



# **WORLD TUNNEL CONGRESS 2014 40<sup>th</sup> ITA-AITES GENERAL ASSEMBLY**

**May 9<sup>th</sup> to 15<sup>th</sup>, 2014 - Iguassu Falls - Brasil**

## **INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION**

**APRIL / MAY 2014**

### **PRESS KIT**

**ASSOCIATION INTERNATIONALE DES TUNNELS ET DE L'ESPACE SOUTERRAIN - AITES  
INTERNATIONAL TUNNELING AND UNDERGROUND SPACE ASSOCIATION - ITA**

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# 1) About us

## a ) Who are we

One of ITA's key strengths is to bring together more than 20,000 experts, both from the tunnelling industry and from world-class universities around the world, to share their experience during conferences and meetings organized by ITA or its Member Nations. These exchanges are beneficial to both sectors, making academic research available to the industry and giving researchers access to cutting edge technologies and projects in the field.

### Who we are

The International Tunnelling and Underground Space Association (ITA) is an international non-profit, non-governmental organization that promotes an improved use of underground space as a solution for sustainable development.

Founded in 1974 and headquartered in Lausanne, Switzerland, ITA is a community of professionals involved in the tunnelling and underground space industry made up of owners, engineers, town planners, architects, designers, both heavy construction and specialized contractors, material and equipment suppliers, lawyers, politicians, academics and researchers, economists, financiers and other stakeholders.

### Our profile

ITA currently federates 71 Member Nations, 300 Affiliate Members, including 15 Prime Sponsors and 60 supporters. It is governed by an Executive Council composed of 15 elected members hailing from various Member Nations (see Annex 1.) representing a different aspect of the tunnelling community.

The President for the current 2013-2016 period is Mr. Søren Degn ESKESEN, from Denmark and the 4 Vice-Presidents are Mr. Rick P. Lovat (Canada), Mr. Tarcisio B. Celestino (Brazil), Mrs. Amanda Elioff (USA) and Mr. Daniele Peila (Italy).





## Special consultative status with the United Nations

ITA is an international technical-based organization having Special Consultative Status with United Nations since 1987. Through it, ITA has been implicated with:

- **Habitat II**, the Second United Nations Conference on Human Settlements,
- **Feasibility studies to link Europe to Africa**, through the construction of a tunnel to cross the Gibraltar Straits,
- **Poverty Reduction** within the United Nations Development Programme,

ITA has also co-organized a seminar on “the use of underground space as an unexpected solution for promoting sustainable development”, at the United Nations Headquarters in New York, on December 14, 2007.

ITA participated and contributed to:

- **The World Urban Campaign**, a platform for public, private and civil society actors to elevate policies and share practical tools for sustainable urbanization.
- **UN-ISDR “Making Cities Resilient program”**. During the fourth session of the Global Platform for Disaster Risk Reduction, organized by UNISDR, the ITA presented a vision for the city of the future, where underground space would be used as a solution to the challenges presented by urban growth.
- **The World Urban Forum**. In April 2014, ITA organized at the WUF7 side event and training sessions on underground of space use.

## b ) Vision, mission and objectives

### Vision

**ITA the leading organization promoting the use of underground space through knowledge sharing and application of technology.**

*Working together*

Members at ITA share their expertise inside 4 committees and 13 active working groups:

## Committees

- Committee on Operational Safety of Underground Facilities
- Committee on Education and Training
- Committee on Underground Space
- Committee on Technologies

## Working groups

- |                               |   |
|-------------------------------|---|
| • Research                    | • Underground Works & Environment       |
| • Contractual Practices       | • Long Tunnels at Great Depth           |
| • Health & Safety in Works    | • Conventional Tunnelling               |
| • Maintenance & Repair        | • Underground Works & Environment       |
| • Seismic Effects             | • Urban Problems, Underground Solutions |
| • Immersed & Floating Tunnels | • Life Cycle asset management           |
| • Use of Sprayed Concrete     | • Mechanized Tunnelling                 |

Additional information concerning the working groups: <http://www.ita-aites.org/en/wg-committees>

### *Communicating with ITA members*

ITA regularly issues several publications which are available to all members through its Corporate Website.

- |                       |                              |
|-----------------------|------------------------------|
| • ITA Reports         | • Working Group publications |
| • ita@news            | • Committee publications     |
| • ITA Position Papers | • Key lectures               |

ITA is also preparing a series of Open Sessions for World Tunnel Congress (WTC).

### *Informing the public*

An Information Website informing the public has been introduced at the same time as its corporate counterpart. This site is available in English, French and Spanish; The Chinese version will be soon available.

It explains:

- “Why go underground”
- “How to go underground”
- “Uses of underground space”



## Mission

ITA's mission is twofold:

- **To further the exploitation of the subsurface as a solution for sustainable development;**
- **To encourage progresses in planning, design, construction, maintenance and safety for tunnels and underground space.**

ITA is currently operating on several mid-term goals:

- Arranging international exchanges regarding the latest developments in underground technology:
  - ITA is gathering engineers, owners and other stakeholders involved in the development of underground space, such as architects, planners, authorities, economists, lawyers, insurers, financiers and politicians to share underground technology development and user feedback.
  - ITA is supplying owners with information having to do with the best solutions available to them, with respect both regulations and safety.
  - ITA is promoting better, more cost-efficient methods for planning, geo-investigation, design, construction, operation, maintenance and safety of underground structures, through the use of new technical developments and risk management principles.
- Perfecting the technical experts and engineers' training:
  - ITA is improving training for all, through workshops and worldwide academic programs and through improved on-the-job training.
- Promoting new and modern applications for underground space to benefit the public and the environment and to provide sustainable development solutions.
  - ITA is supporting studies of underground alternatives to surface construction,

which take into account not only construction costs but also indirect life-cycle costs and savings, as well as social and environmental advantages.

- ITA is interested in the guidelines development for a positive public strategy that takes full advantage of subsurface potential.



## 2) Technological progresses for sustainable development

Most countries have passed over the past few decades legislation to protect the environment. Public opinion is likewise increasingly concerned with the preservation of habitats as well as with clean air and clean water, both on the surface and underground. This is why all building sites, above and under the surface, are expected to take appropriate measures to respect the environment during construction and after it is completed.

### Environmental respect on building sites during construction

Digging tunnels and creating new underground infrastructures can generate a certain level of nuisance for the surrounding neighbourhood, especially in urbanized areas. Underground building sites can also however generate waste materials that must be disposed of in an environmentally safe way.

Water is one of the very first things that come to mind, with regards to an underground building site.

Also, preliminary studies should have determined the geological nature of the ground and given recommendations to sort, remove and store all solid waste material in a way that does not harm the environment.

### The underground space alternative

To understand how underground space can be an ecological alternative in a sustainable development approach, we need to understand that more than half of the world's population is currently living in urban areas – a figure expected to reach a staggering 70% by 2050. What's more, on top of challenges with regards to available space on the surface, the urban concentration increases the need for heating and transportation. All of these release greenhouse gases and amount for 1/2 to 2/3 of global emissions.

Modern cities worldwide thus need to cope with rapid urbanization while protecting their population from possible natural disasters and the effect of climate change. This is where underground space use can make a big difference in terms of available urban space. Up until now, many town planners have considered the subsurface as some sort of utility space through which metro lines and sewage pipes run when actually, underground structures provide a real ecological alternative to urban sprawl and contribute to environmental sustainability by saving natural resources on the surface from degradation and overuse.

Underground space also allows cities to become more compact as multiple layers are added underneath it. This creates opportunities to reduce our energy needs and therefore our waste production.

### **Solutions through the development of technologies**

Today, tunnelling technologies have evolved to such a degree that taking advantage of underground spaces is possible virtually anywhere – regardless of geological conditions and pre-existing infrastructures.

The development of multiboom track-mounted drill jumbo and the modern data drill method greatly reduce impacts and can be combined with environmentally friendly explosives. Positioning technology has also significantly improved, incorporating laser technology with global positioning system. It is undeniable that machine automation and computer control have improved efficiency, precision and safety for excavation work. They could also be less expensive - which would allow underground project developers to protect the environment without going off-budget.

Also an answer to this has been the creation of Earth Pressure Balance Shields, in which the soil excavated by the cutting wheel is used to support the tunnel face. The key information is fed into the central control cabin where it can be visualized by the tunnel boring machine operator making it thus easier to monitor and correct. Other tunnelling machinery includes the Mixshield – which can operate either as a shield with fluid-supported face as well as a shield with alternating operating mode.

## **3 ) Concrete applications**

### **Waste collection and environment**

At every step of an underground infrastructure project, technological evolution makes it possible to find solutions to environmental issues. Taking things underground can help urbanism specialists find more space, rationalize public utilities, provide climate-controlled solutions for everything from storage to entertainment, and help us reach our destinations faster and with a smaller carbon footprint.



Tunnel and underground space design is the first stage during which solutions to environmental issues can be provided. It takes into account multiple disciplines: geology, environmental sciences, soil and rock mechanics, structure calculations, electric engineering, aerodynamics and hydraulics. Each new underground infrastructure comes with its own challenges and engineers a response as unique as the geological and hydrological conditions it has to deal with. Everything is done at this stage to weight future construction impacts and consider the technologies and materials most apt at mitigating them.

The capital of Malaysia has indeed long been battling a dual problem: congested traffic and heavy storms once or twice every year during the rainy season. Urban planners were looking for a way to solve both of those issues and came up with the **Storm Management and Road Tunnel**, a SMART solution. It is a unique, dual-purpose tunnel which diverts floodwaters away from the confluence of the two major rivers running through the city centre while providing a central section doubling up as a two-deck motorway to relieve traffic at the main southern gateway into the city centre.



## Transportation



Recent mass transit projects have therefore been carried out in various places like Canada and China. Amongst these projects, the **Greater Cairo Underground Metro** in Egypt is of particular note for its size as it consists of three lines linking the capital districts with the centre of the city, of secured parking areas and of multi-story garages for private parking. This project is considered to be one of the most important national projects executed in Egypt in the second half of the 20th century.

Mass transit was not the only mode of transportation impacted by growing populations and increasing pressure for greener and more sustainable ways of travelling. Over the past thirty years, high speed railway connections have grown from a few lines to entire networks covering entire regions of the world. But these new trains need smoother, flatter railway lines to function at their optimal speed and not winding mountain routes. The **Gotthard Base Tunnel** being the longest tunnel in the world with a length of 57 km and a total of 153.5 km of tunnels, shafts and underground passageways is the perfect example. Tunnels have therefore proved to be quite useful in crossing mountains, topographical hurdles and waterways.



As an example, the **Trans-Tokyo Bay Highway**, the world's largest underwater shield tunnel used for motor vehicle traffic, is an answer to the issue of crossing bodies of water in Japan. It was created as a means to link the cities of Kawasaki and Kisarazu which are on either of the bay and now only 15 minutes apart.



## Current models and projects

### *Current examples*

Canada is home to what is probably the most famous underground city in the world: **Montreal's RESO**. It is considered to be one of the largest underground complexes in the world with over 32 km of tunnels spread over more than 12 km<sup>2</sup>, connected areas include shopping malls, apartment buildings, hotels,



condominiums, banks, offices, museums, universities, seven metro stations, two commuter train stations, a regional bus terminal and the Bell Centre amphitheatre and arena. There are more than 120 exterior access points to the underground city. Each access point is an entry point to one of 60 residential or commercial complexes comprising 3.6 km<sup>2</sup> of floor space, including 80% of all office space and 35% of all commercial space in downtown Montreal. The underground city was so successful – a roughly estimated 500,000 people every day – that street level retail development came to a halt in 1964.

On a much, much smaller scale, **Monaco**, originally only 160 hectares wide between the mountains and the sea, is another demonstration of how underground space use can be successfully integrated into sustainable urbanism. It has now grown to about 202 hectares by adding land onto the sea and by using underground space through the resettlement of two rainwater and waste water plants and the construction of a new road which was constructed for 80% underground. Moreover, since the railway system is totally underground within Monegasque territory, and no trains can be seen at ground level within the nation, underground space also helps preserve the landscape and historical monuments. Leisure has not been left out of this underground urbanism plan since most of the Grimaldi Forum is located beneath the surface. This entertainment complex harbours an actual 1,900 seat opera house as well as meeting and exhibition rooms.



## 4 ) Tunnels for a better quality of life : 2014 WTC

The subsoil presents numerous opportunities for urban planning but this is often forgotten or neglected. Despite the fact that the tunnel culture is already very common in European countries, in North America and in some Asian countries, it is not the case in Latin America yet. And so, the 2014 World Tunnel Congress (WTC) shall take place during a period of remarkable growth in South America, where the number of these structure installations should increase. Tarcisio B. Celestino, CBT President, explains that the 2014 WTC “is a great opportunity for the world community of tunneling to exhibit its cutting-edge equipment, its suppliers and its services.”

### **Brazil, a booming host country**

2014 is a big year for Brazil as it will host the Football World Cup as well as the WTC from May 9th to May 15th 2014 at Iguassu in Brazil. There will also be the Olympics in 2016. These events force Brazil to develop its infrastructures and provide evidence of its international outreach.

Brazil has indeed known an exponential growth for 10 years, a development which should continue in the next ten years. The country has notably invested in infrastructures and numerous projects implicating the construction of tunnels will come to light. São Paulo, the biggest town in Brazil, plans for example on utilizing 200km of subway rails before 2018 – which corresponds to about a tripling of the existing lines. Other construction projects, such as the transposition of the waters of the São Francisco River, the largest waterway in the north of the country, or the underwater tunnel linking the two coastal cities Santos, Brazil's main harbor, and Guarujá, a seaside resort close to São Paulo, are ongoing.

### **The 2014 WTC, a place for exchange**

The 2014 WTC shall bring together public officials, designers, builders, subcontractors, engineering services firms, professors and students. Participants will also have the opportunity to exchange technical information, to present new products and services and to debate on the challenges of underground construction. It shall be the biggest gathering of the Brazilian and international technical community, especially since the ITA's 40th General Assembly shall also be held during this event.

The congress's theme shall be “Tunnels for a better quality of life” and shall illustrate the importance of tunneling in counteracting problems due to traffic congestion, flooding, transportation, and the conservation of the environment but also in keeping surface areas for practical reasons such as recreational activities.



## Prestigious speakers and participants

A number of leading figures like the Brazilian transport authorities and Paolo Sérgio Oliveira Passos, President of EPL and former Brazilian Minister of Transport, shall be present amongst the participants. Mr. Passos shall also talk in short and medium term about logistical planning in Brazil– with for example the high speed train (TAV) which shall connect Campinas, São Paulo and Rio de Janeiro. TAV will be an innovative project, which will include 100 km of tunnels. Jurandir Fernandes, the State Secretary in charge of transportation system, shall also be present at the WTC as well as the press conference, which will be held on May 12th. He will present the urban transport system in São Paulo – such as the expansion of the São Paulo subway – and the growing demand in terms of public transport within the urban area. Moreover, the State Secretary will talk about the influence of underground work within São Paulo transport infrastructures.

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## Annex 1: List of Member Nations 2014

- |                             |                        |                               |
|-----------------------------|------------------------|-------------------------------|
| 1) Algeria,                 | 25) France,            | 49) Poland,                   |
| 2) Argentina,               | 26) Germany,           | 50) Portugal,                 |
| 3) Australia,               | 27) Greece,            | 51) Republic of Korea,        |
| 4) Austria,                 | 28) Hungary,           | 52) Romania,                  |
| 5) Azerbaijan,              | 29) Iceland,           | 53) Russia,                   |
| 6) Belarus,                 | 30) India,             | 54) Saudi Arabia,             |
| 7) Belgium,                 | 31) Indonesia,         | 55) Serbia,                   |
| 8) Bhutan,                  | 32) Iran,              | 56) Singapore,                |
| 9) Bolivia,                 | 33) Israel,            | 57) Slovakia,                 |
| 10) Bosnia and Herzegovina, | 34) Italy,             | 58) Slovenia,                 |
| 11) Brazil,                 | 35) Japan,             | 59) South Africa,             |
| 12) Bulgaria,               | 36) Kazakhstan,        | 60) Spain,                    |
| 13) Cambodia,               | 37) Lao PDR,           | 61) Sweden,                   |
| 14) Canada,                 | 38) Lesotho,           | 62) Switzerland,              |
| 15) Chile,                  | 39) Macedonia (FYROM), | 63) Thailand,                 |
| 16) China,                  | 40) Malaysia,          | 64) The Netherlands,          |
| 17) Colombia,               | 41) Mexico,            | 65) Turkey,                   |
| 18) Costa-Rica,             | 42) Montenegro,        | 66) Ukraine,                  |
| 19) Croatia,                | 43) Morocco,           | 67) United Arab Emirates,     |
| 20) Czech Republic,         | 44) Myanmar,           | 68) United Kingdom,           |
| 21) Denmark,                | 45) Nepal,             | 69) United States of America, |
| 22) Ecuador,                | 46) Norway,            | 70) Venezuela,                |
| 23) Egypt,                  | 47) Panama,            | 71) Vietnam.                  |
| 24) Finland,                | 48) Peru,              |                               |