

W O R K S H O P

ENGINEERING IN KARST



**Portorož, Slovenia
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During the IMWA 1996 Workshop, fourteen national and international colleagues presented their experience about engineering and mining in karstic regions. The papers presented were not published in a proceedings volume, but handed out to the delegates as paper copies.

This PDF is one of those documents provided to the delegates.

All other papers can be downloaded from www.IMWA.info

URBANISATION IN KARST SOME REALISTIC IDEAS ABOUT THE POSSIBLE FUTURE

Introduction

Talking about karst means talking about stone and water, while talking about the Karst proper means talking about the border and the Mediterranean. We cannot discuss urbanisation of the Karst without taking into consideration the primary importance of mutual dependency of determining factors on processes of urban development and its patterns.

Today we can no longer talk about the factors and processes of urbanisation in general terms and in exclusive categories. Therefore the basic factors regarding the Karst may be at the same time stimulative and restrictive; in certain combinations they present a relative advantage while in the other a limitation for further development of a particular karstic area.

The specifics of the Karst is the decisive influence of its litological structure on orography and hydrography of the region. Here we have a stable and yet porous ground. The water that dissolves and transforms the solid rock creates fertile land and washes it underground. Solid elements and dynamic flows conform together a diverse and at the same time very delicate ecosystem. Richly shaped and naturally articulate region is divided into several regional subsystems according to different types of soil. Throughout the region the diversity of the slope offers numerous sunny and sheltered sites in an extremely airy atmosphere. Relatively sharp weather changes occurring in submediterranean climate and heavy rainfalls generate a great biological variety. Large quantities of water drain off rapidly underground, without resorption and filtration. Cause of these phenomena the ground water, which represent a major natural resource of the region, is in the same time the most endangered one.

Hence arise two essential problems concerning physical planning of the Karst region: how to keep as much water as possible on the surface and how to prevent uncontrolled flow of the waste waters to the underground. Because of minimal self-cleaning capacity of soil the effluents present a serious polluting hazard to ground water. With the expansion of urbanisation the consumption of water has increased rapidly. Due to the unbalanced consumption of water

the quantity of the waste water has increased directly threatened the resources of the ground water. Therefore two priorities concerning the regulation of urban development at the Karst are to assure efficient preservation and permanent protection of aquifers, as well as to preserve the forest that holds an important role in keeping the precipitate above ground and prevents erosion of fertile soil.

Global changes

We can not consider the Karst an isolated region that is not influenced by general trends of development or does not undergo the process of permanent urbanisation of rural centres. The regional changes generally show two main trends toward dynamic suburbanisation and redistribution of production. The parallel flow of both processes leads toward increasingly rapid melting of landscape and urban system. The stable centre is losing its predominance. As a result of this a transition from the hierarchical layout of settlements into a network of points linked in all directions is being intensified. Decentralised urban development overcomes the old contradictions between the city and the country.

Former physically definable boundaries of the city are being replaced by dimension of time. Continuous expansion of traffic accessibility and the network of telecommunications offers more and more possibilities in the choice of allocations. The multidimensional hybrid region has been established along the European axes of development in which the relations between the open space and the built up environment are being structured on the large scale. Trends of development show that only the regional scale can ensure an adequate freedom of movement and settings and enables individuals to adapt more easily to the conditions of change. Former systems of mutual dependency between the city and the suburbs, among the cities and between the city and the country are diminishing and finally disappearing. Combination of research and high-tech production parks that use the quality of rural environment are taking shape in the peripheries, while integrated business,

commercial and recreational centres find their location in the open landscape etc. Throughout the network of roads, a stripped pattern of settlement of lower densities is spreading in all directions. Urban, suburban and rural structures are being interchanged into a complex and heterogeneous post-urban mosaic. The recent perception of urban reality derives from a statement that the apparently catastrophic dimension of degraded suburbs and spread city have on the other side shown incredible vitality as a newly discovered source that can also define a new form of urban evolution. Besides saving of energy calls for dispersed rather than concentrated population. Solar and wind energy is using more efficiently in small systems.

Regional changes

Within such a context of changes, it must be realised that the unplanned suburbanisation of the country is an inevitable and objective tendency of the further development. This pattern of growth can be managed from itself rather than hindered by force. This reaction is even more reasonable if we anticipate that the increased economical power of individuals as well as their mobility will be followed by trends of dispersed settlements on attractive locations.

Even though this kind of settlement shows a variety of forms, a typical linear pattern and a unified typology of a free-standing house with the garden are becoming more and more characteristic. This form of isolated housing could be regulated in manner to obtain more rational cluster-housing aggregation. Nevertheless, by directing the housing typology which is connected with gardens - fertile land is spreading on low erosive land at the edges of the Karst fields thus improving the quality of ground.

This open and adaptable pattern of settlement which seems to take shape without any order or evident structural logic can be treated conceptually as the very beginning of a new regional network of garden cities. Within this network, the active gravitation poles of the existing system of settlements are preserved, beside them a multitude of partial centers and poles of specialised activities are established. Yet the real centre of this diffused system of settlement is sooner or later the individual house. Consequently an altered

new settlers more carefully familiarise themselves with the local tradition in coexistence with nature and its resources.

Strategy of regional development

From the aspect of physical planning it is necessary to define and pursue two complementary strategies of development, thus on regional and local levels supporting sense of region and local interdependency.

The aim of both strategies concerning the region is to establish more intensive interpenetration and overlapping of:

- a. regional network that consist of physical conditions, climate and available resources,
- b. technological network, made up by the entire physical infrastructure and services, including the information network,
- c. social network, formed by values, symbolic meanings, cultural identity and attachment to a place.

By increasing of various interactions between the networks and different structural levels, the autonomy of local units should intensify. This could stimulate differences as well as the growth of complexity within the region.

The structure of the region should be constituted by:

- a. co-operative city regions of main urban centres and their hinterland
- b. regional parks as protective areas, where the control of the resources management is ensured according to the principle "as little as possible"
- c. protected natural monuments and specific natural phenomena
- d. managed landscape where the relations between protection and development are defined discreetly and locally

In this way the conditions would be set up for further development of the Karst region into an open urban-landscape continuum with differently arranged densities of settlements - defined by:

- a. sequences of hybrid rural-urban landscape within regional parks and
- b. linear development and poles of denser urbanisation as interjacent area permanently balanced by surrounding protective areas

They could be preserved to enable nutrients from food consumption. In addition a systematical setting up of local sewage system is necessary for the local disposal of sewage water in wetlands recirculating the nutrients in bio mass. To reduce water consumption and ensure the quality of drinking water - grey water and waste water should be reused after purification.

Issues of crucial importance for further balance of dynamics and the scale of future urbanisation at the Karst are therefore:

- a. the overflow seeping from septic tanks into the ground without control and taking into account the minimal capability of soil to absorb the effluents
- b. dismanagement of the solid wastes.

The priority tasks of local communities would be the following:

1. the set up of the local sewage system that is connected to local green wastewater-treatment plants;
2. to install separated pipe-systems for reuse of waste water after minimal treatment for irrigation and sanitary water;
3. to make functioning the left over rainwater collectors as a replacement for the lack of surface waters to establish local dumps for solid waste disposal.

It must be realised that the management of waste is primarily the responsibility of local communities. The practice of collecting waste and diverse sorting of waste can be obtained in systems that are developed in collaboration with the local residents

In order to achieve these goals the strategy planning at the Karst should be carried out on the basis of widely developed local initiative. With various forms of active public support and technical assistance for individuals and local communities the flow of self-planning that has so far often been chaotic should become more functional and efficient. Solidarity among people and the traditional Slovene self-build technology could be directed through private-public partnership into a more demanding project of public sector in smaller extent that would be easier to control. This kind of joint-venture approach could again have the reciprocal effect on planning procedures controlling development in the region. It would make them more adaptable to real circumstances. of change. Moreover, this is the only chance for the local

community to gradually improve the dispersed settlement and to build the lacking communal infrastructure with financial support from public budget.

With public commitment of branches that deal with planning the ways of building at the Karst and their technical rationality could be improved. The strong local attachment to the village based on the sense of common interest could be used for spontaneous realisation of the architecturally more harmonious way of building as-well.

With regard to this the following planning principles should be observed:

1. the non-opposition principle by which the integration of new structures with local cultural and social environment becomes possible
2. the principle of the infill development as an improvement of the existing structures and environmental conditions
3. the principle of the additive transformation as a sedimentary process of the development, where new structures are shaped by gradual rearrangements thus adding new quality to the existing ones
4. the principle of local self-sufficiency creating the local entities as closed systems
5. the principle of fragmentary transformation and incremental development of new structures.

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Practical cases

The planning work by Max Fabiani - carried out among 1917 and 1922 - still remains the best practical example of physical control and directing of urban development at the Karst. When he was a director of the Provincial Administration for Reconstruction of Buildings a task of planning the reconstruction for 81 smaller towns and villages damaged during the 1.world war was entrusted to him. The towns and villages that had to be considered were located in Soča Valley, Vipava Valley and at the Karst; let us mention the places like - Ajdovščina, Vipava, Prvačina, Solkan, Kanal and Opatje Selo, Kostanjevica, Temnica, Jamlje at the Karst.

Although his comprehensive regulation plans has not yet been fully explored and evaluated, we can claim that he had succeeded to implement an efficient method - a synthesis of technical and cultural approach, a combination of development and protective planning. Max Fabiani conceived planning as a permanent task and as an open system of cyclical optimalization which should order the development in constant change regardless of the dimension or the status of a place. This principle has been pursued without exception by all preserved regulation plans that defined reconstruction and incorporation of essential historical elements of genius loci, improvement of the existing street layout, modernisation of the existing structures and regulation of possible further development of settlement over a foreseeable period of time. Fabiani envisaged the strategy of gradual interventions into the network of public spaces and defined those focal points that could generate further development of the whole place in accordance with the specific code of the settlement matrix.

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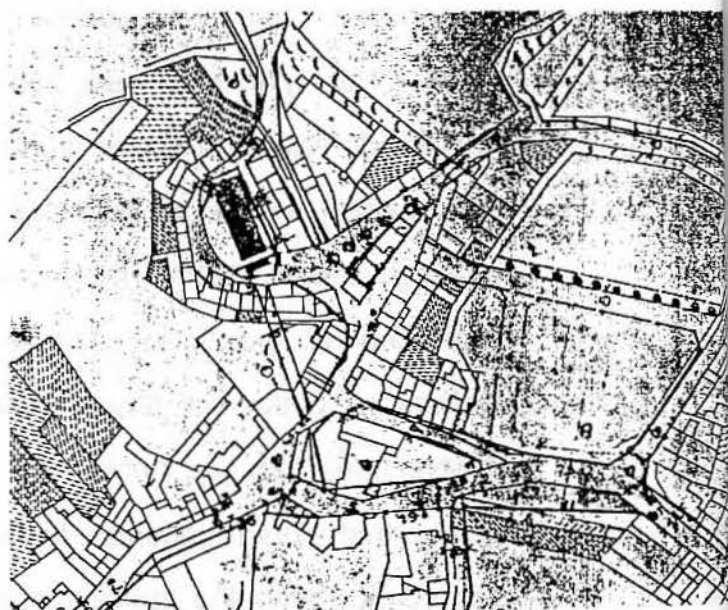
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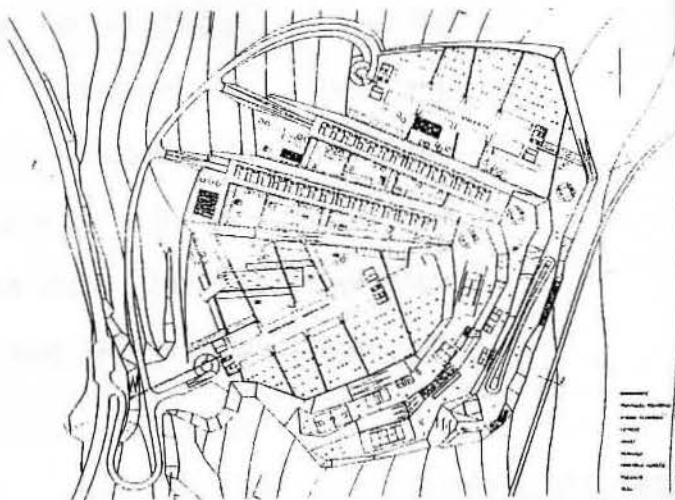
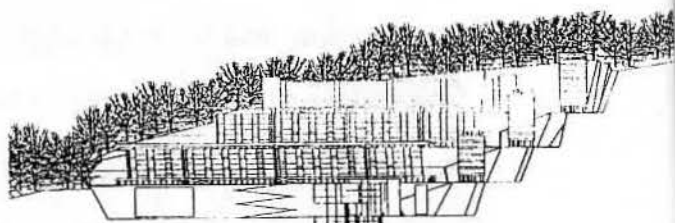
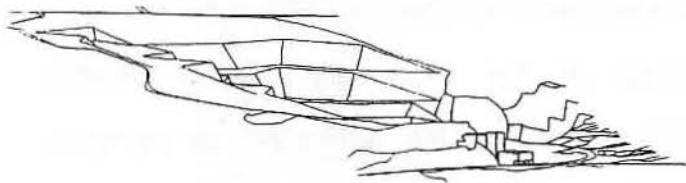
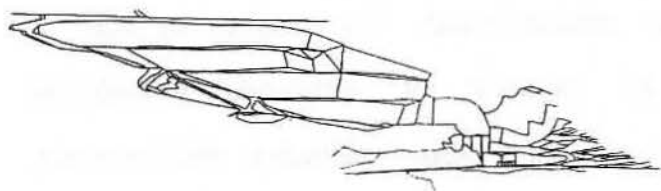
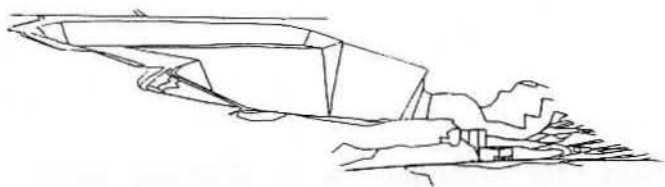


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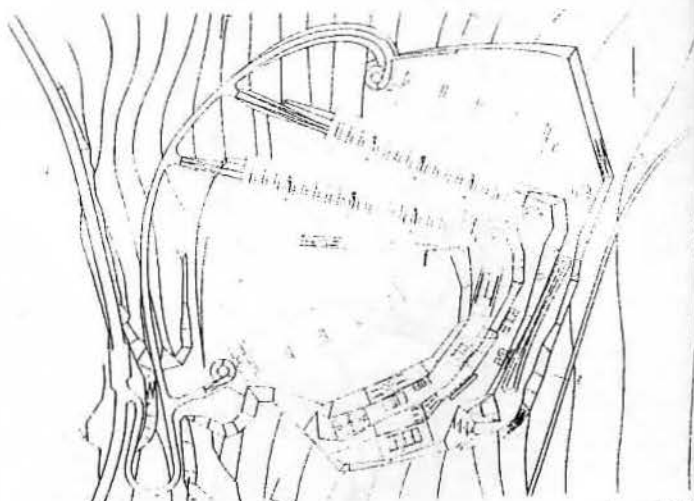
Max Fabiani, UPR regulation plans for Prvačina, Renče, Ajdovščina, Vipava and Solkan, 1917-1922.



The second and more contemporary example is a diploma work dealing with the hypothetical development in a stone-quarry Črni kal after the extraction had been discontinued. The project intends to emphasise the possibilities of sanation of numerous abandoned quarries in the Karst region by creating new, alternative environments. A study of the restoration plan has been prepared in advance, suggesting the optimal way of extraction in order to shaped the final structure of slope with reference to the secondary use of derelict quarry. In this quarry - which is situated on the attractive site as other quarries and has easy access - a modern high-tech centre for research, development, production and promotional activities has been designed. The residential part of the centre contains terrace apartments with patios on particular floors and an internal landscape. All circuits in the centre are arranged in closed circles; a wastewatertreatment plant and a basin for regulating micro climate in the amphitheatre of the quarry have also been envisaged.



Legend:
 Building
 Wall
 Road
 River
 Green space
 Other



Legend:
 Building
 Wall
 Road
 River
 Green space
 Other

High-tech Center in the Črni kal stone-quarry after exploitation, diploma work, 1996.