"Green architecture" in aspect of ecologization of buildings in the urban environment

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Abstract. The article is devoted to improving the environmental comfort of the living environment in a limited territorial resource. From the ecological point of view, the modern urban environment, represented mainly by multi-storey and high-rise high-density buildings is unfavorable in many factors. The article substantiates the need to take into account environmental parameters in the formation of buildings. As an alternative to the anthropogenic environment, the formation of a powerful system of gardening is proposed. As solving the problem, it discusses the measures on creation of system of planting, including on-site areas and building space. The insufficiency of the number of green areas in the urban environment was noted. The groups of factors causing the degradation of natural landscapes of urban environment are identified and determined. Alternatively, anthropogenic landscape in terms of the urban and suburbanite, discusses the formation of "green" buildings, as the totality of the architectural environment and landscaping. This creates a special environment aimed at the combined one-time use by several consumers. Landscaping of the building is considered at the level of integration of the plant with the structure of the building, forming a constant type of external and internal landscaping.

1. Introduction

Currently, there is an active development of cities. The process of urbanization is intrinsically linked to the standard of living of the population and takes place through the transformation of rural settlements into urban as well as the development of peri-urban areas. Scientific and technological progress, changes in social conditions of life, improving the quality of living conditions entail an increase in the urban population (according to Rosstat, the average population density among the subjects of Russia is 164.77 people/km2, for Moscow 4811, 78 people/km2). Urban lifestyle around the world today is becoming crucial. Already in a number of countries, urbanization is well above 50 per cent. While in Hong Kong (China) and Bermuda, the entire population lives in cities. In Russia, as of 2012, the urban population was 74%.

For comparison, according to the world Bank, as of 2012, the level of urbanization in Kuwait was 98.3%, in Japan -91.7%, in Australia – 89.3%, in France – 86.3%, in Brazil – 84, 9%, in the US – 82.6%, in the UK – 79.8%, in Germany – 74.1%, in Bulgaria – 73.6%, in Italy – 68.6%, in Austria – 67.9%, in Morocco – 57.4%, in China – 51.7%.

While actively formed the background of the modern archetype of the urban and suburbanisierung environment (Figure 1).
Figure 1. The archetype of modern development of the sub-urban environment (Moscow, urban fragments of existing buildings, stylistically characteristic of the vast majority of territories).

The modern urban environment is characterized by a set of negative factors [1]. Scientific and technological progress, changes in the social conditions of the population entail an increase in the number of urban population. This serves as a determinant of the urbanization of the environment. This, in turn, is accompanied by a deterioration in environmental performance.

A marked deterioration in the environmental characteristics of the urban environment is confirmed by the increase in morbidity, including irritability, aggression, increased psychosis, "chronic fatigue" syndrome, "Garden ring", hypertension, heart disease, asthma, exacerbation of chronic diseases. Today, almost 100% of children are born with various abnormalities.

The given data is the result of living in a highly aggressive ecologically unfavorable environment. Its formation is largely due to the lack of organization of recreational areas in an urban urban environment.
2. Subject, tasks and methods
The subject of the study is the influence of factors of the suburban environment on the formation of modern residential development in order to improve its quality and aesthetic characteristics. We are talking about the fact that the architecture has an impact on the elements of the environment, both at the stage of construction of the object, and in the process of its operation. The decisions taken (architectural, structural, engineering, technological) must meet the conditions of both social and natural environment. Providing a set of conditions to ensure the stability of the construction site. The stability of the construction site at the present stage should be provided by a set of natural, social, spiritual factors. This can be achieved by various architectural and engineering solutions. However, the implementation of the principle of sustainability requires a comprehensive system approach to design.

3. Results and Discussion
The quality of the environment is largely characterized by the presence of green spaces. In this regard, the need for additional sources of gardening should be considered in several aspects: environmental, recreational, environmental, psychological, decorative.

Active suburbanization of modern cities entails an objective need to change the structure, organization and form of the environment. First of all, such changes relate to the nature and principles of development: the increase in the area of construction of various functional purposes with significant restrictions of territorial resources, leads to an increase in the average number of floors against the background of compaction of construction. Such changes entail the reduction of green spaces in human settlements.

Greening of the territory is considered as one of the criteria for assessing the sustainability of the construction project. In fact, plants are the main and only alternative to the anthropogenic landscape of the environment, which is actively formed by modern architecture. The most significant method of rehabilitation of the environment seems to be the direction of phytoecological environment associated with the introduction of vegetation into the structure of the building.

Today, mass construction occupies more than 80% of the city area, about 16% of the city territory is the road network, and only 4% of the total area of the city is the share of green areas. Systemic degradation of natural landscapes of urban environment is determined by a combination of the following factors:

1. socio-economic
   • concentration of population in cities
   • increasing population density
   • increasing the intensity of the development of the turbo architecture
   • development of high-rise buildings
   • high density of land development
   • active road transport development
2. urbocological
   • chemical pollution
   • dust pollution
   • radioactive contamination
3. planning characterizes the formation of buildings along highways.
4. natural and technogenic
   • reduction of natural areas;
   • reducing the range of vegetation
   • reduced insulating functions of vegetation
   • formation of abiotic conditions

The lack of green areas is increasingly felt by the population in a limited temporary budget. Short-term rest (daily, weekly) is an important component of the recreation system. In fact, today a person is
deprived of recreational and leisure environment, which requires additional measures to ecologize the environment of his life (living and working environment) [2].

In the study of the problem was made a sample of 103 people of different age groups: children and adolescents 0-16 years; students of colleges, Universities 17-22 years; adult economically active population 23-55 years and the elderly from 56 years and more. As a result, it was found that more than 48% of respondents spend in green areas on average 0.5 hours a day, 44% of respondents – 1 hour, at the same time, the elderly population is deprived of such an opportunity due to the inaccessibility of urban recreational and leisure areas.

The current unfavorable urban-ecological situation is the problem of most megacities of the world [3, 4]. The most significant is the direction of phytoecological environment associated with the integration of vegetation into the structure of the building [5]. In fact, plants are the main and only alternative to the anthropogenic landscape of the environment, which is actively formed by modern architecture. In this regard, there was a direction of "green architecture", compensating for the lack of natural spaces [6].

Thus, the task of phytoecological environment is put in front of modern architecture and entails a change in architectural forms of buildings, the formation of new types of buildings, structures, and integration of vegetation in the structure of the building. "Green architecture" is becoming more and more widespread [7], forming a new type of green spaces integrated into the building – "green" buildings [8].

"Green" building as a type of green space solves several problems of modern urban environment:

- favorable impact of integrated landscaping as a recreational environment [9] on the ecological situation of the city
- beneficial effects on the human psyche
- improving the aesthetic characteristics of buildings and areas with dense buildings
- maintenance of the previously created or initially existing natural environment of the city, undergoing forced changes in the process of transition of society to the post-industrial period of development and changes in the functions and structure of the urban environment.

"Green architecture" – a very common phenomenon in many Asian (Singapore, Vietnam) and European (UK, Spain, Italy, Holland, Germany, Sweden) countries. Among the most famous foreign examples of "green" construction: Green quarter in Milan (Italy), Osaka shopping center (Japan), shopping and office center Four harbors in Rotterdam (Holland), Museum of modern art in New York (USA), Zorlu center in Istanbul (Turkey), hotel in da Nang (Vietnam) and others.

Today presented the design development of apartment complexes with accessible roofs. Residential complexes with integrated landscaping are increasingly attractive.

One of the areas of projects with the use of operated roofs is suburban construction. The buildings have a free layout and open terraces, which are supposed to be used as private indoor recreational spaces [10, 11].

In this aspect, it is possible, and in some cases necessary, becomes the use of an isolated natural component – a winter garden. In view of what it is necessary to provide the device of translucent designs of various type [12].

The second direction of use of the operated roofs - multi-storey city construction. The integration of landscaping into the building [13,14] here takes various forms – from "green" roofs [15-17], to vertical facade gardening [18,19]. At the same time, any type of landscaping and the need for its device should be considered in terms of improving the environmental characteristics of the environment [20,21].

In addition to design developments, there are a number of buildings in Moscow with the use of integrated landscaping, both in low-rise and high-rise construction (Figure 2).
Figure 2. Conceptual proposals for the formation of a system of complex landscaping of a construction site (Moscow, as a typical example of a suburban environment).

In the design of "green" buildings raises a number of issues of technical design associated with the formation of a complex multifunctional environment suitable for the joint existence of man and vegetation plants - general environment. Landscaping acts as an additional aggressor for building structures (both enclosing and bearing), being a time-varying structure, which for its normal vegetation requires the presence of soil substrate, as well as natural and climatic conditions.

4. Conclusions
"Green" building as an independent type of urban landscaping, formed in the conditions of territorial and temporary deficit, today can be considered as an alternative to the aggressive anthropogenic environment, which is represented by the construction of modern urban space. "Green architecture" is a combination of different types of landscaping: external and internal. Each of these types of landscaping has a different impact on the quality of the living environment and human condition. This is due to the fact that the choice of vegetation for landscaping should be chosen on the basis of a set of parameters of environmental impact, as well as the perception of environmental conditions.

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