

Think deep to create an urban underground future

Han Admiraal, Isocarp

Underground Space

The use of underground space in urban areas has been a recurring theme in the past 100 years. Édouard Utudjian, a French urbanist, wrote about an urbanism of the underground during the 1930's. In 1937 he founded the 'International Permanent Committee of Underground Technologies and Planning'.

So here we are, 100 years on and it still requires an international committee on urban underground space (ITACUS) to regenerate interest not so much in the use of underground space but in the planning of underground space and the management of its use. What understanding have we gained that really makes a difference?

- First of all, we have a conceptual model of underground space that enhances our understanding of the opportunities it gives but also of the potential conflicts that could arise.
- Secondly we appreciate that the idea of underground space as an urban service level as does no justice to the possibilities of underground space and the contribution it can bring to liveability of cities.
- Thirdly we understand that part of the complexity of underground space stems from the need for planners, architects, engineers and geologists to work together when creating a vision on the use of urban underground space.

One conceptual model of underground space suggests it is not just about the resource space, but also about resources as energy, geo-materials and water.

In that sense underground space differs very much from the spatial concepts above ground. It is not only that in some instances a competition for resources is taking place below the surface, this competition is also likely to block future developments if we use the 'first come, first served' principle.

Underground planning - services and transport

Consider a city that is investigating alignments for mass rapid transport systems that make use of underground lines and stations. Imagine that same city having heavily invested in underground cold-heat storage systems and geo-thermal energy. It might find itself in an impossible situation whereby the use of the underground for the resource energy has led to massive vertical screens of pipes running from the surface to hundreds of meters below the surface that just not allow any horizontal alignments of underground transport systems along routes that would make any sense for a public service.

So it is not just that we have a conceptual model, we also understand the necessity to plan the use of underground space and to manage its use. Only in this way will it be sustainable in the sense that future generations can still consider its use.

Densification - up and down

The pressure on urban areas to densify is such that we may find that apart from going up, the idea of going down is actually attractive and required to balance the demand for urban spaces. This is an interesting concept as going down with our urban development, i.e. the creation of basements that are part of larger atriums inside building gives a completely new urban experience, it also allows for underground connections to be made between basements. Rather than having spot developments underground that lead to nowhere and require the surface to transit between buildings, underground passages provide interesting possibilities as public spaces or retail axis between points of human concentration.

Urban comfort

This is very much the concept that has powered the development of underground cities as can be found in Montreal and Toronto in Canada. In these cases it wasn't just the lack of space, but also the climate that stimulated the development. With extreme high temperatures during summer and extreme low temperatures during winter, it was found that being underground actually became a comfortable experience and a natural way to shield from the weather. Connecting basements with passageways has created a new urban tissue, which contributes to the livability in these cities but also stimulated local development and economies.

Underground space is there for us to use. The words of Utudjian written at the end of his book on a urbanism of the underground hold true now as they did when he originally wrote them. "It is necessary that the urban planner thinks deep and that underground development of cities is done not through random necessities, but according to a definite commitment, legislation and a predetermined plan."

Han Admiraal is a member of ISOCARP and Chair of the International Tunnelling and Underground Space Association Committee on Underground Space – ITACUS.