Urban block as an effective tool for creating an environmentally comfortable environment

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Abstract. Modern urban planning sets itself the task of creating sustainable urban environments that would provide comfortable living and work for the population, while not harming the environment. In this regard, green construction has become one of the most relevant areas in urban planning. Green construction is a construction concept that takes into account environmental aspects and is aimed at creating environmentally friendly and energy-efficient buildings and infrastructure. Green construction includes the use of environmentally friendly materials and technologies, improving the energy efficiency of buildings and infrastructure, as well as the creation of green areas in the city. With the rapid growth of cities and an increase in the number of people, the problem of preserving ecological cleanliness and sustainability of the urban environment is becoming more and more urgent. Environmental problems of cities, such as air, land and water pollution, noise and vibrations, lead to deterioration of public health and negative impact on the environment. In this regard, there is a need for new approaches to urban planning that would take into account environmental aspects. In Russia, as in many other countries of the world, there is a need to create sustainable urban environments. One of the ways to create such an environment is to use urban blocks. Urban blocks are a modern approach to the construction of the urban environment, which allows you to create compact blocks that include residential buildings and infrastructure facilities. They allow for more efficient use of urban space and create comfortable conditions for the life and work of the population. In this article we will look at the practice of using urban blocks in construction, how they differ from other forms of urban development and what advantages they provide for residents and urban infrastructure in general. Keywords: green construction, sustainable urban environment, urban block, urban development, comfortable environment.

1 Introduction

In the modern world, green construction is considered as an approach to construction that takes into account the impact on the environment, human health and economic efficiency. Modern methods of green construction include the use of environmentally friendly materials, the efficient use of energy and water, the use of renewable energy sources, the elimination of waste and the creation of healthy living and working conditions in Figure 1.

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The use of environmentally friendly materials. It includes the use of fewer petroleum products, such as plastics, artificial dyes and glue, as well as the use of natural materials, such as wood, stone and ceramics [1-2]. In addition, the use of recycled materials such as glass and metal is also an important component of green construction.

2. Efficient use of energy and water. It includes the use of efficient heating, ventilation and air conditioning systems, the installation of energy-saving LED lamps and the use of water collection and recycling systems [3].

3. Use of renewable energy sources. It includes the use of solar and wind energy, geothermal energy and other energy sources that can be used without a negative impact on the environment.

4. Waste disposal. This includes the use of recycled materials, the installation of waste collection and recycling systems, and the use of design strategies that reduce the amount of waste generated during construction [4-5].

5. Creating healthy living and working conditions. It includes the installation of air purification systems, the use of natural lighting and the creation of green areas inside buildings. Such zones contribute to improving air quality and creating comfortable conditions for work and recreation.

Nowadays, more and more people pay attention to environmental problems and become supporters of a green lifestyle. This leads to the fact that in construction more and more attention is paid to the use of environmentally friendly materials and technologies [6-7]. One of the promising directions in green construction is the use of urban blocks.

2 Materials and methods

The theoretical and methodological basis of the study was the work of leading scientists, the fundamental provisions of economic theory, a systematic approach and a comprehensive analysis. The methods of work were logical analysis and synthesis, classification and algorithmization of data. The information base for the research was the data of domestic and foreign literature, the electronic information system of the Internet, official and scientific-analytical materials.

Let's take a closer look at the use of urban blocks in green construction.

An urban block is a closed block formed by buildings and bounded by streets or other boundaries, such as rivers or parks. Urban blocks usually have a rectangular or square shape and can be of various sizes. An urban block can be created on an existing city territory or on a new piece of land [8]. The urban block can be built as a whole and is designed for comfortable living and work of people.

One of the main features of urban blocks is their closeness. Thanks to this enclosed space, urban blocks create a cozy and comfortable atmosphere for residents and visitors of the city.
In addition, urban blocks allow you to better organize urban infrastructure, such as roads, parking lots, green areas and other facilities [9-11].

Another feature of urban blocks is their versatility (Figure 2). Residential and commercial buildings, offices, shops, restaurants, cafes, parks and other objects can be located inside the urban block. This makes it possible to create a multidisciplinary urban center where people can live, work and relax [12-13].

Urban blocks are associated with green construction by the fact that they are created taking into account the principles of environmental safety and the use of environmentally friendly materials and technologies [14]. That is, they allow you to create a sustainable urban environment that takes into account environmental aspects. The creation of urban blocks contributes to the preservation of green areas in the city, which reduces air and water pollution, as well as creates a favorable atmosphere for recreation and work. Due to the compactness of urban blocks, it is possible to reduce the traffic flow inside the city, which leads to a reduction in emissions of harmful substances and a reduction in noise and vibration [15-17].

The characteristics of the urban block include the following parameters (Figure 3) [18-19]:

1. Compactness. The urban block occupies a limited territory and combines all the objects necessary for life.
2. Functionality. The urban block is designed for residential, commercial and office activities, as well as for the placement of social infrastructure facilities.
3. Environmental friendliness. The urban block provides for the creation of green zones and parks, which contributes to the improvement of the ecological situation in the city.
4. Security. The urban block ensures the safety of residents and visitors due to the presence of a video surveillance system and modern technologies.
5. Convenience. The urban block is designed for comfortable living and work of people, so it provides all the necessary conditions for convenience and comfort.
6. Aesthetics. The urban block is built taking into account modern design and architecture.
trends, which makes it aesthetically attractive.

In general, urban block is a modern and innovative approach to urban planning, which allows you to create a comfortable and safe environment for people to live and work.

3 Results

The introduction of urban blocks into the construction industry is a complex and multifaceted process that requires coordination of the interests of various parties. Despite the many advantages, such as compactness, functionality, environmental friendliness, safety, convenience and aesthetics, urban blocks also face a number of problems that make it difficult to implement them in the construction industry.

One of the main problems is the high cost of building urban blocks [20]. In order to create a comprehensive urban development, it is necessary to invest significant funds in the construction of residential, commercial and office buildings, social infrastructure facilities and green areas. In addition, urban blocks are often built in the central areas of the city, where land has a high cost [21]. All this makes urban blocks inaccessible to most citizens, which makes it difficult to introduce them into the construction industry.

Another problem is the lack of a unified concept and standards for the construction of urban blocks. Currently, there is no uniform methodology and standards for the design and construction of urban blocks, which leads to the fact that each project is built in its own way. This makes it difficult to coordinate the interests of different parties and create a unified concept for the development of the urban area.

The lack of infrastructure for urban blocks is also a problem. Urban blocks involve the creation of an integrated infrastructure, including transport, energy, water supply and sewerage systems. However, in most cities there is no ready infrastructure for urban blocks, which makes it difficult to introduce them into the construction industry.

In addition, urban blocks face the problem of social adaptation. Urban blocks involve the creation of a new environment for people to live and work, which can cause social maladjustment and conflicts with already existing communities. In addition, urban blocks can lead to increased congestion of urban roads and parking problems.

To solve the problems of introducing urban blocks into the construction industry, it is necessary to develop a unified concept and standards for the design and construction of urban blocks, as well as to create a comprehensive infrastructure for their operation. In addition, it is necessary to take into account social aspects and include representatives of the public and already existing communities in the project development process.
Urban blocks have a direct connection with ecology, as they allow you to create a sustainable urban environment that takes into account environmental aspects. The creation of urban blocks contributes to the preservation of green areas in the city, which reduces air and water pollution, as well as creates a favorable atmosphere for recreation and work. Due to the compactness of urban blocks, it is possible to reduce the traffic flow inside the city, which leads to a reduction in emissions of harmful substances and a reduction in noise and vibration.

The scheme of implementation and implementation of urban blocks in construction can be presented in the following form (Figure 4):

1. Development of concepts and standards for the design and construction of urban blocks. This includes defining goals and objectives, choosing the optimal territory for construction, analyzing the market and the needs of the population, as well as developing project documentation.

2. Creation of an integrated infrastructure for urban blocks. This includes the creation of transport, energy, water supply and sewerage systems, as well as social infrastructure facilities and green areas.

3. Design and construction of urban blocks. At this stage, a comprehensive urban development is being created, including residential, commercial and office buildings, social infrastructure facilities and green areas.

4. Social adaptation and interaction with the community. At this stage, there is interaction with existing communities, taking into account their interests and needs, as well as creating conditions for the social adaptation of new residents and employees.

5. Operation and management of urban blocks. At this stage, urban blocks are operated and managed, including the management of utilities, maintenance of buildings and infrastructure facilities, as well as the management of social processes.

Each stage of the implementation and implementation of urban blocks in construction requires an integrated and coordinated approach, as well as taking into account the interests of various parties. Only in this case, urban blocks can become an effective tool for creating a comfortable and safe environment for people to live and work.

Thus, the implementation of urban blocks can be represented as follows, reflecting the main components and factors:

\[ \text{IP}_{UB} = \sum_{i=1}^{n} (F_{A_i} + F_{S_i} + F_{D_1} + F_{C_i} + F_{D_i} + F_{S_A_i} + F_{O_i}), \]

Where \( F_{A_i} \) – analysis of the market and the needs of the population,
\( F_{S_i} \) – selection of the optimal territory for construction,
F_{DV1} – development of project documentation,
F_{CI} – creation of a comprehensive infrastructure for urban blocks,
F_{DI} – design and construction of urban blocks,
F_{SA} – social adaptation and interaction with the community,
F_{OI} – operation and management of urban blocks.

By adapting the characteristics presented in the article above, it is possible to identify several advantages that make the construction of urban blocks relevant for modern cities:

1. Space saving: urban blocks allow you to use the limited space of cities more efficiently, which is especially important in megacities where land is a scarce resource.
2. Convenience: residents of urban blocks have access to all necessary services and amenities inside the building, which makes their life more comfortable and convenient.
3. Eco-friendly: urban blocks contribute to reducing car traffic, as residents can access most services on foot or by public transport. This reduces emissions of harmful substances into the atmosphere and reduces environmental pollution.
4. Economic efficiency: urban blocks allow you to reduce the cost of construction and maintenance of infrastructure, since all the necessary services and amenities are located in one place.
5. Social integration: urban blocks can contribute to the social integration of various groups of the population, as they combine housing, work and entertainment in one place.

4 Discussion

Thus, it can be noted that the use of urban blocks in green construction has a number of advantages:

Firstly, urban blocks allow for more efficient use of urban space. Due to the closeness of the urban block, it is possible to organize a unified systematic approach to the management and maintenance of communal infrastructure, which reduces the cost of its maintenance. This leads to energy savings, a reduction in emissions of pollutants into the atmosphere and water, as well as a reduction in traffic flow inside the urban block.

Secondly, urban blocks allow you to create green areas in the city. Inside the urban block, you can organize parks, squares, playgrounds, gardens and other green areas that will improve the ecological situation in the city. Green areas absorb carbon dioxide, reduce noise and vibrations, and create a favorable atmosphere for recreation and work.

Thirdly, the creation of urban blocks can be used to solve the problem of social housing. The creation of residential buildings inside the urban block allows solving the problem of housing shortage in cities, especially in megacities where housing prices are very high. Thanks to this, it is possible to provide affordable housing for the population and reduce social tension in cities.

5 Conclusions

Thus, the introduction of urban blocks in the construction industry is a complex and multifaceted process that requires the coordination of the interests of various parties and the solution of a number of problems. However, if the concept is properly developed and social, environmental and economic aspects are taken into account, urban blocks can become an effective tool for creating a comfortable environment for people. They also make it possible to better organize urban infrastructure and reduce the costs of its construction and maintenance.

The use of urban blocks in construction has great potential for solving environmental problems of cities. Urban blocks make it possible to use urban space more efficiently, create
green zones in the city and solve the problem of social housing. They contribute to the creation of a sustainable urban environment that takes into account environmental aspects and contributes to the preservation of the environment. The creation of urban blocks is an important element of urban planning and allows you to create a convenient and comfortable environment for people to live and work.

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