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Scientific prerequisites for the design of environmentally compatible industrial buildings in the conditions of Uzbekistan

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Abstract: Objective. The environmental situation of the Republic of Uzbekistan is extremely worrying. Soil, air and water are contaminated. The extraction of deposits and building materials is carried out irrationally, and scientifically based approaches to the placement of new production forces and industrial enterprises, as well as their design, are not in demand. The purpose of the study is to propose conceptual principles for the construction of a building that combines a holistic expression of the production environment and environmental infrastructure, which, when designing production enterprises, it is possible to change industrial buildings to a standstill, that is, to the desired side, looking at them as an ecological object.

Methods. The ecological purity of production enterprises is considered as a complex task, that is, to create a harmonious and comfortable environment for the productive work of a person; to establish waste-free use of energy resources in the form of a closed system; to ensure that architectural and building forms (building elements) are harmonious and proportional to the natural environment

Results. Currently, the spiritual deterioration of technology begins in 2-3 years and is at most 5-7 years. And the physical deterioration of industrial buildings and structures will be for 50-70 years or more.In order for the designed buildings to be able to respond to calls for time, it is necessary to ensure that their spatial-constructive and architectural solutions can accommodate the level of progress of science,

technique and technology for the next 50-70 years. For this, it is proposed to plan in advance the problem of spiritual deterioration.

Conclusion. Environmental components of ecological buildings are systematically approached in terms of quality, complex requirements for the use of the environment and nature are observed during the construction and use of buildings, a typological series of multifunctional energy-efficient buildings with innovative architectural-construction and engineering-technical solutions is created, an environment with maximum aesthetic appeal organically linked with, architectural compositions consisting of building and technological modules of different plans and heights are created.

Keywords: Projects based on innovative approaches, harmony with the natural environment, environmentally adaptability, architectural and composition elements of industrial buildings, energy-efficient building structure, planning of the problem of spiritual deterioration.

Introduction: The nature of society's interaction with the environment has recently caused concern inthe general public. The human environment is becoming more and more polluted, and its ability to self-regulate is catastrophically declining. Such diseases are widely spread, which were previously either not observed at all or were of a local nature. They were called "diseases of civilization".

The ecological state of the Republic of Uzbekistan is of extreme concern. Soil, air and water are polluted. Mining of deposits and building materials is carried out irrationally, there are no scientifically based approaches to the deployment of new production forces and industrial enterprises [1].

The absence of a unified set of scientifically substantiated legislative acts and standards for environmental protection, equally mandatory in the design, construction and operation of industrial facilities, has a significant impact on the destabilization of the ecological balance. Until now, the theory of interaction between industrial formations and the natural environment as a single natural-industrial system has not been developed[2,3].

There is also no generally accepted methodology for the formation of environmentally friendly natural-industrial complexes and criteria for evaluating their projects. While the requirements for them are limited to sanitary standards. At the same time, as a rule, the indicators are considered separately for each enterprise, even in cases when it is located in an already ecologically unfavorable area: in such conditions, each new enterprise introduces additional extensive impacts on the environment [4,5,6].

Based on the development strategy of the New Uzbekistan for 2022-2026, tasks are set to ensure economic development in our country in order to ensure comprehensive and balanced socio-economic development of regions, districts and cities, rapid development of high-tech processing networks, to establish compliance with environmental requirements of economic and other types of activities carried out on the territory of the Republic [7].

The implementation of these tasks requires the construction of many modern production enterprises and the reconstruction of existing ones.

The reform of the construction sector requires, first of all, to abandon existing old molds in the design of buildings and structures and start by doing research on ecologically flexible projects based on innovative approaches in accordance with world standarts.

METHODS

In the conditions of consistent development of man-made civilization, the problem of ecological safety of urban areas is becoming one of the most important national tasks today. A reasonable solution to these tasks will create favorable conditions for the health and well-being of current and future generations, as well as for effective work.

When analyzing the impact of negative anthropogenic sources on the components of the urban environment, it was found that the role of industrial enterprises is important. A large part of the total amount of pollutants in some cities is contributed by production enterprises [8,9,10,11].

Today, the main sources of urban pollution are industry and transport. Despite the huge costs and efforts of specialists to reduce harmful emissions into the environment, curb and neutralize them, industrial pollution in large cities accounts for 50% of the total amount of pollutants around the city [12].

Serious air pollution is observed in the industrial cities of our country - Angren, Almalyk, Bekabad, Tashkent, Chirchik, Fergana and Navoi. The problem of protecting the environment from pollution by production and consumption waste is associated with the problem of rational and complex use of Natural Resources and the introduction of clean technologies into production. Energy, non-ferrous and ferrous metallurgy, chemical industry and construction waste are the main sources of environmental pollution. The annual volume of production and consumption waste in the country

exceeds 100 million tons, of which more than 14% are poisonous [13].

In the existing practice of design in the architectural and construction industry, it is not customary to consider a production building as an ecological object. In contrast, a production enterprise that has an impact on the environment through the technological waste of production is perceived as an ecological object [14]. However, foreign experience shows that modern single-purpose and multi-purpose production enterprises have the opportunity to change their production and technology frequently, and are considered as an ecological object that interacts with the environment.In this case, environmental cleanliness of production enterprises is considered as a complex task, that is, creation of a stable and comfortable environment for effective human work; establishment of waste-free use of energy resources in the form of a closed system; it is ensured that architectural-construction forms (building elements) are harmonious and proportionate with the natural environment [15].

RESULTS AND DISCUSSION

The design of ecological production buildings, referring to these three tasks, is achieved only by ensuring the systematic mutual harmony and proportionality of spatial-planned and constructive solutions with the elements of the heating system, ventilation, air cooling, natural lighting, sanitary and household services, recreation area and architectural and compositional of an industrial building.

The optimal solution to these tasks encourages research on the development of a building project with an energy-efficient and special technological structure. The result of such a search is to make the building at the optimal ecological level - to make it possible to use the production technology without waste as much as possible and to use energy repeatedly, that is, not to pollute the natural environment with harmful waste [16] .

The research on connecting the ecologically clean and energy-efficient structure of the building with its moderate comfort and technological perfection leads to the adoption of very interesting architectural-compositional solutions. Its main principle is to build a building that incorporates a flexible production environment and a holistic expression of ecological infrastructure: winter gardens, energy-active windows, maximum use of natural light, solar energy receiving devices, air exchange devices, etc. In general, the industrial building should be considered as a single ecosystem consisting of spatial structure and physical environment [17].

Quantitative requirements for an environmentally "clean" industrial building are reflected in the assignment for design, and it serves as the basis for the choice of spatial-constructive solutions of the building. Such buildings should be flexible to a rapidly changing variety of technologies and production areas in modern times.

The competitive environment in modern times necessitates the use of intellectually high-level technologies in production. At the same time, the rapid development of technology and technology in pictures shortens the period of their spiritual wear and tear. Currently, the spiritual depreciation of technology begins in 2-3 years and is at most 5-7 years. And the physical depreciation of industrial buildings and structures will be for 50-70 years or more [18,19,20]. This is where the problem arises: the buildings that are being built today are subject to spiritual obsolescence faster than physical obsolescence. There is only one solution to this problem: the buildings being designed today must have such spatial-constructive and architectural solutions that can meet the challenges of time, and can absorb the level of development of science, technology and technology in the next 50-70 years. For this, the problem of moral attrition must be planned in advance.

Requirements aimed at ensuring the spiritual viability of production buildings should imply the use of such volumetric-spatial forms of structures so that they are based on the following principles:

-the possibility of using buildings for various purposes and the fact that they have volumetric-planned and constructive solutions adapted to frequent replacement of technologies;

-the tendency of the building to change volumetric-planned, constructive and engineering solutions and the presence of an excitable (mobile) character, that is, the possibility of changing and updating the role, type or description of all existing communications in them;

- the strength of building structures that ensure effective production during the period taken into account;

- optimizations of the conditions of interaction of workers and equipment;

- environmental adaptability with external environment;

- architectural splendor of buildings in harmony with the level of socio-cultural development of society;

- the embodiment of modern business food and traditions (environmental aspects of product sales, advertising, production).

At this point, it should be recognized that, based on the

traditions of change in modern production technologies, increasingly robotics and manipulators are widely used in production technologies. It is known that robotic technology can be placed in buildings with a relatively low height. In this regard, when designing industrial buildings and their structural elements, it is important to consider elements that in the future make it possible to divide the working height of the building into vertical parts (modules), consisting of several floors. This event can be carried out by designing additional mounting elements and load-bearing finishes at certain distances to vertical load-bearing elements (column, fachverk).

It is known, the main goal of any production enterprise is to successfully sell its product. One of the current traditions of doing modern business is to demonstrate that environmentally friendly production has been established by introducing buyers (importers) to the production process, and to establish strong economic ties by gaining their trust. From this point of view, we believe that during the design period, it is necessary to refer to tourist routes on the territory of the enterprise and showrooms and grounds directly in the production building, special sidewalks intended for hiking.

Also, when assessing the technical and economic indicators of an industrial building, among other indicators, it is proposed to include the coefficient of the trajectory of the moving space of the technological unit (robot, manipulator, crane, equipment), which corresponds to one unit (1m3) of the working volume of the building. Because, without being limited only to the efficient use of each square meter of area of the building, there is an incentive to use the space at its height even more efficiently.

CONCLUSION

It is proposed to popularize the implementation of the issue of ensuring mutual harmony and proportionality of architectural, spatial-planning and structural solutions in ecological production buildings with the above parameters by building model innovation centers.

The practical significance of the proposal is that the developed architectural-construction and engineering-technical solutions of the buildings of the innovation centers ensure their multi-functionality and ecological comfort, as well as saving energy resources and saving from nature due to a comprehensive approach to the formation of new types of buildings that meet the modern requirements of the organization of the living environment. increases the efficiency of use.

Conceptual principles of the proposal:

- Integrated Deployment of experience-based production, scientific research and entrepreneurial activity in innovation centers is achieved due to the universality of multifunctional buildings and the fact that they have flexible solutions;
- the universality of multi-storey buildings of experienced production in innovation centers and the mobility (variability) of internal space are explained by the spatial-plan solution, and the flexibility - by the interchangeability of architectural and construction solutions and engineering systems;
- the problem of energy saving is solved with energy-efficient engineering systems, as a single set of energy-saving architectural and construction (volumetric-planned and constructive) solutions, on the basis of an integrated approach;
- the ecological component to ecological buildings is ensured by a systematic approach in quality, compliance with comprehensive requirements for the use of the environment and nature in the process of building and use.
- the presence of a typological series of multifunctional energy-efficient buildings with innovative architectural-construction and engineering-technical solutions.
- achieving maximum aesthetic attractiveness — the creation of architectural compositions organically connected with the environment, consisting of construction and technological modules of different plan and height;

The design and construction of production buildings based on the new concept and its principles can be carried out at the present stage of scientific and technological progress, since they take into account the existing and promising level of development of construction science and practice, as well as the production potential of construction structures and materials.

The implementation of the proposed concepts and principles makes it possible to comprehensively solve the problem of the duration of the construction of production buildings and reducing resource consumption, ensuring the acceleration of industrial production, increasing the efficiency of capital investments and, most importantly, making industrial construction environmentally safe.

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