WELCOME

The ITA-AITES Czech Tunnelling Association welcomes you to the 12th International Conference „Underground Construction Prague 2013“, which is held in Prague, the capital of the Czech Republic, from 22 to 24 April 2013. A number of important Czech and foreign experts who have accepted membership in the Preparatory Committee and the Scientific Council of the Conference were involved in its preparation.

In this final programme you will find all necessary information about the Conference including detailed information about the scientific programme. We are very pleased that a total of 143 papers are included in the Conference proceedings (including four keynote lectures and invited lectures in each session) by authors from 18 countries.

Each participant will receive a printed Book of Abstracts in Czech and English and an electronic version of Proceedings with all papers on CD in English and Czech or Slovak languages.

Four keynote lectures will be presented after the Opening Ceremony. Subsequently, a total of 68 lectures will be performed always in two parallel sessions by major world experts in the field of underground construction. The Technical Exhibition and Poster Session will also be well presented. The programme will be completed by excursions to tunnel construction in Prague.

We are convinced that the Conference will meet its main objective which is the dissemination of knowledge and experience in the preparation and implementation of underground structures of various kinds.

The Conference will surely be an opportunity to obtain new and interesting information and personal contacts.

We appreciate your participation and also thank all the Conference partners.

Ivan Hrdina
Chairman of Cz-TA
ITA-AITES vice-president

Dr. Alexandr Butovič
Chairman of the Preparatory Committee

Dr. Matouš Hilar
Chairman of the Scientific Council

CONTACTS

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PREPARATORY COMMITTEE AND SCIENTIFIC COUNCIL

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Dr. Stojan Bratojev, Bulgaria
Heinz Ehrbar, Switzerland
Søren Degn Eskesen, Denmark
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Piergiorgio Grasso, Italy
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Prof. Ignacio del Rey, Spain
Prof. Anna Siemińska-Lewandowska, Poland
Prof. Wulf Schubert, Austria
Prof. Markus Thewes, Germany
Dr. Alun Thomas, United Kingdom
Prof. Walter Wittke, Germany
Prof. Bai Yun, China

The Conference “UNDERGROUND CONSTRUCTION PRAGUE 2013” is under the auspices of the Mayor of Prague, Assoc. Prof. Bohuslav Svoboda.
The Clarion Congress Hotel Prague is a new modern hotel complex aimed at congresses and conferences. At the same time offers pleasant accommodation in comfortably furnished rooms, restaurant, bar and wellness center. Its advantage is an excellent transport accessibility – it is located directly at the metro station „Vysočanská“ (line B), less than 15 minutes drive from the city centre. It has sufficient space in underground garages for guests arriving by car. Next to the hotel a shopping gallery Fénix can be found.
ROOM NADIR  SECTION 3 – Other Underground Structures – Design and Construction
Chairs: Jakob Líkar, Richard Šhupárek, Karel Vorášek
13:30–13:50  M. Horáček (Czech Republic): Possibilities of caverns usage by the Czech Republic’s energy sector
13:50–14:10  R. Šhupárek (Czech Republic): Present situation and development trends in the area of underground nuclear waste storage sites
14:10–14:30  J. Likar (Croatia): Adequacy of the yielding elements selection for underground construction in high squeezing grounds
14:30–14:50  V. Horák (Czech Republic): Feasibility study of underground garage at Petrov hill in the centre of Brno city
14:50–15:10  J. Žímal (Czech Republic): Securing Calculation of the Gallery Ceiling according to the RMR, BLLL and RMI theories
15:10–15:30  M. Schagerer (Czech Republic): Construction No. 0065 Strahov tunnel 2. Construction – part 2B Excavated tunnel MO, relocation of utilities – a key to tunnel construction

16:00–18:00  Parallel Sections 2 and 4

ROOM ZENIT  SECTION 2 – Non-urban Transport Tunnels – Design and Construction
Chairs: Bai Yun, Libor Mařík, Miloslav Frankovský
16:00–16:20  Invited Lecture
Prof. Bai Yun (China): Trans-national railway under the Himalayas
16:20–16:40  G. Harer (Austria): The Austrian Koralm tunnel investigation, design and construction process for a large base runnel project
16:40–17:00  J. Němeček (Czech Republic): Construction of rail tunnels on Votice – Benešov u Prahy railway track
17:00–17:20  P. Balušík (Slovakia): Modernisation of the railway line Holm – Nykirke, parts UHN-03 Holm and UHN-06 Fibo
17:20–17:40  J. Kušnír (Slovakia): Turecký Vrch tunnel
17:40–18:00  J. Pechman (Czech Republic): Jablunkov railway tunnel – dealing with a cave-in through the eyes of a planning engineer

ROOM NADIR  SECTION 4 – Geotechnical Investigation and Monitoring for Underground Construction Projects
Chairs: Martin C. Knights, Heinz Ehrbar, Alexandr Rozsypal
16:00–16:20  J. Barták (Czech Republic): Deformations of surface structures during EPBS driving of Prague metro tunnels
16:20–16:40  R. Katzenbach (Germany): Enhanced inner urban tunnelling for the protection of World Heritage Properties
16:40–17:00  Invited Lecture
Prof. Anthony O’Brien (United Kingdom): Geotechnical Characterisation, Recent Developments and Applications
17:00–17:20  K. Rössler (Czech Republic): EPBM Support Pressures of Metro V.A. Excavations
17:20–17:40  P. Duník (Czech Republic): Extraordinary settlement of buildings around the cut and cover tunnels in Prague 6
17:40–18:00  T. Ebermann (Czech Republic): Construction of Metro V.A – First Massive Usage of Continuous Monitoring in the Czech Republic
10:50–12:30 Parallel Sections 1 and 5
ROOM ZENIT
SECTION 1 – Urban Transport Tunnels – Design and Construction
Chairs: Martin Bosshard, Jiří Smolík, Tomáš Parák
10:50–11:10 D. Krása (Czech Republic): Systematic approach to the new Metro Line I.D design in Prague
11:10–11:30 G. Blazek (Germany): Double-track tunnels of the extension of the Metro V.A line “Dejvická – Motol”, tunnel boring and final lining
11:30–11:50 Invited Lecture
Martin Bosshard (Switzerland): The Zurich Cross Rail: Tunnelling the City’s Challenging Ground – Highlights
11:50–12:10 L. Vydrová (Czech Republic): Construction of the Prague Metro V.A – Change in the conception of the Veleslavín Station construction
12:10–12:30 J. Čeněk (Czech Republic): Construction of the metro in Chennai, India

ROOM NADIR
SECTION 5 – Numerical Modelling, Development and Research for Underground Construction Projects
Chairs: Robert Galler, David Mašín, Jan Pruška
10:50–11:10 Invited Lecture
Prof. Robert Galler (Australia): 3-dimensional numerical modelling in underground engineering – some remarks to the state of the art and actual research activities
11:10–11:30 Z. Žižka (Czech Republic), M. Thewes (Germany): Face stability of XL-diameter slurry shields
11:30–11:50 J. Fillibeck (Germany): Prediction of Tunnel-Induced Settlements in Soft Ground
11:50–12:10 T. Janda (Czech Republic): Modeling of instance response of upper structure due to advancing tunnel excavation
12:10–12:30 M. Hilar (Czech Republic): Load testing and numerical modelling of SFRC segments
14:00–15:40 Parallel Sections 3 and 4
ROOM NADIR
SECTION 3 – Other Underground Structures – Design and Construction
Chairs: Wulf Schubert, Karel Vojtašsk, Richard Šňupárek
14:00–14:20 Invited Lecture
Prof. Wulf Schubert (Austria): Requirements for non-transport underground structures
14:20–14:40 A. Caravanas (Czech Republic): Bunji Hydropower Project, 7100 MW
14:40–15:00 N. Plasencia (Portugal): Groundwater impacts of deep excavations – the Venda Nova repowerings case
15:00–15:20 R. Kuk (Czech Republic): City Ring Road – Construction Project No. 0065 – Relieve Storm Water System C03

14:20–14:40 J. Pavlík (Czech Republic): Geotechnical Survey for the Tramway Tunnel of Large City Ring Road Žabovřeska in Brno
14:40–15:00 R. Chmelář (Czech Republic): Exploratory gallery of Radlice tunnel in Prague
15:00–15:20 M. Botella de Faragó (Spain): Urban tunneling and the advantages of using InSAR SPN satellite technology to detect and monitor surface deformation
15:20–15:40 J. Tlamsa (Czech Republic): Geological exploration works on the new metro line V. A in Prague – assessment of expected and actually encountered geological conditions and their impact on design and realization

16:00–18:00 Parallel Sections 1 and 5
ROOM ZENIT
SECTION 1 – Urban Transport Tunnels – Design and Construction
Chairs: Patrick Rennkamp, Jiří Smolík, Boris Šebesta
16:00–16:20 P. Rennkamp (Germany): Newest technology and trends in mechanized tunnelling
16:20–16:40 J. Růžička (Czech Republic): Metro V.A – Experience in designing for running tunnels
16:40–17:00 A. Rasulov (Azerbaijan), T. Parák, P. Růžička (Czech Republic): New Era in Metro Construction
17:00–17:20 V. Vesely (Czech Republic): New Metro Lines L3 and L6 in Santiago de Chile – Basic and Detail Design of New 35 km in the Underground of Santiago
17:20–17:40 I. Lejčar (Czech Republic): Urban railway tunnels (Newly connected 2) in Prague
17:40–18:00 K.-H. Wennmohs (Germany): Improving safety and reducing cycle time in conventional tunneling with high performance bolting rigs in conjunction with a new innovative bolt system

ROOM NADIR
SECTION 4 – Geotechnical Investigation and Monitoring for Underground Construction Projects
Chairs: Anthony O’Brien, Karel Rossler, Alexandr Rozsypal
16:00–16:20 J. Pacovsky (Czech Republic): Tunnel Lining Loading Measurement of Drainage Gallery of Strahov Tunnel in Prague
16:20–16:40 J. Pavlík (Czech Republic): Geotechnical Survey for the Tramway Tunnel of Large City Ring Road Žabovřeska in Brno
16:40–17:00 A. Boscaro (Italy): Ground Conditioning for Mechanized Tunnelling: analysis of the correspondences between laboratory tests and results during excavation with EPB
17:00–17:20 G. Blazek (Germany): Expansive rock blasting – a new alternative in rock fracturing/splitting
17:40–18:00 M. Levorová (Czech Republic): Impact of thermal loading on tunnel stability
TECHNICAL EXHIBITION

The exhibition is located in the foyer of the congress floor and in the Meridian room, and will be open as follows:

- Monday, 22 April 2013: 08:00–18:00
- Tuesday, 23 April 2013: 08:00–18:00

**List of exhibitors in alphabetical order:**

- 3G Consulting Engineers, s.r.o. 30
- Ambberg Engineering Brno, a.s. 16
- AMTEKO International s.r.o. 22
- Anton Vorék 24
- ARCADIS Geotechnika a.s. 6
- Atlas Copco s.r.o. 5
- BASF Stavební hmoty ČR s.r.o. 13
- BEKAERT Hlňovec a.s. 31
- DESOI GmbH 29
- Elrado EG, a.s. 23
- FERALPI – PRAHA s.r.o. 19
- GEOtect, a.s. 18
- Herrenknecht AG 4
- Hochtief CZ a.s. 20
- Idea RS s.r.o. 33
- IKP Consulting Engineers s.r.o. 28
- INSET s.r.o. 5
- KRAMPEHAREX CZ s.r.o. 32
- LIEBHERR-Števneň stroje CZ s.r.o. 10
- MAPEI, spol. s r.o. 8
- Métroprojekt Praha a.s. 17
- Metrostav a.s. 1
- Mínová Bohemia s.r.o. 7
- Mott MacDonald CZ, spol. s r.o. 26
- Promat s.r.o. 25
- PUDIS a.s. 11
- Sika CZ s.r.o. 3
- SPLM CZ, a.s. 15
- Subterra a.s. 2
- Sudop Praha a.s. 12
- Tiwo, s.r.o. 14
- Volvo Stavební stroje Czech s.r.o. 9

TECHNICAL EXCURSIONS

The conference participants can choose from five excursions to the underground structures in and around Prague organised on **Wednesday, 24 April 2013** in the morning. For available spaces please check with the registration desk.

**Excursion A: The Blanka Tunnel Complex**

The Blanka Tunnel Project in Prague is currently the largest underground structure being built in the Czech Republic. The total length of this ambitious project is 6,382 meters and it forms part of the North-west Inner City Circular Road of which a section about 17 km long is already in service. After its opening, expected in 2014, the tunnel will be the longest in the country and at the same time one of its sections will be the longest driven tunnel in the Czech Republic with its length of 2.23 km.

The visit will focus on the tunnel section at Královská obora which starts at the “U Vorlíků” crossroad first with a short cut and cover section at Letná followed by a driven section routed under the blocks of buildings, Stromovka (Královská obora park), river canal, Čísařský ostrov (island), the Vltava river and then continues with another, slightly longer, cut and cover section to the portal at Trója. The total length is 3.09 km of which 2230 m are driven.

During this visit you will see the three lane tunnels, VAC machine room – one of the tunnels with the biggest cross section area in the country (300 m²), ventilation outlet shaft of 7 m diameter which runs closely under the three lane tunnels and Room No. 4 housing plant and equipment. The visit will focus on the tunnel furnishing.

**Meeting point:** Information centre at the Letná construction site

Milady Horákové street, opposite the Sparta football stadium

**Transportation:**

public – by tram No. 1, 5, 12, 25 or 26 from Hradčanská station (metro A), or by tram No. 1 from Vltavská station (metro C); Sparta stop

**Excursion time:** 09:30–11:30

**Recommended:** solid shoes

**Provided:** English interpretation, hard hat, protective jacket
Excursion C: Multi-utility Ducts in the Historic Centre of Prague

Prague has a large network of underground multi-utility ducts of about 90 km total length. These ducts contain the majority of service networks needed to sustain city life. The multi-utility ducts were built as part of major housing developments in the outskirts of the city but in recent decades they were also built in the historic centre. The total length of the duct network in the centre is 17 km and it consists of the backbone and distribution ducts. The back bone ducts (Category 2 ducts) with a cross section profile of 20 m² are located 25 to 30 m below ground level and they deliver water, gas etc. to the points where they are connected to the distribution ducts (Category 3 ducts). These are located 6 to 11 m below the ground level and their cross section profile is 20 m². They have branches leading to the buildings. The site visit to the multi-utility ducts in the centre of Prague will be organised with the support of the system operator – Kolektory Praha, a. s. The participants will be divided into groups and, after a brief introduction of the duct network and its control system, they will visit the main control room and a section of a duct in operation.

Meeting point: Kolektory Praha, a.s.
Senovážné náměstí 11, Praha 1
Transportation: public – by tram No. 3, 9, 14, 24 from Václavské náměstí (Wenceslas Square – Můstek station, metro A), or by tram No. 9 or on foot from Hlavní nádraží station (metro C); Jindřišská stop
Excursion time: 1st group 09:00–11:00, 2nd group 09:30–11:30, 3rd group 10:00–12:00
Recommended: solid shoes, comfortable clothes
Provided: English interpretation, hard hat, protective jacket

Excursion B: Section V.A of the Prague Underground

The V.A underground section is the extension of Line A from Dejvice to Motol. The total length of this section is 6.12 km and there are three driven stations at Červený vrch, Veleslavín and Petřín and one cut and cover station at Motol. The Project is divided into 9 sub-projects.

The station at Petřín is designed as a single driven nave of 217 m with an island platform situated 37 m below ground level. The axial distance between the rails in the station is 14.7 m. In the direction of Motol station there is a single turning track located in a single track tunnel between the two main line tunnels. All three tunnels are interconnected at the point where the turning track ends and the tunnel continues with the main ventilation plant room with the vent shaft. The exit at the north end of the station is via three escalators in a driven tunnel leading to the entrance hall. The driving operations at the station started in June 2010 by driving the access shaft called “Markéta” and at the moment the final lining operations are going on.

Veleslavín station is located approximately in the middle of Evropská Street between the existing railway line and the east end of K Červenému vrchu Street. The station is designed as a shallow driven structure with three naves and the island platform 19 m below ground level. The axial distance between the rails is 15 m. At the west end of the platform there is a cut and cover structure in which three escalators and lifts leading to the entrance hall are located. The positioning of the station, entrance hall and exits is designed so that there would be a direct link to the temporary bus terminal, tram stops at Evropská Street and it also takes into consideration the envisaged modernisation of the railway line including the express line station without any future need for modifications.

The visit will focus on Petřín and Veleslavín stations where the concreting of the final lining is going on now. From both these stations it will be possible to see the completed single track tunnels driven with an EPB tunnel boring machine. The completed line will be put in service in the second half of 2014. The excursion also includes a walk through track tunnels between Veleslavín and Petřín stop with 2 km length and duration of about 30 minutes. The path has a concrete base.

Meeting point: Clarion Congress Hotel Prague – 1st floor (street entrance)
Transportation: by bus, departure at 9:00
Excursion time: 09:30–12:00
Recommended: solid shoes
Provided: English interpretation, hard hat, protective jacket
Excursion D: Josef Regional Underground Research Centre
The Josef URC is responsible for the operation of the Josef Underground Laboratory, the activities of which commenced in 2007 with the commissioning of 650 metres of underground galleries. Today there is available 5 km of underground galleries for the research activities and for the teaching of students and also the new administrative centre with laboratories is possible to exploit. The Josef Underground Laboratory is used by students from Prague universities as well as those from universities throughout the Czech Republic (approximately 300 students per semester). A total of 12 Czech and other European projects will make use of the underground facilities in 2013. The lab is located next to Slapy dam, close to Čelina village not far from the town of Příbram (approx. 65 km from Prague).

Meeting point: Clarion Congress Hotel Prague – 1st floor (street entrance)
Transportation: by bus, departure at 8:00, return at 14:00
Excursion time: 09:30 – 12:30
Recommended: solid shoes, warm clothes (temperature of 8 °C)
Provided: English interpretation

Excursion E: Main traffic control centre in Prague (HDRÚ Praha)
HDRÚ Praha is the traffic control centre for road tunnels in Prague and it is the most advanced telematic traffic control system operated in Prague. The control centre is located in the building of the Central Dispatch Centre of the Prague public transport company at Prague 2. It is operated by members of the police. This specialised centre collects and processes data on the traffic on specific sections of the roads and road network, traffic data from telematic applications at each level of sensor profiles, process information from plant and equipment and alarms and warnings related to emergencies. The visit will focus on the control centre and everything related to traffic monitoring and control in tunnels in the centre of Prague.

Meeting point: HDRÚ - hlavní dopravní řídící ústředna
Transportation: public – I.P. Pavlova station (metro C)
Excursion time: 09:30-11:00
Provided: English interpretation

RECEPTION
The Conference Reception for participants and accompanying persons will be held in the historical site of the Břevnov Monastery on Monday, 22 April 2013 from 19:30.
The accompanying person fee includes:
• Admission to the opening ceremony
• Participation at the reception
• Guided walk in the historical centre of Prague on Monday, 22 April from 10:00 to 13:00
• Half day excursion by bus to Kutná Hora (UNESCO site) on Tuesday, 23 April from 12:30 to 18:00

GENERAL INFORMATION
REGISTRATION
The registration desk will be located on the congress floor of the Clarion Congress Hotel Prague (3rd floor) and will be open as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td>Sunday, 21 April</td>
<td>16:00–20:00</td>
</tr>
<tr>
<td>Monday, 22 April</td>
<td>07:30–18:00</td>
</tr>
<tr>
<td>Tuesday, 23 April</td>
<td>08:00–18:00</td>
</tr>
</tbody>
</table>

SPEAKER’S READY ROOM
All speakers are kindly asked to provide their presentation in electronic version in the Speaker’s Room which is located in a room opposite the Nadir session room. It will be open as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, 22 April</td>
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<tr>
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</tr>
</tbody>
</table>

Official languages of the conference
English, Czech / Slovak

Translation
All presentations will be simultaneously interpreted to Czech and English.

Internet
An internet corner can be found in Kepler room near the Poster session.

Coffee breaks
Coffee breaks will be served in the foyer and in Meridian room where the exhibition is located.

Lunches
Lunches for registered participants will be served in Veduta restaurant on 2nd floor of the hotel upon voucher presentation.

Packing
The Clarion hotel offers underground garages of the Fenix shopping centre with capacity of 600 lots. The parking fee is not included in the registration fee.

Certificate of attendance
Upon request, the Certificate of Attendance will be distributed at the registration desk.

Poster session
The poster session is located in the Kepler session room where a board for each poster can be found.
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Organizování soutěží na výběr dodavatelů
Organizování soutěží na výběr dodavatelů

Zeměměřičské práce
Zeměměřičské práce

Technický dozor investora
Technický dozor investora

Kolaudace stavby a její předání uživateli
Kolaudace stavby a její předání uživateli

Studijní prověřování využitelnosti pozemků
Studijní prověřování využitelnosti pozemků

Assistance in the development of an investment program

Project procurement and management

Provision of zoning decisions and building permits

Organising tender procedures for the selection of contractors

Surveying

Investor supervision services

Inspection of completed buildings and transfers to the user

Studies evaluating land utility

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**Mott MacDonald**
Tunnel design and foundation engineering

- Preliminary studies, concept and detailed designs
- Pre- and post-tender design for contractors
- Project management, construction management and supervision
- NATM engineering
- Geotechnical monitoring
- Risk management
- Tunnels
- Shafts
- Caverns
- Cut and cover structures
- Retaining structures
- Special foundations
- Slope stabilisation

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**Metroprojekt**

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CZECH@MOTTMAC.COM
UNIQUE „DTG® inside“ FBG SENSORS

SYLEX offers FBG fiber optic sensors and sensing systems manufactured using unique DTG® (Draw Tower Grating technology) fiber providing superior optical and mechanical parameters.

Structural Health Monitoring

- Geo-Technical monitoring
- Underground monitoring
- Fundament stability monitoring
- Borehole deformation
- Mines
- Dams
- Historical Buildings
- Power Plants
- Tunnels
- Bridges

Advantages

- High strength: 5% elongation (5x times higher than conventional FBGs)
- Splice-less arrays with multiple measuring sections on one fiber
- Easy customization of final sensor design (sensor length, routing, connections to other SYLEX products)
- User friendly data reading with portable “LAMBDA reader” interrogator
- Intrinsically safe measurement system (no electrical signal), Electromagnetic interference immunity

Strain gauges, Extensometers, Thermometers, Piezometers, Interrogators

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