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Spatial organization of Russian cities. Underground development

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Abstract

Spatial development of the largest Russian cities requires development of the basic principles of their spatial organization, including huge development potential of underground spaces. This study uses Moscow as an example to examine some principles of space organization of the largest Russian cities and improvement of their structure, which must take into account the underground development as one of the most important resources.

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1. Introduction

Generation of a city development strategy and its spatial organization requires constant thorough studies and consideration, especially in view of underground development. Spatial development of any large city, much less one of the largest agglomerations in the world, Moscow, requires development of the basic principles of its spatial organization, including huge development potential of underground spaces.

Development of underground spaces will give an opportunity to form a well-developed system of pedestrian areas and transport hubs, urban community centers and multipurpose public areas, will ensure maximum availability of service facilities. It is necessary and possible to place the facilities for temporary and permanent storage of vehicles underground when conducting complex reconstruction of existing residential development, production and

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warehouse facilities, and engineering structures. This requires intensification of use of city mains and conservable industrial areas, introduction of new lines of high-speed off-street public transport, power plants, transformer plants, and distribution substations.

Integrated use of underground spaces can be achieved through creation of large underground infrastructures and underground facilities. For example, the measures for utilization of the largest Russian cities' underground space capacities could include formation of underground social infrastructure systems as part of multipurpose community centers with development of underground public complexes.

Development of residential areas must also be carried out with development of underground space to its greatest extent. In particular, the garage construction can be incorporated into the system of underground facilities under buildings and the existing road network. The complexity of use of underground facilities is what is important here: besides parking lots,underground infrastructure may include gym and entertainment halls, theaters, retail facilities, car-care centres. Some part of the road network for cars and public transport can also be taken out underground. This will ensure maximum safety of people and will greatly improve environmental situation in residential areas. Retail enterprises' warehouses, public service and catering establishments, and utility infrastructure such as transformer plants, objects of consolidated collection and disposal of garbage, etc. may be placed underground. Due to the placement of a number of utilities under the ground, the above-ground will become available for arrangement of green spaces, parks, and public gardens.

2. Principles of Spatial Organization of Russian Cities (Case Study: Moscow)

Many cities in the world, along with Moscow, have a monocentric structure. All monocentric cities have similar problems: the quality of life in their centers diminishes with time due to excessive traffic load. Basic parameters of a monocentric city, as well as density of its underground development, increase as one approaches the center. Many cities of the world, including Moscow, have adopted the polycentric development strategy.

Let's use Moscow as an example to examine some principles of space organization of the largest Russian cities and improvement of their structure, which must take into account the underground development as one of the most important resources.

2.1. "Compact City"

The concept of 'compact city' is one of higher priority for many countries. High concentration of population and infrastructure in the compact city allows to achieve the highest economic efficiency per urban unit (Rosdorff et al, 1994). The "compact city paradox" (Breheny, 1993) means that the compact city contributes to preservation of the environment as a whole, and that the more developed is the city's underground, the higher is its environmental quality and the more space is available for green and pedestrian areas.

Compact City development trend requires reconsideration of development concepts of its various infrastructures-first and foremost, the transport infrastructure development concept, which should be based on reduction of the amount of road transport and replacing it with off-street, rail, and underground transport.

There have been several urban strategic decisions made recently in the development of Moscow that will have negative impact on implementation of this concept in the near future:

- Unjustified and unwarranted administrative decision to expand the city boundaries by more than twofold;
- Continuation of the intensive housing construction within both the old city limits and the conjoint areas;
- Continuation of the branch-wise approach to formation of transport and engineering infrastructures;

In order to implement the concept of 'compact city', it is necessary to draft a comprehensive plan of structural reorganization of the city in order to optimize its territory, including development of the underground space, and stages of implementation of this plan, the slogan of which must be "comprehensiveness".

2.2. "Dispersed City"

This concept shall be based on awareness of the value of city spaces in all their complexity, uniqueness, and diversity. There are considerable changes occuring in the city's spatial characteristics during the city development. It

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