

ECOLOGICAL AND ECONOMIC FACTORS OF PLACING PUBLIC BUILDINGS IN THE UNDERGROUND SPACE OF THE CITY

Вінницький національний технічний університет

Анотація

В статті розглядається еколого-економічні чинники розміщення громадських будівель у підземному просторі міста. Розглянуто міста-мегаполіси та їхній відсоток, що показує, що засвоєння підземних міст. Розглянуто проблеми, щодо розміщення міст у підземному просторі. Наведено розподіл іноземних споруд за сучасними містобудівними концепціями. Розглянуто комплексне використання підземного простору. Зображено схеми житлових, громадських і виробничих будівель. Приведений іноземний досвід у Японії будівель-комплексів.

Ключові слова: підземний простір міста, архітектура, громадські будівлі, економічність, екологічність.

Abstract

In the article the ecological and economic factors in the allocation of public buildings the underground space of the city is given. Megacities and their deal, showing the assimilation underground cities are considered. The problems regarding the placement of cities in the underground space, allocation of foreign facilities with modern town planning concepts , integrated use of underground space are investigated A diagram of residential, public and industrial buildings as well as Japanese experience in building complexes are described in the article.

Key words: underground space of the city, architecture, public buildings, economy, ecology.

Nowadays, there is a growing need for territory in cities, so architects are finding ways to take up space underground, which has a significant impact on the economy and environmental friendliness of the city. Increasing volumes of housing and communal construction, further development of transport networks, construction of new engineering objects and structures, industrial enterprises, etc. require the allocation of large urban areas, the deficit of which, especially in the central areas of cities is increasing every year. At the same time, in large cities there is an increasing lack of land for the development of new squares and parks, the creation of pedestrian zones, sports grounds, etc. [1]. The development of large metropolitan cities at present, with dense urban development and acute scarcity of free areas for construction, is impossible without the development of underground space. Foreign experience shows that in order to ensure a stable balance and comfortable living in a metropolis, the proportion of underground structures from the total area of the introduced objects should be 20-25%. Today in Moscow this figure does not exceed 8%, in Kiev no more than 6%, even less in other CIS cities [2]. In large cities of Japan, China, England, Italy, France, Sweden, Norway, the USA and other countries, underground space is intensively developing and considerable experience has already been gained in constructing underground facilities.

For example, several urban agglomeration projects have been developed in Japan. One of the Toda Underground Beautiful Environment consists of dispersed eighty-storey underground complexes, buried 50 m deep and connected by a tunnel containing: reservoir, cultural and sports territory, recreational space, engineering communications, subway lines [3]]. Currently, increasing attention in planning and construction of large cities and metropolitan areas is being given to complex development and use of underground space, which allows to influence the

urban environment, rational use of the territory, development of urban transport and engineering systems, residential and non-residential buildings and other elements. modern urban economy [2].

The complex problems of cities at the present stage can be solved by creating multilevel and multifunctional objects with maximum vertical development, with integrated use of underground space in accordance with the master plan of city development. At the same time, a change is being made to the overall strategy of urban planning: to replace the centralized scheme with the highest density in the city center, the bulk of multi-storey land-based construction is proposed to be dispersed in the suburbs. This will preserve the central area with dense landscaping and developed underground infrastructure for transport and service purposes as cultural and historical. With this concept of construction, the problem of a systematic approach to the development of underground space at a depth of 50-100 m becomes especially urgent. Modern city planning concepts provide for the distribution of all urban underground structures on four levels of depth: - the first level (located at the maximum possible depth): engineering communications, operated without constant human presence; - second level: enterprises of industry and energy with constant presence of a limited number of qualified personnel; - the third level: transport tunnels, garages and parking lots, utility rooms, unloading yards, office communications, etc. structures used briefly by an unlimited number of people; - fourth level (pre-surface): pedestrian zones, shops, cultural and leisure centers and other enterprises of retail and public services, constantly exploited and visited by an unlimited number of people. Integrated use of underground space allows to concentrate public services in places where there are not enough sites for construction of new ground complexes and where it is necessary to minimize all transitions, replace long horizontal connections with shorter vertical ones. Accordingly, the underground space should be designed to accommodate transport systems, auxiliary premises, warehouses, part of industrial and service enterprises, while the living surface is intended for the life and rest of citizens.

Often the basis of the underground infrastructure of the modern city is the transport network, and, first of all, the subway system, which is connected to all areas of the city, stops of all types of urban and suburban land transport, recreation areas and cultural and public services. Underground objects of various purpose can be placed: along the subway lines - above and below the tunnels and next to them, in the underground and ground lobbies of stations and interchanges, or in the composition of multilevel underground complexes [3]. Ecological and economic factors in the placement of public buildings: - Urban shortage; Co High cost of the territory; Saving the territory; - Resource and heat saving; - Isolation of pedestrians from noise and polluted air; - Use of ecological materials (precast, precast monolithic or monolithic reinforced concrete); - Economical of the material, because the thickness of the outer walls is not required, as for above-ground buildings or the thickness of the insulation layer on the floor; - Increased heat protection due to soil collapse.

REFERENCES

1. Цимбал С. Й. Підземне будівництво: навч. посібник / С. Й. Цимбал. – Київ, 2004. – 147 с.
2. Ремонт своїми руками [Електронний ресурс]/ Комплексне використання підземного простору // Режим доступу: http://allofremont.com.ua/kompleksnoe_iskpolzovanie_podzemnogo_prostranstva_50
3. MGP_Shapoval_and_Ko_r10.pdf [Електронний ресурс]/ Підземні споруди // Режим доступу: http://ir.nmu.org.ua/xmlui/bitstream/handle/123456789/146421/MGP_Shapoval_and_Ko_r10.pdf?sequence=11&isAllowed=y
Козак Вадим Юрійович – аспірант кафедри БМГА, Факультет будівництва, теплоенергетики та газопостачання, Вінницького національного технічного університету, м. Вінниця. e-mail: kozak.v1995@gmail.com
Науковий керівник: Степанова Ірина Сергіївна — кандидат філологічних наук, доцент, завідувач кафедри іноземних мов, Вінницький національний технічний університет, Вінниця, e-mail: Stepanova.fld@gmail.com
Vadim Kozak - Postgraduate student, Faculty building, power engineering and gas supply, Vinnytsia National Technical University. Vinnitsa, e-mail: kozak.v1995@gmail.com
Supervisor: Iryna Stepanova — Candidate of Philology, associate Profesor, Head of the Department of Foreign Languages, Vinnytsia National Technical University, e-mail: Stepanova.fld@gmail.com