

Underground Space Challenges in Urban Development

International Congress Amsterdam

28 & 29 January 2008

For more information please contact

COB
Büchnerweg 1
2803 GR Gouda, the Netherlands
T: +31(0)182 - 540 660
E-mail: info@cob.nl
www.cob.nl

Enlightened Underground is organised by:
the Centrum Ondergronds Bouwen (COB) [Netherlands Centre for Underground Construction] in Gouda.

The event is supported by:

ECTP – European Construction Technology Platform, Focus Area Underground Construction

KIVI NIRIA TTOW – Tunnel Technology and Underground Works Department
of the Royal Institution of Engineers in the Netherlands KIVI-NIRIA

ITA - AITES – International Tunnelling and Underground Space Association

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Programme Enlightened Underground 27 01 2008 / 31 01 2008

27 01 2008 Meetings	28 01 2008 International Congress 	29 01 2008 International Congress 
09.00 Meetings	<ul style="list-style-type: none"> – Seminar opening and opening address – Keynote 1 Urgenda by prof. J. Rotmans – Keynote 2 The New Cross London Rail Link Project by D. Oakervee OBA FREng, Executive Chairman Crossrail – Keynote 3 ITA's Strategy for the Coming Years by M. Knights, President International Tunnelling and Underground Space Association (ITA) – launch ITACUS 	<p>Session D: Tunnelling in Urban Environments: Case Studies</p> <ul style="list-style-type: none"> – Interaction between Design and Urban Surroundings by prof. J.W. Bosch MSc – Results Hubertus Tunnel Mark a New Tunnel Era in the Netherlands by P.P.M.K. Janssen MSc – Multi Purpose Deep Tunnel by A.L. Lanti M.Eng MSc – Visions of underground interchanges – mode vs node by L. Dobrovolsky
10.30 coffee/tea break		
11.00	<p>Session A: The Challenge for Planners</p> <ul style="list-style-type: none"> – Zuid Holland Underground Transit by dr. F.D. van der Hoeven MSc – Zuidas Amsterdam by E. Brinkman MA (under consideration) – The Urban Underground in the Deep City Project - 'for construction but not only' by prof.dr. A. Parriaux – Underground Solutions for Streetlevel Ambitions by S. van Bodegraven BSc 	<p>Session E: Urban Underground Facilities: challenging the future</p> <ul style="list-style-type: none"> – AMFORA - Alternative Multifunctional Underground Space Amsterdam by B.K.J. Obladen BSc and prof. M.E. Zwarts MSc – Recent Underground Space Development in Japan by prof. T. Hanamura – US Perspective: Challenges of Underground Facilities in Urban Areas by A.E. Elioff and C. Laughton
12.30 lunch break		
14.00	<p>Session B: Services & Utilities Tunnelling: Case Studies & Research</p> <ul style="list-style-type: none"> – Trenchless Technologies and their Impact on Urban Utility Systems by prof. R.L. Sterling – Utilities in the Netherlands – research projects by C.H. Schaapman MA – The Public Utility Tunnel Mahlerlaan, Amsterdam by F.M. Taselaar MA – Utilities in Germany (under consideration) 	<p>Session F: The Climate Change Challenge</p> <ul style="list-style-type: none"> – The SMART Project – A Unique Dual Purpose Solution for the City of Kuala Lumpur, Malaysia by K.J. Abraham MSc – Climate Change Impacts on Inland Navigation by M. Koetse – Thames Tideway Project (under consideration) – Airquality in the Netherlands by J.W. Huijben MSc (under consideration)
15.30 coffee/tea break		
16.00	<p>Session C: Successful Urban Underground Projects</p> <ul style="list-style-type: none"> – The Underground Faculty of Theatre and Dance in Arnhem by prof. H.J. Henket MSc and prof. F. van Herwijnen MSc – Souterrain, The Hague by R.C Hilz MSc – Underground Landscape: The Urbanism & Infrastructure of Toronto's Downtown Pedestrian Network by prof. P. Bélanger – Worldwide Use of Underground Space - Solutions to Urban Challenges by prof. M. Thewes PhD MSc 	<p>Session G: Safe & Secure Underground Space Use</p> <ul style="list-style-type: none"> – Fire Safety Engineering for Deep Underground Metro System by A.J.M. Snel MSc – Netherlands Tunnel Safety Commission by K.M.H. Peijs MA – ITA-COSUF by F. Amberg MSc – Tunnel Fire Safety: Results of the Largest European Research Project UPTUN by dr. C. Both MSc
18.00	Welcoming reception	
19.00	Opening Underground Space Pub Dirk Coppens - Amsterdam Underground Festival	Underground Space Pub
20.00	Canal Cruise Amsterdam by Night	Closing banquet

30 01 2008 Site Visits	31 01 2008 National Underground Space Day*
<p>Working visits to:</p> <ul style="list-style-type: none"> – Amsterdam – The Hague – Arnhem 	<ul style="list-style-type: none"> – Parallel sessions on technical aspects of underground construction – Discussions on the applicability of the results of the international congress to the Dutch situation – Schreuders Award Ceremony <p>* Programme in Dutch only</p>

Underground Space Challenges in Urban Development 

International Congress Amsterdam

28 & 29 January 2008

Amsterdam is the venue for the international congress on **Underground space Challenges in Urban Development**. Speakers from all over the world will address to the latest developments in construction, safety, urban planning, utilities and will present the latest projects and views. An outstanding opportunity to catch up with your fellow professionals world wide. Join us in Amsterdam, 28 & 29 January 2008. The international congress is part of the Festival of Underground Space – **Enlightened Underground** that is being held from 27-31 January.

Register now at: www.thinkdeep.nl



Monday 28 01 2008

09.00 Seminar opening and opening address

Key Notes

The New Cross London Rail Link Project: Crossing the Capital, Connecting the UK

D. Oakervee OBE FREng CEng FICE FHKIE, Executive Chairman Crossrail

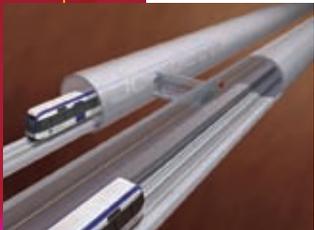
Crossrail is an exciting and visionary new railway proposal for London and the South-East. It will deliver a world-class, affordable railway, with a high frequency, convenient and accessible train service across the capital from 2017. This presentation will discuss the way this project has come about, the foreseeable non-technical issues which still need to be dealt with as well as giving an overview of the project which needs to be completed by 2017.

11.00 Session A

The Challenge for Planners

Zuid Holland Underground Transit

Dr. F.D. van der Hoeven MSc, Associate Professor Urban Design Department of Urbanism Delft University of Technology



The Southern part of the Randstad needs a well integrated transit network that can effectively steer its urban development. Some bold steps in the right direction were undertaken recently but much needs to be done. Underground space will play a strategic role in such a development. It is about time to bring the discussion on urban development, transit systems and the use of underground space on a higher level. The EU sponsored Connected Cities Interreg IIIC network raised these topics through so-called Showcase Workshops and a Guide to Good Practice. In this way Connected Cities sets an agenda for a closer tie between sustainable mobility and urban development in Europe.

The Urban Underground in the Deep City Project: for construction but not only

Prof.dr. A. Parriaux, Director GEOLEP Ecole polytechnique fédérale de Lausanne

The Deep City Project is considering the geological volume below the cities as a resource for several socio-economic uses : space for construction (but not only), geomaterials, geothermy and groundwater. These resources are one of the last degree of freedom for a sustainable development of big cities in the world. Therefore, underground space must be planned with a new 3D-land planning policy, according to a multi-use of this volume, by developing synergies and avoiding incompatibilities between these different potential resources.

Underground Solutions for Streetlevel Ambitions

S. van Bodegraven BSc, Alderman Spatial Planning, City of Arnhem

The desire for a high quality city environment often conflicts with development and redevelopment in densely built-up inner-city areas. The city of Arnhem will highlight some of its underground solutions which have solved their urban challenges. Examples and success factors will be presented.

14.00 Session B

Services & Utilities Tunnelling: Case Studies & Research

Trenchless Technologies and their Impact on Urban Utility Systems

Prof. R.L. Sterling, Director, Trenchless Technology Center, Louisiana Tech University

In the past two to three decades, a series of underground utility construction and repair technologies have emerged that are grouped under the term trenchless technology. The term is used to describe those technologies that allow the installation, replacement or repair of underground utilities or conduits without the need for the excavation of a continuous trench from the surface. While the term trenchless certainly also applies to larger bored tunnels, the term is typically used to refer to urban-utility-scale-technologies rather than rail, metro, or road tunnel installations. The development of these technologies provides new solutions for installing and maintaining urban utility systems, but it also introduces new issues into the planning, design and operation of these systems. These new issues have an impact on the engineers who plan and design the systems, an impact on the conduct of site investigations for utility work, and an impact on the long-term arrangements of urban utility systems as the techniques are used more extensively.

The Public Utility Tunnel Mahlerlaan, Amsterdam A new Approach to the Use of Urban Underground Space

F.M. Taselaar MA, Hompe en Taselaar



A more efficient use of space in densely-populated areas and the desire for a high-quality city environment requires an innovative approach to accommodate the rapidly-increasing amount of cables and pipelines for public utility networks in the city. The Public Utility Tunnel Mahlerlaan in Amsterdam is one such approach. The design, construction and commissioning of the tunnel will be discussed.



Monday 28 01 2008

16.00

Session C

Succesful Urban Underground Projects



The Underground Faculty of Theatre and Dance in Arnhem

Prof. H.J. Henket MSc, Henket and Partners Architects and prof. F. van Herwijnen MSc, ABT building consultants and structural engineers

The Arnhem Academy of Art, originally designed in 1958 by Gerrit Rietveld, had to be tripled in size to accommodate the new Faculty of Theatre and Dance. Because of the fact that the Rietveld building is designated as a listed building and the location is considered a landscape of high value, we decided the only acceptable solution would be to add an underground extension. Hence an underground structure was designed, 17m deep and 45 by 100m, to facilitate 150 students and staff, two theatres, 16 studios and offices. The River Rhine runs directly adjacent to the building with a maximum water level of approximately 1 metre below ground level. Since no experience worldwide was available at the time of educating students - with high physical and emotional stress - underground for eight hours a day, five days a week, the users were rather apprehensive during the design stage. The end result is spacious, light and well received.



Souterrain, The Hague

R.C Hilz MSc, Partner LAB-DA architects

Due to its position between the North Sea and the A4 motorway, The Hague has very little room for expansion. Its growth can only take place through increasing the density within its own borders. The Hague's desire to improve the city's quality has led to a curbing of the motorised traffic in the inner city and the simultaneous improvement of the public transport capacity. The Grote Marktstraat, a street which is the central axis where all the larger shops are situated, will become a pedestrian boulevard; the trams, (future) Randstad rail and parking facilities will be below ground. The greatest challenge in this project was to prove that architecture could have a positive influence on the rigid, difficult pragmatism of the infrastructure. The building is a tunnel tube measuring 1,250 metres long and 15 metres wide, with two stations that have a parking garage of 650 metres, partially spread across two layers. The floor plans are determined by the contours of the buildings above.



Underground Landscape: The Urbanism & Infrastructure of Toronto's Downtown Pedestrian Network

Prof. P. Bélanger, Centre for Landscape Research, Faculty of Architecture, Landscape & Design, University of Toronto

Beneath the streets of Toronto lies a sprawling labyrinth that serves over 100,000 people every day. One of the city's most under-appreciated urban spaces, Toronto's underground is remarkably the largest underground shopping complex in the world according to the Guinness Book of World Records with more than 30 kilometres of shopping tunnels and retail nodes. Since the 1970s, this underground system has grown and multiplied beneath the surface of the city with relatively little intervention from city planners. This presentation discusses the development pattern of the underground as a network and the future it holds as an important public infrastructure.

Worldwide Use of Underground Space Solutions to Urban Challenges

Prof. M. Thewes PhD MSc, Head of the Institute for Tunnelling, Pipeline Technology and Construction Management, Department of Civil Engineering, Ruhr-University Bochum, Germany

The presentation highlights underground solutions to solve urban challenges. Key elements in the decision-making process are discussed and outstanding international case examples will be presented.

19.00 Opening Underground Space Pub
Dirk Coppens - Amsterdam Underground Festival

20.00 Canal Cruise Amsterdam by Night





Tuesday 29 01 2008

09.00

Session D

Tunnelling in Urban Environments: Case Studies



Prof. J.W. Bosch Msc, Deputy Managing Director, Project Office North South Metro Line Amsterdam and Chair of Underground Space Technology, Delft University of Technology

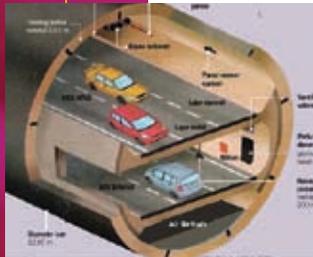
Planning and building of new major public transport infrastructure in a densely built-up area such as the historical inner city of Amsterdam is a complex matter. The design and the construction technology are greatly influenced by the restrictions posed by the urban surroundings.



Results Hubertus Tunnel Mark a New Tunnel Era in the Netherlands

P.P.M.K. Janssen MSc, Project Organisation Hubertus Tunnel

In The Hague the Hubertus Tunnel has nearly reached completion. This twin-tube bored tunnel, 1600 metres in length, with a diameter of 10 metres, is the first bored tunnel in the Netherlands which actually runs under buildings. The results in terms of settlements and vibrations give a lot of confidence for further tunnels in our weak soil. The brick buildings demonstrated a settlement of less than 5 mm, and no cracks occurred. The next era for tunnel-boring in the Netherlands has begun.



Multi Purpose Deep Tunnel (MPDT), an Integrated Solution for Flood Control, Water Supply, Waste Water, Road Tunnel and Public Utilities in the Jakarta Megapolitan City

A.L. Lanti M.Eng MSc, Chairman of the Jakarta Water Supply Regulatory Body

Multi Purpose Deep Tunnel System (MPDT) is an emerging technology in the integrated efforts to mitigate flood, to address urban water resources management, and to reduce traffic congestion in the urban area which can be implemented in a synergic manner. This presentation describes the concept and potential of MPDT system application to solve urban infrastructure challenges for the Metropolitan City of Jakarta.

11.00

Session E

Urban Underground Facilities: challenging the future

AMFORA - Alternative Multifunctional Underground Space Amsterdam The City beneath the City

B.K.J. Obladen BSc, Strukton and prof. M.E. Zwarts MSc, Founder and Board Member of Zwarts & Jansma architects

AMFORA presents the opportunity of realising the much desired improvement of the living environment, without compromising mobility demands. Through a system of underground spaces with entrances and exits at several points along the A10 ring road, different functions can be relocated below ground. Examples are shops, parking spaces, sports facilities, cinemas, supply facilities, archives, bomb shelters, cables and ducts, personnel transport, there are many possibilities. AMFORA is as it were a "City beneath the City". And by relocating different functions underground, opportunities emerge for spatial development on the surface level. When special attention is given to the energy concept and environmental impact, AMFORA forms an integral and sustainable solution for the challenges that the city of Amsterdam faces. AMFORA is a solution with far-reaching potentials, highly innovative, a sustainable solution for the living environment in Amsterdam, and not to say the least, technical and economical feasible. It brings back some of the glory days of the experience of the city of Amsterdam, without compromising the mobility demands of this era.

Recent Underground Space Development in Japan

Prof. T. Hanamura, Okayama University, The Graduate School of Environmental Science, Division of Social Engineering and Environmental Management, Division of Environmental Design

This presentation addresses recent underground space development in Japan, mainly focusing on urban underground infrastructures such as the underground metropolitan expressway (road) in Tokyo. This project is now under construction – one section will open in December 2007. Or the outer flood discharge tunnels in the metropolitan area of Tokyo completed a couple of years ago, and other projects such as multi-functioning utilities tunnels, subway constructions, etc.

US Perspective: Challenges of Underground Facilities in Urban Areas

A.E. Elioff, Senior Professional Associate Project Management, Tunnel Engineering, PB Americas, Inc. and C. Laughton, Project Manager for Underground Design and Construction at Fermi National Accelerator Laboratory

The presentation will illustrate challenges to underground construction (in the USA, urban areas) using illustrations from both successful and unsuccessful underground projects – and the impact of these on current and planned underground construction. Projects are expected to include CSO/Water tunnels, NUMI and DUESL Projects, WAMATA extension, (Virginia) Alaska Way Viaduct - Seattle, Los Angeles Metro System and Central Artery in Boston.



Tuesday 29 01 2008

14.00

Session F

The Climate Change Challenge



The SMART Project – A Unique Dual Purpose Solution for the City of Kuala Lumpur, Malaysia

K.J. Abraham MSc, Project Director, Kuala Lumpur Flood Mitigation Project, Department of Irrigation and Drainage, Malaysia Ministry of Natural Resources and Environment, Government of Malaysia.

The SMART Project is a unique and innovative project conceived to alleviate flooding in the City Centre of Kuala Lumpur whilst helping to reduce traffic congestion in the city. The paper will elaborate the objectives of this project and the challenges faced in the construction of this dual-purpose 11.8m tunnel, 9.7 km long, under the city of Kuala Lumpur which now has been completed.

16.00

Session G

Safe & Secure Underground Space Use

Fire Safety Engineering for Deep Underground Metro System

A.J.M. Snel MSc, Senior Consultant Tunnel Safety, Witteveen+Bos consulting engineers and Project Office North/South Line Amsterdam

An integrated safety approach has been developed for the new underground North/South metro line based on the "safe haven" concept. A functional fire safety design for the stations was hereby an essential topic. The depth of the (multi level) platforms and spatial constraints demand a solution whereby safe evacuation will be supported by escalators and an emergency ventilation system. For the main Central Station transport hub, special attention was given to the multiple and complex safety interfaces with other public transit areas, not only for the final state but also during the ten year construction period.

Netherlands Tunnel Safety Commission

K.M.H. Peijs MA, Chair of Tunnel Safety Commission

Given the scarcity of space in the Netherlands underground infrastructural solutions are becoming increasingly deployed. Constructing a tunnel is an obvious solution. For all tunnels, old and new, tunnel safety is of essential importance. Certainly because all infrastructure – also in tunnels – is being used more intensely. European and national legislation and regulations address many tunnel safety issues. The supplementary legislation governing road tunnel safety provides for the establishment of the Committee for tunnel safety. The Committee, established in May 2006, is an independent committee of experts that is called upon in the early stages of a tunnel project to give advice on tunnel safety. Because of its role in all tunnel projects the Committee can apply the knowledge and experience it has amassed from previous projects, and thus guarantee expertise and continuity.

ITA-COSUF

F. Amberg MSc, Amberg Engineering Ltd, Hagerbach Test Gallery Ltd, Chairman of ITA-COSUF

ITA-COSUF – the committee on operational safety of underground facilities of the international tunneling and underground space association is an international partnership to improve safety and security. It is the Committee's ambition to contribute to and to promote tunnel safety by fostering innovation, raising awareness and supporting the development of regulations. This is done by 3 Activity Groups (external communication, regulation and best practice, research and development) and workshops addressing issues related to safety and focusing on international research programmes. For further information please refer to the ITA-AITES website.



Tunnel Fire Safety: Results of the Largest European Research Project UPTUN

Dr. C. Both MSc, Technical Director Efectis Nederland BV

Last year the largest European research project in the area of tunnel safety was completed. This project, named UPTUN, was the closure of seven research projects in this area, initiated by the European Commission as a result of the famous tunnel fires over the past twelve months. The results of the UPTUN research are valuable for a wide public, varying from constructors to suppliers to tunnel operators and emergency response teams.

19.00

Underground Space Pub

20.00

Closing banquet

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