rock Modelled with Discrete Methods** Anastasia Blioumi, Vaclav Smilauer, University Innsbruck, Austria	
60 min	**Development of a Viscoplastic Model for Coupled Hydro-Mechanical Modelling: Application to M/H-M Argillite** Roland Plassart[1], Simon Raude[2], François Laigle[1], Alexandra Silvestre[1], [1]EDF, France; [2]LaEGO, France	
80 min	**Stochastic Analysis of the Tunnels Using LHS** Jan Pruška, Matouš Hilar, CTU in Prague, Czech Republic	
MS-09b	Damage Analysis and Risk Assessment for Existing Buildings Jan Rots	Seminar Room
0 min	**Three Dimensional Finite Element Analysis of a Strutted Sheetpile Supporting a Deep Excavation** Ali Helwa, Manal Salem, Mostafa Mossaad, Cairo University, Egypt	
20 min	**Effects from a TBM-EPB to Adjacent Buildings: 3D Simulation of a Twin Tunnel** Emilios M. Comodromos[1], Mello C. Papadopoulou[1], Georgios K. Konstantinidis[2], [1]University of Thessaly, Greece; [2]Attiko Metro S.A.	
40 min	**Influence of Tunneling on Nearby Existing Building and/or Tunnel: Model Test and Finite Element Analysis** Teruo Nakai[1], Hossain Shahin[1], Toshikazu Iwata[2], Show Kuroi[1], [1]Nagoya Institute of Technology, Japan; [2]Nippon Telegram and Telephone West Corporation	
60 min	**Pioneering Real Time Computational Models for Building Damage Prediction during Adjacent Tunnel Excavation** Julie A. Clarke, Debra F. Laefer, University College Dublin, Ireland	
80 min	**Prediction of Structural Movements due to Large Diameter Twin TBM Tunnels using Bayesian Updating** Anthony Bauer[1], Anmol Bedi[1], Vojtech Gall[1], Philippe Bourdon[2], [1]Gall Zeidler Consultants, USA; [2]Bouygues Civil Works Florida, USA	
18:30 - 22:00	Welcome Reception	Bistro

Thursday, 2013 April 18th

08:40 - 10:20	Parallel Sessions	
MS-01d	Numerical Modeling in Mechanized Tunnelling Mitsutaka Sugimoto	Room2a
0 min	**Seismic Prediction on Tunnel Boring Machines – Comparison of Active Seismic Sources and Drilling Noise Measurements** Rüdiger Giese[1], Silke Hock[1], Kay Krüger[1], Stefan Lüth[1], Elena Martin Diaz[2], [1]Helmholtz Centre Potsdam, German Research Centre for Geosciences GFZ, Germany; [2]DRAGADOS, SA	
20 min	**Simulation of Seismic Wave Propagation for Reconnaissance in Mechanized Tunneling using the Spectral Element and Nodal Discontinuous Galerkin Method** Lasse Lambrecht, Wolfgang Friederich, Ruhr University Bochum, Germany	
40 min	**Parallel Implementation for Coupled Simulations of Partially Saturated Soils in Finite Element Analyses** Hoang Giang Bui, Janosch Stascheit, Günther Meschke, Ruhr University Bochum, Germany	
60 min	**Optimization of Tunnel Profile in Different Ground Conditions Using Genetic Algorithms** Mohamed Abdelfattah Eid, Mostafa Zaki Abd Elrehim, Minia University - Egypt, Egypt	
80 min	**Periphery Trench for Reducing the Impact of Surface Subsidence on Structures** Marwan AL Heib, INSTUT National de l'Environnent Industriel et de RISque (INERIS), France	
MS-08	Computational Failure Analysis in Subsurface Engineering Carlo Callari	Room 1
0 min	**Numerical Analysis of Swelling Deformations in Tunnelling – A Case Study** Bert Schaedlich[1], Helmut F. Schweiger[1], Thomas Marcher[2], [1]Graz University of Technology, Austria; [2]ILF Consulting Engineers	
20 min	**Damage Analysis for Wells in CO2 Storage Sites** Carlo Callari[1], Valentina Fasano[2], [1]University of Molise, Italy; [2]University of Rome „Tor Vergata“	
40 min	**Damage Plasticity Model for Intact Rock** David Unteregger, Benjamin Fuchs, Günter Hofstetter, Universität Innsbruck, Austria	
60 min	**Determination of Uniaxial Tensile Strength of Rock Materials with Numerical Methods** Markus Johannes Mikl[1], Thomas Antretter[2], Gerhard Pittino[2], Martin Gimpel[2] [1]Materials Center Leoben Forschung GmbH, Austria; [2], University of Leoben, Austria	

Thursday, 2013 April 18th

80 min	**A Posterior Analysis of Sao Paulo Tunnel-Shaft Collapse** George Saratsis[1], Maria Stavropoulou[2], George Exadaktylos[1], [1]Technical University of Crete; [2]University of Athens, Greece	
MS-11b	TBM-Ground Interactions Adam Bezuijen	Seminar Room
0 min	**Modelling of Foam-Sand-TBM Interaction** Adam Bezuijen[1,2],[1]Ghent University, Belgium; [2]Deltares, The Netherlands	
20 min	**Two-scale Investigations on the Rheological Properties of Foam and Particle-Laden Foams** Aycan Özlem Özarmut, Mario Galli, Holger Steeb, Markus Thewes Ruhr University Bochum, Germany	
40 min	**Face Stability Assessment of Large Diameter Slurry Shields** Zdenek Zizka, Britta Schößer, Markus Thewes, Ruhr University Bochum, Germany	
60 min	**Application of the ANFIS Method for the Prediction of Surface Settlements Caused by a Slurry Shield Tunnel Boring Machine** Djamila Bouayad[1], Fabrice Emeriault[2], [1]University of Bejaia, Algeria; [2]Grenoble INP, France	
80 min	**Automatic Seismic Prediction on Tunnel Boring Machines (TBM)** Andreas Kassel[1], Manuel Gehrig[1], Andre Heim[1], Ingo Koglin[2], Judith Kirchner[2], Daniel Korcz[2], [1]Herrenknecht AG, Germany; [2]VMT GmbH, Germany	
10:20 - 11:00	Coffee Break	Foyer
11:00 - 12:40	Parallel Sessions	
MS-08b	Computational Failure Analysis in Subsurface Engineering Carlo Callari	Seminar Room
0 min	**Deformation Effects of Deep Excavation on the Adjacent Metro Lines and its Safety Control** Feng Chu[1], Yongsheng Li[2], Fayun Liang[2], Zhu Song[2], [1]Shanghai Lujiazui Finance and Trade Zone United Development Co., Ltd, China; [2]Tongji University, China	
20 min	**Ovalisation of Cast-Iron Bolted Tunnels and their Modelling** Zili Li[1], Kenichi Soga[1], Bian Xia[2], Peter Wright[3], [1]University of Cambridge, Cambridge, UK; [2]Southeast University, Nanjing, China; [3]Halcrow Group Ltd, London, UK	
40 min	**A 3D Finite Element Model for Shield Tunnel Undercrossing the Historical Building in Soft Ground** Ya-fei Qiao[1], Wen-qi Ding[1], Dong-wu Xie[2], Wei-Kang Song[1], [1]Tongji University, China; [2]Shanghai Tunnel Engineering & Rail Transit Design and Research Institute, Shanghai, China	

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60 min	**Ceneri base Tunnel: Optimization of the Excavation and Temporary Lining Design to Cope with Time-Dependent Mechanical Behavior** Matteo Maria Montini[1], Riccardo Castellanza[2], [1]SBB - Schweizerische Bundesbahnen, Switzerland; [2]University of Milano Bicocca	
80 min	**3D Modeling of the Subsurface Works Beneath Rabat Fort, Morocco** Adriano Fava[1], Marco Ghidoli[1], Francesco Gamba[1], Riccardo Castellanza[2], David Betti[3], Francesca Giussani[4], [1]Alpina Spa, Milano, Italy; [2]University of Milano Bicocca, Italy; [3]SIPOS srl, Terni, Italy; [4]ABC, Politecnico di Milano, Italy	
MS-02a	Constitutive Models for Support Materials Josef Eberhardsteiner	Room 2a
0 min	**Micromechanics-Based Sensitivity Analyses Regarding the Influence of Shotcrete Composition on Load-Level Estimation in NATM-Tunnel Shells** Christian Hellmich, Vienna University of Technology, Austria	
20 min	**A Multiscale Oriented Concept for the Finite Element Analyses of Fiber Reinforced Concrete Tunnel Linings** Yijian Zhan, Günther Meschke, Ruhr University Bochum, Germany	
40 min	**Masonry Weathering of the Metro de Paris Gallery: Modeling via a Continuum Approach** Taous Kamel, Ali Limam, Claire Silvani, Insa of Lyon, France	
60 min	**An Analytical Model of a System of the Concentric Rings to State the Stresses in the Material Heterogeneous Cross Section of a Steel Shotcrete Tunnel Lining** Karel Vojtasik, Eva Hrubesova, Marek Mohyla, Lukas Duris, VSB-Technical University of Ostrava, Czech Republic	
80 min	**The Sacrificial Gallery in Tunnelling** Javier Garcia Barba, Roberto Tomás Jover, Miguel Cano González, David Bru Orts, University of Alicante, Spain	
MS-05a	Back Analysis and Inverse Problems Maria Dimitrova Datcheva	Room 1
0 min	**Sobol Global Sensitivity Analysis: Background, Monte Carlo Algorithms and Applications** Ivan Tomov Dimov, Rayna Spasenkova Georgieva, IICT-BAS, Bulgaria	
20 min	**Application of the Extended Kalman Filter for Soil Parameter Identification during Tunnel Excavation** Thanh Luan Nguyen, Tamara Nestorovic, Ruhr University Germany	

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40 min	**Some Thoughts about Solving Non-Linear Inverse Problems** Emoke Imre[1], Tom Schanz[2], Csaba Hegedus[3], [1]International Education Center of the Budapest University of Technology (BME), Hungary; [3]Ruhr University Bochum, Germany; [3]Eötvös Lórand University, Hungary	
60 min	**Soil-Model Parameters Identification via Back Analysis for Numerical Simulation of Shield Tunneling** Veselin Yulianov Zarev[1], Maria Dimitrova Datcheva[1,2], Tom Schanz[1], Ivan Dimov[2], [1]Ruhr University Bochum, Germany.; [2]Bulgarian Academy of Sciences, Bulgaria.	
80 min	**Benchmarking of Optimization Algorithms** Jörg Meier[1], Tom Schanz[2], [1]Gruner AG, Switzerland; [2]Ruhr University Bochum, Germany	
12:40 - 14:00	Lunch Break	Mensa
14:00 - 14:20	Keynote Lecture 4 Chairman: Tom Schanz	Room 2a
0 min	**Interface Modelling Based on Level Sets** Hans Muhlhaus, Lutz Gross, The University of Queensland, Australia	
14:20 - 16:00	Parallel Sessions	
Case Studies A		Seminar Room
	Markus Thewes	
0 min	**Static Performance Evaluation of a Tunnel Built in Very Soft Clay** Juan Manuel Mayoral[1], Azucena Román[2], [1]Institute of Engineering, Mexico; [2]Universidad Politécnica de Madrid,Spain	
20 min	**Rock Tunneling in Manhattan - Optimization of Rock Support using Distinct Element Modelling** Harald C Cordes[1], Sotirios Vardakos[2], [1]Parsons Brinckerhoff, USA; [2]Parsons Brinckerhoff, USA	
40 min	**Soil Movements Associated with Compensation Grouting During Line 9 Excavation in Barcelona: A Case Study** Alessandra Di Mariano[1], Antonio Gens[1], Robert Mair[2], [1]Universitat Politècnica de Catalunya (UPC), Barcelona, Spain; [2]Cambridge University, UK	
60 min	**Behaviour of a Tunnel and Surrounding Strata Using 3DEC Numerical Modeling: Case Study of an U/G Metro Rail Project** Rama Sastry Vedala, Shivshankar R, Nalini Rebello, Lakshmi Sreedharan, National Institute of Technology Karnataka, India	
MS-02b	Constitutive Models for Support Materials Josef Eberhardsteiner	Room 2a

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0 min	**Ground-Shell Contact Stresses in NATM Tunneling: Quantification from 3D Displacement Measurements** Shafi Ullah, Bernhard Pichler, Christian Hellmich, Vienna University of Technology, Austria	
20 min	**Influence of Combined Thermo-Mechanical Strain Behavior of Concrete on the Performance of Tunnel Linings** Thomas Ring[1], Matthias Zeiml[1,2], Roman Lackner[3], Josef Eberhardsteiner[1], [1]Vienna University of Technology, Austria; [2]Fritsch, Chiari & Partner ZT GmbH, Austria; [3]University of Innsbruck, Austria	
40 min	**A Dual Random Two-Scale Model for Estimating the Thermal Expansion Coefficient of Early-Age Aoncrete** Shu Liu, Renchao Lu, Xian Liu, Xiaofei Guan, Tongji University, China	
MS-05b	Back Analysis and Inverse Problems Ivan Dimov	Room 1
0 min	**Comparison of Optimization Algorithms for Identification of Parameter Values in Unsaturated Soils** Domenico Gallipoli[1], Youliang Zhang[2], Dengxue Liu[2], [1]Université de Pau et des Pays de l'Adour, France; [2]Chinese Academy of Sciences, China	
20 min	**Kalman Filter – from Control Applications to Identification in Geomechanical Problems** Tamara Nestorovic, Luan T. Nguyen, Ruhr Univeristy Bochum, Germany	
40 min	**Electrical Monitoring of Ambient Geological and Hydraulic Conditions Beyond Tunnels and Underground Construction** Thomas Kopp, QuMon GmbH, Germany	
60 min	**Back Analysis of Blow out in Warsaw Project** Rafal Kuszyk, Warsaw University of Technology, Poland	
16:00 - 16:40	Coffee Break	Foyer
17:00	Bus to Henrichshütte (see information on page 4)	
18:00 - 18:30	Tour Henrichshütte	
18:30 - 0:30	Banquet	

Friday, 2013 April 19th

09:20 - 10:20	Keynote Lectures 5 and 6 Chairmen: Markus Thewes and Kenichi Soga	Room2a
0 min	**Innovations in Tunnelling Construction Management: Applications of Simulation** Simaan AbouRizk, University of Alberta, Canada	
30 min	**A coupled Discontinuum-Continuum Numerical Model for the Analysis of Face Instabilities in Blocky Rock Masses** Jian Zhao[1], Andrea Delisio[1], Tohid Kazerani[2], [1]Ecole Polytechnique Fédérale de Lausanne, Switzerland; [2]The University of Nottingham, UK	
10:20 - 11:00	Coffee Break	Foyer
11:00 - 12:40	Parallel Sessions	
MS-07/10	Coupled Problems in Subsurface Engineering and Tunneling Günter Hofstetter Advanced Multiphase Models for Grouting Materials Holger Steeb	Room 2a
0 min	**Computational Modeling of Artificial Ground Freezing** Meng-Meng Zhou, Günther Meschke, Ruhr University Bochum, Germany	
20 min	**Structural Analysis of Loadcase Fire for the Segments of the Sluiskiltunnel** Benno Ring[1], Thomas Böhme[2], [1]Maidl Tunnelconsultants, Germany; [2]Wayss & Freytag Ingenieurbau AG	
40 min	**Jet-Grouting Modelling: Constitutive and THM Aspects** Antonio Gens[1], Marcos Arroyo[1], Matteo Ciantia[2], José Manuel Gesto[1], Riccardo Castellanza[2], [1]Universitat Politecnica de Catalunya, Spain; [2]Politecnico di Milano	
60 min	**Simulation of the Backfilling Process with Annular Gap Grouting Mortar** Alexander Schaufler[1], Christian Becker[1], Holger Steeb[1], Alexander Scheuermann[2], [1]Ruhr University Bochum, Germany; [2]The University of Queensland, Australia	
MS-14	Risk and Reliability Analysis Ton Vrouwenvelder	Room 1
0 min	**A Two-Step Approach for Reliability Assessment of a Tunnel in Soft Soil** Rohit Ranjan, Wolfgang Betz, Iason Papaioannou, Daniel Straub, Engineering Risk Analysis Group, TU München, Germany	

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20 min	**Reliability analysis of unreinforced tunnel final lining** Petros Fortsakis, Dimitrios Litsas, Michael Kavvadas, National Technical University of Athens, Greece	
40 min	**Concepts for Reliability Analyses in Mechanised Tunnelling – Theory & Application** Steffen Freitag[1], Michael Beer[2], Kok Kwang Phoon[3], Janosch Stascheit[1], Jelena Ninić[1], Ba Trung Cao[1], Günther Meschke[1], [1]Ruhr University Bochum, Germany; [2]University of Liverpool, UK; [3]National University of Singapore	
60 min	**Cut-Slope Versus Shallow Tunnel: A Risk Management Perspective During Construction** Hongwei Huang, Tongji University, China	
80 min	**The Computation of Life-Cycle Costs for Road Tunnels** Peter Vogt[1], Thewes Markus[2], [1]Alpine Bau Deutschland AG, Germany; [2]Ruhr University Bochum, Germany	
12:40 - 14:00	Lunch Break	Mensa
14:00 - 15:40	Parallel Sessions	
MS-12	Computational Models for Safety and Security Götz Vollmann	Room 1
0 min	**Comparative Performance of Tunnel Linings under Blast Loading** Tanusree Chakraborty[1], Martin Larcher[2], Norbert Gebbeken[2], [1]Indian Institute of Technology Delhi, India; [2]Universitaet der Bundeswehr Muenchen, Germany	
20 min	**Application of Computational Fluid Dynamics for Simulating Building Fires in Subway System: Current Situation** W.K. Chow, The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)	
40 min	**Complex Variable Solutions for Ground Movement Induced by Oval-Deforming Twin Tunnels** Jinyang Fu, Herbert Kapperich, Slamet Widodo, Technische Universität Bergakademie Freiberg, Germany	
60 min	**Fluid Grout and the Longitudinal Beam Action of a Tunnel Lining** Arno Talmon[1,2], Adam Bezuijen[1,3], [1]Deltares, The Netherlands; [2]Delft University of Technology, The Netherlands, [3]Ghent University, Ghent, Belgium	

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MS-13	Numerical Modeling of Segmental Tunnel Lining and Grouted Anchors Peter Mark, Janosch Stascheit	Room 2a
0 min	**Towards Topology and Shape Optimised Concrete Linings for Shear Load Transfer in Ring Joints** Thomas Putke, Peter Mark, Mark Alexander Ahrens, Ruhr University Bochum, Germany	
20 min	**Structural Behavior of Segmented Tunnels Taking into Account the Interaction Between Rings** Arturo Galván, Fernando Peña, Instituto de Ingeniería, UNAM, Mexico	
80 min	**Structural Design of Segmental Tunnel Linings** Mehdi Bakhshi, Verya Nasri, AECOM, New York, USA	
15:40 - 16:00	Closing Session – Chiarman: Markus Thewes	Room 2a

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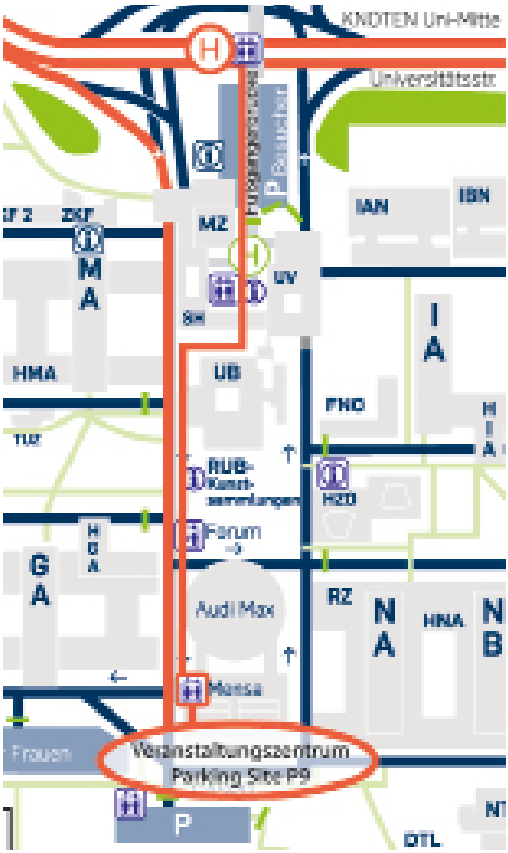

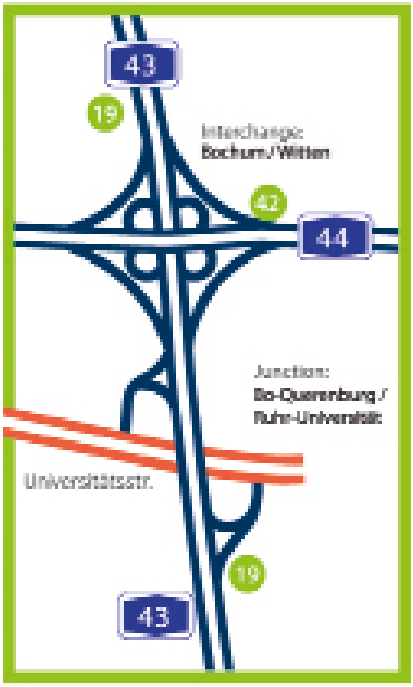

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