

INTERNATIONAL EDITION

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Tunnels

AND TUNNELLING



ITA'S INFLUENCE

Underground solutions to natural disasters

Asia • EPBMs • Settlement

ITA PRESIDENT SEES INCREASED INTERNATIONAL AWARENESS

In a Q&A session released by the *International Tunnelling Association (ITA)*, president **Soren Degn Eskesen** outlines what can and is being done to mitigate the effects of climate change through underground infrastructure. Eskesen also reports an increased appreciation from the international community for the benefits tunnelling can bring

The effects of climate change are now widely visible throughout the world. Regarding these phenomena, what solutions could underground infrastructure provide?

Eskesen: Cities around the world are challenged by rapid urbanisation, climate change, and the need to become more resilient. The ITA believes that underground space in urban areas can be used for meeting many challenges cities face. If done in a planned manner, the development of underground space can contribute to sustainable development of urban areas and help them adapt to climate change effects.

The solution falls into two categories. Firstly using the underground can assist in reducing the carbon footprint that big cities today recreate. There are several options [to accomplish] this – by moving transport into underground systems [that are not powered by carbon-generated energy sources], and by changing [the means of energy production] to ‘green energy’ sources such as hydropower, of which the use of the underground is an integral part; providing tunnels for water transport and underground caverns for the power house.

Secondly, solutions using the underground may be used to create flood protection for cities by providing tunnels for flood control. This can be accomplished either by diverting flood water through tunnels instead of surface rivers, which will be overflowing, or by creating underground storage facilities for the retention of flood waters. Such solutions have been used in several cities, [an example being] Buenos Aires in Argentina.

Are states fully aware of the potential of underground infrastructure for population and structure protection?

Eskesen: The ITA has for some years been reaching out to decision makers and urban planners to promote the use of underground space. During our annual World Tunnel Congresses in Helsinki 2011, Bangkok 2012, and Geneva 2013, we organised open sessions where the subject was the use of underground space in a changing world.

Cities everywhere are under pressure to support their growing

populations, and to meet their future energy and transportation needs in far more sustainable ways. Decision makers and organisations are now talking about underground space and how to include the underground in city planning to make cities more resilient. We at the ITA support them and are being acknowledged and being invited to activities driven by UN global agendas. The ITA was named as one of the partners in the Expert Group on Urban Drainage, set up by UN Habitat. An excellent example of this is the SMART project in Kuala Lumpur, Malaysia.

The UN Habitat has recently identified the five basic principles on Urban Drainage, and one of the five is that “effective use of tunnelling and underground space is appropriate where required”. Tunnelling and underground space is now becoming part of UN policy. So yes, the international community is aware of the matter. This is only a first step, but it is significant, and it does show our work in ITA is achieving what we set out to do.

ITA participated in a New York summit last September. What were its successes?

Eskesen: The ITA was represented by the chair of our Committee on Underground Space, Han Admiraal, and myself at the

Below: Soren Degn Eskesen is ITA president and tunnelling specialist for Cowi of Denmark



UN Climate Summit in New York in September 2014. At the historic meeting, many governments and organisation pledged to an alliance to combat climate change. From this moment on, it became clear that investors were increasingly backing green projects geared towards a low carbon economy. This is caused by three reasons outlined by the speakers. Firstly it became clear that no longer is there any doubt as to the fact that climate change is altering our world, and that it is being caused by human activity. Secondly, that the costs of not doing anything are now outweighing the costs of acting. Thirdly, that governments alone are not going to change anything, and involvement of the private sector is needed. That involvement is not about individual companies, but about companies willing to act together based on a common interest and on the simple fact that if they don't act now, there soon will be no world left.

In the closing session, UN Secretary Ban Ki-moon announced a 'Global Geothermal Alliance' in the field of energy, which made it clear that the ITA's efforts to develop underground space in a planned manner need to continue. Other fields that the ITA shall remain focused on are transportation, and cities. The reduction of carbon emissions and transitioning to a low carbon economy are vital and can be delivered through these fields. Tunnelling and underground space can play an important role in delivering solutions in these areas.

The participants acknowledged that underground space can contribute to numerous urban challenges and they now acknowledge the ITA as a global leader on tunnelling and underground space.

Floods are likely to increase in frequency and strength. How can the industry foster greater investment in underground infrastructure to limit the effects of these disasters?

Eskesen: Our industry has solutions for flood control by diverting water into tunnels to avoid floods at the surface. We have proven the solutions exist already, demonstrated by a number of projects. We need to spread the message, and inform people that it is cheaper, safer, and more resilient to provide the solutions prior to the disaster occurring. We need to convince states and governments to invest to avoid the disasters. The capital is better spent investing for disaster risk reduction, than to spend a similar amount or even more in rebuilding efforts.

Cities everywhere are under pressure to support their growing populations, and

to meet their future energy and transportation needs in far more sustainable ways in order to reduce the carbon footprint and the climate change effect. Moving people efficiently is critical to the livability and economic success of cities. Success depends on how well cities utilise their underground space, because what happens below greatly enhances what is possible above. By investing in the underground you create room at the surface to develop the city into an economic powerhouse.

Are there any significant ongoing construction projects that aim to reinforce the security of populations and goods located in flood prone areas?

Eskesen: Southeast Asia is probably the area of the world where the risk of flooding is highest. In Jakarta, the capital city of Indonesia, flooding is too frequent in recent times. Several projects exist to cope with immediate remediation, such as the tunnel that will connect the Ciliwung River in the Bidaracina district of eastern Jakarta, with Jakarta's East Flood Canal. But for the longer term an important project is the Jakarta multi purpose tunnel, based on the example of the Kuala Lumpur SMART project.

After the mega flood that occurred during the autumn of 2011 in Bangkok, Thailand; the Bangkok Metropolitan Administration (BMA), as well as the local ITA member association (TUTG), proposed various solutions including tunnels to prevent such flooding. TUTG proposed the construction of a long multi-purpose tunnel from the north of the city to the sea, and BMA is reinforcing its network of drainage tunnels. The construction of such a tunnel began a few weeks [prior to Tunnels and Tunnelling going to press]. It will be a 6.4km-long tunnel some 5m in diameter. Other projects exist in various countries and parts of the world. Even in my hometown of Copenhagen in Denmark, we are considering the construction of a tunnel that would serve as a combination of drainage tunnel and a six-lane road. At the moment, the heavily congested surface road follows the alignment of a river that now runs through drainage pipes. By moving the road underground and combine it with a drainage tunnel to control heavy rainfall, we will free the surface area and make room for reinstating the river to create a recreation area to the benefit of the city's inhabitants.

In 2015 Paris will host the World Climate Conference, an occasion that will put climate disorders at the heart of discussions. What key messages does ITA plan to convey?

Eskesen: During our work with UN Habitat, we will inform delegates of the role underground space can play in urban drainage and disaster risk reduction. We are now part of a process that wants to bring together cities and private partners to really start projects that will do this. No more concepts, the real thing and especially in those fast-growing cities that need it but have never considered it. We are challenged to come up with solutions to solve the challenges these cities have. These being, among others, drainage and flood control.

The benefits of the urban decisions we make today will be valued by generations to come, exactly in the same way as we in our older cities see the benefit of the investment our grandfathers made, such as building underground metro systems in cities such as: Paris, London, New York etc. Today's urban population is still benefiting from the investments made more than 100 years ago.

ITA has never before been so close to getting the attention of the world, and ensuring that tunnelling and underground space are seen as vital to meeting the biggest challenges this world has ever faced. We are committed, and ITA will show leadership to carry the solutions through