

PROBLEMS AND PROSPECTS FOR THE DEVELOPMENT OF LOW-RISE BLOCK HOUSING IN MODERN CITIES

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Abstract. The article discusses low-rise residential development in the modern urban environment. Problems related to the formation of new districts are particularly relevant for Ukraine, as these are mainly high-rise buildings, which have a negative impact on both the environment and the mental and emotional state of residents. Another important problem is the progressive growth of energy consumption and prices for hydrocarbon raw materials, which make it a priority to conduct research aimed at solving problems related to the formation of sustainable residential development. The design of buildings and structures must be carried out with priority concern for people and harmony with nature, which requires a change in the mindset of urban planners, architects, designers, engineers, and other specialists. Low-rise buildings and developments that are specifically designed and built with environmental requirements in mind cause significantly less damage to the environment and, indirectly, to each individual. Low-rise buildings should be designed to be life-sustaining, comfortable, and associated with improving quality of life, conserving natural resources, and using innovative technologies. Small eco-friendly cities and settlements should transition to self-regulating systems, i.e., adopt circular metabolic cycles that ensure the continued viability of the environment.

Based on an analysis of global experience, the main techniques for the structural organization of low-rise buildings are considered. The direction of structural organization known as «green urbanism» has not been properly developed in urban planning practice in Ukraine. In European countries, the principles of ecological urbanism have recently gained increasing recognition. For Ukraine, such urban planning systems could help overcome the crisis in the energy sector, as green urbanism involves the use of renewable energy sources.

Keywords: low-rise buildings, residential buildings, comfortable urban environment.

Introduction. The relevance of the study is determined by the need to develop scientifically sound approaches to the planning, design, and management of low-rise block complexes as a tool for the sustainable development of urban areas. Given global trends toward decentralization, digitalization of city management, and rising environmental standards, this form of development could become the basis for a new type of urban settlement – one that is energy efficient, socially cohesive, and harmoniously integrated into the natural environment.

Modern cities are undergoing a rethinking of approaches to housing construction. In the context of the growth of urbanized areas, the reduction of vacant land within cities, and the need to improve the quality of the living environment, the search for balanced forms of residential development is becoming increasingly relevant. One promising form that can combine economic feasibility, environmental sustainability, and social comfort is low-rise block housing.

Over the past decades, many countries around the world have seen a shift in housing policy priorities – from mass high-rise construction to the development of medium- and low-rise structures that create a comfortable living environment for different social groups. This process is linked to the desire to reduce population density in certain areas, ensure environmental balance, reduce energy consumption, and improve microclimatic conditions.

In Ukraine, low-rise block development has not yet become widespread, although it has significant potential for development in both peripheral and inner-city areas. On the one hand, such facilities provide relatively high land use density and optimal conditions for the formation of local communities. On the other hand, the lack of an adequate regulatory framework, standard project documentation, and a systematic approach to engineering and social support creates numerous obstacles to the implementation of this form of housing.

In the context of modern urbanism, low-rise block housing is an important element of the transition to a «human-centered city model», where the main focus is on comfortable living, environmental safety, and the accessibility of services and public spaces. It forms a new architectural typology that combines the advantages of urban and suburban environments, creating synergy between the individuality of private space and the collectivity of urban life.

Analysis of recent studies and publications. The theoretical and informational basis for this study was provided by various literary sources, scientific works, and publications by prominent scholars in various fields of knowledge, which were grouped by topic: issues in the field of modeling and managing the development of urban planning systems – E.P. Grigorieva, D.N. Yablonsky, G.A. Zablotsky, G.Y. Filvarov, M.M. Dyomin, G.I. Lavrik, A.M. Rudnitsky, Yu.P. Bocharov; in the field of structural and functional analysis of urban planning systems – V.L. Glazyrin, V.L. Glazichev, A.E. Gutnov, V.A. Pliner, Yu.M. Shkodovsky, V.P. Urenov; research on low-rise residential development – works by T.V. Kosmina, V.A. Nikolaenko, E.B. Stadnik, N.M. Trubnikova,

The works of foreign researchers K. Lynch, J. Forrester, F. Franke, I. Vladimirov, T. Kabus, and others are of considerable interest for studying this problem.

Statement of the objective. The purpose of the article is to comprehensively analyze the problems and prospects of low-rise block housing development in modern cities, as well as to identify ways to integrate it into the system of sustainable urban development.

The research methodology is based on the analysis and generalization of literary sources, scientific publications, Internet resources, project materials, regulatory documents, and standards; the results of scientific research published in open print; conducting field surveys of low-rise buildings and the methodology for preliminary design of architectural and planning solutions for low-rise residential buildings.

Main material and results. Low-rise buildings are not only a functional solution for housing the population, but also a sociocultural phenomenon. They form a special image of the urban environment, where space is organized in a more individualized and less anonymous way than in high-rise areas. Their social role is manifested in the creation of a comfortable environment for different categories of the population: families with children, young married couples, and elderly people who value peace and comfort. Such areas often have closer social ties, as residents interact directly with each other, creating a sense of local community. The economic importance of low-rise development lies in stimulating the development of local labor markets in the areas of construction, repair, improvement, and housing maintenance. In addition, the private sector often contributes to the development of small businesses, from coffee shops to service workshops. In spatial terms, low-rise areas serve as a kind of “buffer zone” between high-rise central buildings and suburban settlements. They help to reduce the contrast between high-rise buildings and the natural environment.

Low-rise housing includes apartment buildings, townhouses, duplexes, and cottages, most of which are no more than 2-3 stories high. A distinctive feature of such buildings is the absence of elevators and central garbage chutes. These are houses with simplified engineering infrastructure.

The emergence of such a form of settlement as a city led to environmental consequences of human society's activities that had to be taken into account. In addition, at each stage of urban development, various problems arose and solutions were found, which became the basis for the emergence of environmental and urban planning knowledge. This knowledge was applied in the process of urban planning in the past and will be used in the further development of cities [1].

The industrial and scientific and technological revolutions contributed to an increase in the rate of global population growth. Over the past century and a half, the population of our planet has increased sixfold and reached more than 7 billion people in 2021 [2]. Currently, the population of the Earth is 7.9 billion people.

The problem of low-rise construction development is closely linked to the tasks of locating residential areas and settlements, forming settlements while taking into account the needs of the population and creating a comfortable living environment.

In economically developed countries, most of the population of urban agglomerations lives outside their central core: in New York, 70%; in Boston, 80%; in Canada, block houses account for 65% of the housing stock. They are characterized by a large area of low-rise housing compared to apartments in high-rise buildings (Fig. 1).



Fig. 1. Block development «Basecamp Housing». Oregon, USA. Architectural studio: Hacker Architects.

The population of Ukraine is 41 million 284 thousand people [3]. In Ukraine, 67.2% of the population lives in cities, while the global average is 50%. The demographic crisis of the 21st century will be reflected in two opposing trends. In some countries and civilizations, the crisis of overpopulation will continue, associated with the growth of the demographic burden on nature and the economy, with the problem of employment and poverty. In other countries, there will be a crisis of depopulation, which will cause a deterioration in the age structure of the population. One of the important aspects aimed at solving this problem is improving the quality of the living environment the comprehensive formation of the architectural and planning organization of low-rise urban settlements with modern social, engineering, and transport infrastructure.

Historically, low-rise block development originated in Europe in the 18th–19th centuries, when rapid urbanization led to the formation of terraced houses in London, Paris, and Amsterdam. In the 20th century, this type of housing developed into townhouses and sectional houses, which combined privacy and urban convenience.

In Ukraine, similar developments appeared in the 1920s and 1930s in the form of workers' settlements and urban-type villages (for example, in Kharkiv, Kyiv, and Odesa), but the systematic development of this trend was interrupted by the Soviet policy of unified mass construction.

The current stage of the revival of block housing in Ukraine began after the 2000s, when private developers focused on the middle class and new standards of comfort appeared on the market.

A concrete solution to the problem could be the promotion of block housing. Low-rise block housing is a form of residential architecture in which individual housing units (blocks) are arranged in a linear fashion or in groups, sharing walls but having separate entrances, engineering systems, and adjacent land plots. It combines the features of individual housing (privacy, private land, autonomy) and multi-family housing (compactness, resource efficiency, rational use of land).

From a theoretical point of view, low-rise block development is an intermediate link in the evolution of housing types between sparse estate development and dense multi-story neighborhoods. This format corresponds to the ideas of a «compact city», «new urbanism», and «sustainable urbanization», as it contributes to the formation of an environment with a high level of pedestrian accessibility, local social connections, and a low carbon footprint (Fig. 2).



Fig. 2. Variants of blocking houses. Student works, supervisor Kyselov V.M.

The variety of ways to locate low-rise buildings can be differentiated depending on the transport and time distance from the city or center of large cities to the outer boundaries of their zones of influence. According to this typology, the placement of such buildings can be averaged in the following cases:

1. Within the city (or city center for large cities) – in the central and middle parts of the city; in the peripheral zone of residential areas.
2. Outside the city in the near (5-10 km), middle (10-30 km), and far suburbs (30 km and more).
3. Inter-settlement areas, including rural settlements.

The formation of a low-rise block development environment can be characterized by the following principles:

1. The principle of adaptability: the ability to change the structure of residential blocks during operation – additions, transformation of interior spaces.
2. The principle of spatial integration: the interpenetration of private and public spaces through courtyards, passageways, and internal streets.
3. The principle of landscape interaction: the use of natural relief, the preservation of existing vegetation, and the formation of water elements.
4. The principle of social inclusion: creating conditions for different socio-demographic groups to live together.
5. The principle of environmental efficiency: energy efficiency, use of local materials, bioclimatic solutions.

Of all the various possibilities for the location of low-rise block development in agglomerations, the best option for the first two options is considered to be the concentrated formation of settlements as opposed to dispersed ones. This is due to the following urban planning characteristics: population concentration is closely linked to the parallel revitalization of employment locations, creates the conditions for the development of social infrastructure, increases the efficiency of public transport and engineering equipment systems, and promotes the development of recreational functions. For inter-settlement territories and rural settlements, a dispersed structure is the most rational [5].

Low-rise development in modern cities is one of the promising directions for the development of the urban environment, capable of ensuring comfort, environmental friendliness, and a high quality of life. It contributes to the formation of local communities, the development of individual housing, and the strengthening of social ties between residents.

At the same time, its development is hampered by a number of problems, ranging from a lack of land resources and high infrastructure costs to transport isolation and environmental challenges.

Overcoming these difficulties is only possible with a comprehensive approach that combines architectural and planning innovations, urban concepts, and socio-economic mechanisms.

The prospects for low-rise development lie in its integration into a unified urban structure, harmonious combination with the natural environment, and orientation towards the principles of sustainable development. It is this approach that can provide cities with a new quality of living space and create a comfortable environment for future generations.

Depending on the spatial organization and functional characteristics, the following main types of low-rise block development can be distinguished:

1. Linear (row) development – a sequence of residential blocks with their own entrances from the street and small plots at the rear. Characteristic of dense urban areas.

Advantages of this type of development: clear street structure, economical use of land.

Disadvantages of this type of development: limited access to sunlight in interior spaces.

2. Cluster development – grouping of blocks around a common interior space (courtyard, pedestrian area).

Advantages of this type of development: promotes social interaction among residents.

Disadvantages of this type of development: requires careful planning of common areas and communications.

3. Terrace development – blocks are arranged in tiers with usable roofs that serve as terraces for the upper levels.

Advantages of this type of development: effective use of the terrain, possibility of panoramic views.

Disadvantages of this type of development: complexity of engineering solutions.

4. Combined development – a combination of row and group elements of different heights, creating a mixed morphology of the neighborhood.

Advantages of this type of development: diversifies the spatial structure, allows for the integration of service functions.

Disadvantages of this type of development: complexity of managing shared spaces.

The typological parameters of low-rise residential buildings are not only architectural and planning characteristics, but also socio-spatial indicators: the number of residents per hectare, the ratio of private and common areas, the level of transport accessibility, and the availability of public spaces.

Based on the study of the experience of designing low-rise residential buildings used in domestic and foreign practice, the systematization of planning techniques for such buildings is considered, according to which the main techniques of structural organization of low-rise development can be identified:

- regular development. Development with different types of buildings (detached houses with land plots, block, sectional, or combined houses), including neighborhood development;

- historical copying. New development replicates historical development in a modern interpretation and creates a comfortable urban environment with pedestrian access to social infrastructure facilities and without zoning of territories. Development is usually formed by low-rise townhouses or mid-rise apartment buildings.

- landscape urbanism is a direction that combines a huge number of diverse projects (landscape and park, historical, ethnic, literary, and others). These projects are characterized by the creation of a comfortable living environment, landscape design, the use of characteristic historical, ethnic, literary, and other features of a given place in the development of the project concept, or their transfer from other places to this complex.

- open planning is the most characteristic trend in multi-storey construction during the Soviet period. Such construction forms the basis of the planning organization of micro districts. This type of planning is sometimes used in low-rise construction.

- an ecological approach («green urbanism») is a modern trend in global urban planning practice, which concerns overcoming the problem of creating life-supporting (ecologically safe) buildings, in particular energy-efficient, resource-saving, and low-waste buildings. These are eco-cities, eco-complexes, and eco-districts of low-rise buildings with specific planning.

Of these trends, the ecological trend (green urbanism) can be considered new for urban planning in Ukraine. This trend has not been properly developed in our urban planning practice. In European countries, the principles of ecological urbanism have recently been gaining increasing recognition. For Ukraine, such urban planning systems could help overcome the crisis in the energy sector, as «green urbanism» involves the use of renewable energy sources.

Conclusions. Low-rise block housing is one of the most promising forms of organizing the living environment in modern cities, combining the principles of sustainable development, social integration, and architectural and aesthetic harmony. An analysis of the current state of urban development shows that high-density multi-story buildings, which dominated throughout the 20th century, are gradually exhausting their potential as a housing model that meets modern ecological, social, and psychological human needs. Instead, low-rise residential complexes are capable of providing a more balanced living space – comfortable, energy-efficient, flexible, and people-oriented.

Low-rise block housing is distinguished by combining the advantages of individual housing (privacy, private outdoor space, individual character) with urban advantages (accessibility of services, transport integration, communal efficiency). It forms a new morphology of urban space — human-centered, fragmentary-flexible, and socially oriented. From the point of view of architectural theory, low-rise block housing is not only a type of development, but also a model of living environment that allows for the creation of high-quality spatial relationships between private, semi-public, and public areas.

At the same time, the study revealed a number of systemic problems that hinder the development of this form in modern Ukrainian cities.

First, the regulatory framework has not yet been adapted to the needs of block development. Existing state building codes are largely oriented toward detached or multi-story development, which creates difficulties in coordinating density indicators, street parameters, distances between buildings, and landscaping requirements.

Second, economic barriers – the lack of specialized financial instruments for developers and the underdevelopment of cooperative forms of ownership and maintenance of common spaces – significantly hinder the spread of low-rise block development.

Thirdly, urban and social challenges lie in the insufficient understanding of the advantages of this model among both designers and housing consumers. The mass consciousness is still dominated by the idea of comfortable housing as a detached house or a high-rise apartment building, which reduces the demand for intermediate forms.

Infrastructure integration is also a significant challenge. Low-rise block housing requires a balanced system of engineering, transport, and social connections. If such developments are implemented without prior analysis of transport load, accessibility of public services, and provision of green spaces, they may lose their advantages and become isolated residential enclaves. That is why its development must be based on the principle of integrated spatial planning, which involves combining housing with recreational, commercial, and cultural functions.

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ПРОБЛЕМИ ТА ПЕРСПЕКТИВИ РОЗВИТКУ МАЛОПОВЕРХОВОЇ БЛОКОВАНОЇ ЖИТЛОВОЇ ЗБУДОВИ В СУЧASNIX MISTAX

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Одеська державна академія будівництва та архітектури

Анотація. Стаття присвячена комплексному аналізу проблем та перспектив розвитку малоповерхової житлової забудови в умовах сучасного міста. Актуальність дослідження зумовлена зростанням населення та погіршенням урбаністичної та екологічної ситуації, особливо в Україні, де нові райони здебільшого представлені багатоповерховими будинками. Такий формат негативно впливає на навколишнє середовище та психоемоційний стан мешканців. У статті доводиться, що малоповерхова забудова займає особливе місце у структурі міського середовища, оскільки поєднує приватність та індивідуальність житла з міським комфортом та доступом до розвиненої інфраструктури. Вона формує інший масштаб міста – більш зрозумілий та дружній людині.

У роботі висвітлено соціокультурні, економічні, просторові та екологічні функції малоповерхових кварталів. Підкреслено їхню роль у створенні комфортного середовища для різних груп населення, зміцненні локальних спільнот та стимулуванні розвитку малого бізнесу. Автор аналізує особливості розміщення малоповерхових житлових масивів у межах міста та приміських територій, розглядають типологію планувальних прийомів (регулярна забудова, історичне копіювання, ландшафтний урбанізм, відкрите планування, екологічний підхід). Окрема увага приділяється новим тенденціям світового містобудування, зокрема «зеленому урбанізму», що набуває поширення у Європі, але ще недостатньо застосовується в українській практиці. Визначено ключові проблеми розвитку малоповерхового житла: дефіцит земельних ресурсів, висока вартість інфраструктури, транспортна залежність, екологічні виклики. Водночас підкреслюються перспективи інтеграції цього формату в єдину міську структуру, його поєднання з природним середовищем та орієнтація на принципи сталого розвитку. Зроблено висновок, що лише комплексний підхід, який включає архітектурно-планувальні інновації та соціально-економічні механізми, здатний забезпечити ефективне формування якісного життєвого простору.

Ключові слова: малоповерхові будинки, житлові будинки, комфорктне міське середовище.

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