Architectural and Ecological Approaches in Improvement of Visual Framework of Building of the River Cities (on the Example of Hybridism of Coastal Building)

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Abstract. Researches cover methodical bases of formation of visual framework of the city in the concept of architecture and ecology of hybrid spaces. The model of civil engineering of hybrid sites aimed at providing comfort of vital environment, formation of the various environment, permission of environmental and social problems of the city is developed. In article the analysis of arrangement is provided in space structure of the coastline of Volgograd of architectural and town-planning objects and their influence on figurative characteristics of the site. The indicator of visual perception of the environment evaluating qualitative characteristics of building is developed. In work are used the multifactorial architectural and ecological analysis connecting inductive practical and deductive theoretical approaches; method of modeling and experimental design of the coastal site of Volgograd. The technique of formation of visual framework constructed on the basis of creation of hybrid spaces allows to use the received offers in domestic and foreign construction in similar town-planning conditions. The analysis of experience of formation of visual framework has allowed to evaluate design of hybrid spaces of the city in a new way.

1. Introduction

The theory of visual formation of image of the city was widely adopted around the world and was actively discussed in the professional sphere of architecture and architecture. Since the end of the last century in Moscow, many river inhabited places of Russia own strategies of development of visual representations and panoramas from the river have been offered and realized. Increase in comfort and improvement of exterior of the environment became possible by means of hybridization of the building which is determined by multiple layers, change of scales, creation of space, the different parts connecting it by the cultural historically or to social context. As specialists note, evolution of hybrid spaces in the 21st century happens in structure of coastal territories on the basis of expansion of their functional saturation and variability of functional interaction [21].

Relevance of work consists in expansion of architectural and ecological approaches to formation of visual framework of coastal zone of the city on the basis of the received results ("indicator of visual perception of the coastal environment") and modeling of the urban environment with hybrid territories. The scientific importance of the conducted research decides by development of methodical bases of architectural and esthetic and environmental planning of visual framework on hybrid building, the panoramas from the river directed to improvement of image of coastal building, formation of the
comfortable environment of life activity of citizens and modeling of hybrid space for creation of various types of activity and rest, the solution of social problems.

Practical and theoretical base of research were scientific works on the following directions:

- studying of perception of architecture of city space (artistic image, scale, in the movement, according to the planned plan of the review of architectural object [1,2];
- the questions of ecological perception of volume and space composition of residential units, industrial building [3] and the direction of visual ecology defining pollution effects of common air [4-6];
- identification of role and influence of color on perception of appearance of buildings, coloring of the urban environment and searches of reference space [7-9];
- ideas of space orientation in the environment ("orientation framework") [10-12];
- topical issues of domestic and foreign formation of public buildings, complexes on embankments and processes of arrangement and reconstruction coastal territories (features of functioning, specifics of the architectural organization, condition of interaction of water resource and space structure of the building, pattern of design of the adjacent territory) are considered [13-19];
- questions of hybrid constructions of objects and spaces [20,21].

2. Problem definition
In article architectural and ecological approach of perception of the urban environment and formation of visual framework transfers thematic emphasis of design of image of city structure on the solution of aspect of development of hybridism of building of the coastline.

Research problems became:

- studying of domestic and foreign experience of construction of coastal space;
- definition of indicator of visual perception of the urban environment;
- formation of model of visual framework with hybrid building (intellectuality of mountains of the environment;
- check of the received results in experimental design, with development of the system of the main objectives of modeling.

The section of Tsentralnaya Embankment of Volgograd in borders of the Central and Voroshilovsky districts with the existing apartment block of the different period, public objects and the open planted trees and shrubs spaces became underlying cause for carrying out research. On graphic material the arrangement of architectural and town-planning objects of different functional purpose (figure 1) is shown.

![Figure 1. Analysis of coastal building of the city of Volgograd.](image)

Housing (33%), public buildings - 21% and town-planning constructions more than 11% (figure 2) is creating visual image of building.

3. Theoretical part
Theoretical part of research consists in development of model of visual framework, architectural and ecological approach of design of visual framework, definition of concept of the comfortable visual environment of the coastal territory with hybrid building (figure 3).

Architectural and ecological design of visual appearance of urban development (architectural and town-planning concept of certain buildings and building in general; the city design and improvement) in work is set by indicator of visual perception of the coastal environment. The algorithm of definition of the last proceeds from step-by-step performance of the main objectives (definition of extent of influence of object of architecture on the urban environment and visual framework of building and definition of influence of the urban environment on the citizen is carried out by means of complex of methods) [14]. Authors of article extension of the contents of technique was offered (on the example of "method of architectural development", directed to work with the frontal planes of buildings). The method has been added with the positions concerning monitoring of planning features of historical and modern building. So, deep penetration into process of perception of dynamics of change of the architectural environment has demanded studying of contemporary records (photos, schemes), since the moment of formation of building of the coastline (19 - the beginnings of 20 centuries). The architectural and historical analysis has allowed to present graphically the first centers of development (moorings, piers, warehouses, inhabited tents) of coastal zone of Volga, further planning development of objects and their influence on perception of modern development of building.

In research the "Algorithm of tasks" directed to implementation of the analysis of the visual environment of coastal territories, considering performance of the following methods has been developed: method of expert assessment; psycho-semantic method of perception of the environment from the point of view of the citizen's life; sociological poll of the population; method of the structural and information analysis; method of the frequency and spectral analysis;
graphic-analytical method of assessment of aggression and homogeneity of the environment. The order of performance of the objectives allowing to define value of indicator of visual perception of building of the river city is given in the figure 4.

**Figure 4.** Algorithm of definition of value of indicator of visual perception of the environment of the river cities.

The offered technique of assessment consists in definition of indicator of the visual environment which consists of definition of value of esthetic coefficients and coefficient of aggression of the environment. Methodological part of research is constructed on holding sociological poll of the population, expert assessment of building of the river cities and direct experiment which is based on the analysis and calculation of graphic material of panorama of building of the coastline (figure 5). After assessment of aggression of the environment data with use graphic-analytical, graphic, statistical, mathematical and other methods are processed. The specified criteria of indicators of research allow to define: extent of influence of building on visual framework of appearance of the river city (from 0 to 99%); sites of the territory where inhabitants, live in conditions of beneficial influence of visual framework, and the platforms which are not getting under positive action of the considered objects.

**Figure 5.** Analysis of panorama of the river city.

The planning structure of Volgograd was stretched along the Volga River. The panorama of objects from the river opens image of the city, creates visual framework of building which includes the main reference points: monumental ensembles of the Soviet era (V. I. Lenin's monument, Embankment and river station, building of the museum of the Panorama of the Battle of Stalingrad, legendary statue Mother of the Homeland); objects of industrial architecture in the northern districts of Volgograd; high-rise dominants of modern housing estates and sports ensembles. The analysis of perception of the visual environment (the ekologo-esthetic analysis) indicates insufficiency of reference points and lack
of harmonious composition unity with the environment (relief, the planted trees and shrubs spaces) in visual framework. Also, the carried-out architectural and ecological analysis has allowed to characterize construction of residential buildings down the street of Chuykov as the process destroying scale of the environment of historical part of the city (buildings are built without video ecological characteristics), objects bring dissonance in visual framework of the coastline in the Central district.

The research of opportunities of design of hybrid building, i.e. integration the developing coastal zone in city life and creation of the greatest possible variety of city activities became problems of methodical approach of improvement of visual framework of the coastal territory. Such approach capitalizes the site deprived of attractiveness, it will be able to develop as self-valuable fragment of well-planned natural landscape of the river. Placement in coastal zone of the multipurpose subjects to public assignment creating hybrid spaces gains in Volgograd number of features in architectural and ecological interaction with water resource and conditions of design of visual framework at development of the coastal line. So, along with system of the main reference points (high-rise dominants, city squares turned on the river), in visual framework of Volgograd new planning nodes of different functional purpose become characteristics of identification and expressiveness. Them became: nodes of landscape and town-planning value - the Central ladder with pro-piles, walking terraces, the interactive park museum "Russia — My History" and the bridge through the Volga River; sports assignment – territories and the architectural volume of stadium Volgograd Arena. These city hybrid spaces represent quickly developing structural elements of the city having properties of self-organization in town-planning aspect (social and economic, functional and planning, recreational, landscape and composition and ecological).

Modeling of visual framework of the site of the coastline of Volgograd is built on the basis of designed hybrid projects and territories which became: zones and objects of contact (socially indifferent infrastructure); diversification of public functions; differentiation of contacts; continuity of city functions; ecology (comfort of movement for pedestrians, the integrated system of gardening, etc.); orientation in hybrid spaces [22,23] (figure 6).

![Figure 6. Design of visual framework with hybrid building, Volgograd](image)

4. Practical importance, offers and results of implementations, results of pilot researches

The practical importance of work consists in the carried-out analysis of visual framework of the coastline of Volgograd, identification art and esthetic lack of frontal development of building and according to planning shortcomings of the territories deprived of economic activities and also disclosure of potential of coastal zones in structure of the city.

Drawing up "Algorithm of tasks" for definition of value of indicator of visual perception of the environment of the river cities, expansion of concept and "method of architectural development" for improvement of visual framework of building became results of implementation.
The result of pilot research is shown in systematization of maintenance of hybrid spaces at integration of coastal space in life of Volgograd and design of variety of city activities of multipurpose objects and questions of the effective organization of coastal territories for ensuring high level of vital activity of citizens on the embankment (the device of recreational and sports infrastructure).

Modeling of visual framework with hybrid building on the example of Volgograd is carried out.

5. Conclusions
Expansion of practice of use of results of researches leans on the developed indicator of visual perception of the environment evaluating qualitative characteristics of exterior of the area, possible existence of dissonansny impact on the environment of town-planning objects and the subsequent recovery of humane scale of the environment.

The developed model of visual framework with hybrid building becomes the tool for assessment of intellectuality of the visual environment, architectural and ecological initiatives and city strategy and experimental design. The successful realization of strategy of model of visual framework with hybrid building can be enabled in different town-planning conditions, irrespective of economic, political and geographical situation in the city.

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