The model of formation of the spatial organization of shift settlements

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Abstract. The purpose of the study contains two main aspects: - improvement of the spatial organization of the shift settlement of the oil and gas industry - the potential of the structure-forming component of the country's settlement system; - development of the optimal functional and planning structure of the morph types of the shift settlements, providing a high level of comfort that meets the increasing needs of a modern, dynamically developing society. Comprehensive review of the existing forms of spatial organization of shift settlements is carried out on the example of foreign and domestic experience in the design, construction and operation of shift settlements at various stages of development in order to identify the intensity of their formation and determine the most perspective type, as a basis for development and the subject of further research. The vector of external and internal, first of all, production - technological and social factors influencing the morphology of shift settlements and the structure of territorial settlement in the system of industrial development of the natural complex is determined. The evolutionary transformations of the morphology of shift settlements in all countries took place taking into account the factors and characteristics of natural-geographical, climatic, socio-economic aspects and functional-industrial affiliation. Considered the circumstances and features of formation of the architectural and planning organization of shift settlements that affect the creation of an algorithm of gradual development through modernization the quality of its internal spatial structure. The increasing technological potential of the territories stimulated to the formation of typological and classification diversity of the territorial structure and spatial organization of shift settlements, their morphological and taxonomic hierarchy. On the basis of a concept formulated a predictive theoretical model of the holistic shift space settlements, with the functional program of the formation of the quality of the environment is comparable to quality of life in large urbanized space with respect to information-technology resource of the modern world, shaping the potential for sustainable development.

1. Introduction

The priority task of our time is the intensification of the development of territories in the zones of the presence of deposits of the most valuable natural resources. A qualitatively new level of development dynamics of scientific and technological progress, which has occurred in the last two decades, allows to create a functional-spatial habitat of the highest degree of comfort, reliability and environmental friendliness in the most extreme conditions.

Society is constantly increasing the activity of functioning and increasing the volume of global processes that create conditions for more intensive development of territories through transformation, the existing network of reference spatial nodes and connections of different hierarchical levels and the
territorial organization of the settlement structure [1]. The creation of a multifunctional transforming network of spatial nodes and connections of various levels of the territorial organization of the settlement system is becoming an important aspect of strengthening the activity of functioning and building up of global processes. It also contributes to a more intensive penetration and dynamic development of the formed structure of the settlement system, improving the quality of the environment in an urbanized space that meets the growing needs of society.

One of the means of solving this problem is the functional and spatial organization of an urbanized industrial exploration-survey model – is a shift settlement. The shift organization of the process of development of remote hard-to-reach territories with extreme climatic conditions has become the most popular at the present stage of economic development. The transport structure of the oil and gas main pipeline system is indicative in this format.

The oil and gas industry - is the platform on which the spatial organization of settlement is best interpolated. Its "linear" vector has a structure-forming component of the settlement system. Branch territorial and spatial elements, growing, are arranged in planning hierarchical and nodal structures for various purposes. The main priorities of the formation of shift settlements are the planning organizations of the spatial structure, which ensure the reduction of economic costs in the construction process and the provision of a minimum level of comfort, while increasing the volume of functional processes, while striving for the overall minimization of both the size of the functional zones and the object as a whole.

For creating a comfortable urbanized environment in modern society, there are four main trends:

1. Formation of self-sufficient residential complexes created according to the concept of "city within a city" (the presence in a separate urbanized cluster of a full range of social, cultural, engineering, communication and transport functional variability);
2. Complex improvement of the territory and organization of recreational areas directly in the structure of the residential complex;
3. Renovation and reorganization of former large industrial and warehouse facilities, such as factories, warehouses, barns, depots, etc. into a new environmentally friendly enterprises or into leisure, cultural, sports and entertainment centers;
4. Creation of comfortable recreational areas in the adjacent territories of existing natural and landscape complexes. An important factor of comfort of the spatial-planning organization are: security level (all levels), quality of infrastructure, housing affordability, economic and natural environmental factors, the presence of a developed system of health, education, preschool education and sports, cultural and community services [2, 3].

2. Methods
The study used a wide range of analytical methods to study the spatial organization and morphological features of shift settlements. The research methodology was based on a comprehensive approach and analysis, including full-scale, statistical, graph analytic, structural-functional, morphological, comparative analysis, compensation model method, "Alexander model method" and other methods and approaches that ensure the achievement of the main goal in solving the tasks set. Special attention was paid to the comparability of indicators for analyzing the dynamics of the studied processes.

For the analysis, we used publicly available data from Rosstat, Transneft and Transgaz, reports from foreign oil and gas companies, as well as materials from research works of industry research institutes. Within the framework of a comprehensive system approach, the theoretical and practical aspects of the existing forms of spatial organization of shift settlements in foreign and domestic practice are considered, patterns and trends in the development of environmental quality are determined, on the basis of which the functional and planning types of modern shift settlements are formed. The features of the formation of the spatial organization of shift settlements at various stages of development in the countries of the far and near abroad are revealed. The vector of external and internal, first of all, production, technological and social factors influencing the morphology of shift settlements and the structure of territorial settlement in the system of industrial development of the
natural complex is determined. The features and main aspects of the modern development of the spatial structure of shift settlements are identified, reflecting the fundamental changes taking place in the paradigm of the development of the modern national structure of settlement in Russia against the background of socio-economic transformations of society that ensure the sustainable development and stability of the regions.

The increasing intensification of production processes and the insufficient level of social and living conditions have formed such trends as the minimization of functional and planning variability, the low level of comfort and architectural expressiveness, and the aggravation of social problems of personnel.

3. Results
The concept of the territorial organization and spatial structure of the shift settlement is as follows. The shift lifestyle is becoming more and more popular, and in some cases, it is simply the only way to function, for example, in the conditions of space exploration and in regions with extreme climatic conditions.

One of the answers to the question of the "mobility" of society as a whole and of the individual in particular is a new round of evolution of mobile (including shift) the method of organizing the object's space. Given the appearing practical impossibility to initially determine all the possible applications options and evolutions of the spatial structure of the facility for the entire period of its existence, it must have certain adaptive characteristics [4].

Adaptation processes occurring in the spatial structure (housing, settlement, scientific, military base, etc.) must have a certain degree of freedom and control, passing the stage of interactivity - the possession of a certain kind of feedback interface "man-housing-nature". The structure of the organization of architectural and urban planning space at all levels is being improved under modern conditions into adaptable and self-adaptive systems. Within the framework of modern trends in the formation of new types of comfortable space, there are many practical developments and technological capabilities that allow you to create a comfortable environment on any local territory, regardless of the surrounding conditions, even the most extreme [5] (figure 1-2).

Modern trends in the development, functioning and development of the habitat allow us to draw conclusions about the need to create a self-sufficient viable space for a comfortable human habitation in any abnormal conditions.

With the current level of information-technology potential, the implementation of such opportunities is quite real – from the printer method of building a home to obtaining energy supply from natural sources (sun, earth, water, air) directly, without disturbing the ecological balance.
The creation of local oases of a comfortable environment (including within the existing urbanized spatial structure) according to the need (implementation of target programs at any level) allows us to formulate the concept of effective development of various (including extreme and hard-to-reach) territories - targeted acupuncture of spatial development [6].

The concept of targeted acupuncture of spatial development in the context of the evolution of models of new cities assumes that the structure of settlement denotes a network of cities-clusters, locally positioned in space, but quite self-sufficient and information-technologically connected settlements with a high-quality urbanized environment for modern requirements.

The main strategy of the settlement process through the organization of the spatial structure of the territorial-planning network of the extractive industry is to create a precedent for the spatial organization of new territorial locations by relocating a certain number of production forces and labor resources (figure 3).

![Figure 3. Possible formation of a Russian settlement network in the areas of natural resource development.](image)

The solution to this problem is possible through the industrial development of the natural complex, the construction of a multi-faceted connectivity and concentration of functions that form a dense, complex, adaptive, flexible urbanized fabric - an integrated space. And the placement in areas already developed and elaborated within the specified production cycle time a certain number of natural resources, environmentally friendly production on the basis of the formed network of spatial structures will contribute to the further development, improvement and mounting of the settlement processes.

In the context of increasing integration and increasing the pace and volume of functional processes focused on the globalization of the ongoing social transformations, the possibilities of modernizing the territorial settlement system through the processes of spatial adaptation and the development of architectural and planning structures of objects of a new quality level have been identified [7] (figure 4).
Proposed concept is the creation of an algorithm of gradual development through modernization of the quality of the spatial organization of the structure of shift settlements, which makes it possible to significantly advance in the implementation of the program of the modern economically justified process of development of hard-to-reach territories through the creation of a qualitatively new structure of integrated space.

The implementation of the plans of development of the system of production and transportation of hydrocarbons through a network of pipeline transportation - this is a powerful motivation for the diversification of the process of development of territories, the implementation of which will be possible through the creation of a scientifically based theoretical model of the architectural and planning environment within the spatial and territorial organization of shift settlements. It is necessary to systematize the existing experience of development of new territories, summarize historical data and modern trends of development planning structures, and create a modern approach to the formation of architectural-spatial and planning organization of shift settlements based on the creation of a forecast model of development.

4. Discussion

Features of the organization of the structure of the shift urbanized space. Shift settlements structured their architectural and spatial forms in accordance with the industry purpose, natural, geographical and climatic conditions, as well as the social order of the public. State programs for the development of new territories have influenced the functional orientation of shift settlements, which has become a determining factor in influencing the type and classification variability of spatial volumetric-planning and compositional forms.

Spatial connectivity today is characterized by the level of accessibility (speed and time to achieve the goal) and realization of the increased flow of needs provided by the capabilities of modern society.

Only in the presence of positive dynamics of the denoted characteristics, with their harmonious functioning, does the concept of "quality of urbanized space" acquire a new meaning, which is able to ensure the fulfillment of the main conditions of vital activity - Comfort, Safety, Environmental Friendliness [8].

In the conditions of successful interaction of the components of an architectural and planning cluster (newly created or modification of an existing one), when interacting with the surrounding natural and socio-economic resources, the territory acquires the potential of connectivity at the global level. There is an opportunity to solve the potential problem of the appearance of "dead cities", which is painful for northern cities in the future [9]. There is a real saving on the costs of creating social and
auxiliary infrastructure by using the already created technical and socio-economic potential of previously developed (basic) regions [10]. Socio-economic tasks in this regard are inextricably linked with the creation of a functional-planning and nomenclature system of spatial organization of a shift settlement.

Based on the conducted research, the basic principles of the development of shift settlements are formulated:
- functional transformation – availability of a rapid response resource (shift-mobile-stationary);
- functional implementation - the ability to change the status in order to provide the structure-forming components of the settlement system;
- complex integrity of functional and spatial self-sufficiency;
- parity compromise interaction with the surrounding natural context;
- permanent updates of functional saturation;
- functional-spatial flexibility - the ability of adaptive functional-spatial transformation;
- harmonious integration of social and cultural resources;
- spatial generation - the formation of a resource for the active development of the territorial model of the settlement structure.

5. Summary
Formulated principles allowed us to create a predictive theoretical model of the holistic space of shift settlements: spatial urbanized area self-sufficient functional and planning structure, having the resource of development from mobile function up to stationarity with a maximum using technological resource, natural component, in the development potential of which is based package of social purposes (figure 5).

6. References
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Figure 5. Graphic scheme of the theoretical model of the integral space of shift settlements.
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