Formation of the Appearance of Multistory Residential Complexes in Largest Cities

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Abstract. In the modern practice of development cities, the architectural and artistic expressiveness of residential buildings has become one of the important factors of their consumer qualities that determine the cost of houses. Under these conditions, the tasks of the directed application of numerous technological and constructive means of achieving the architectural and artistic expressiveness of residential areas with the aim of ensuring the maximum aesthetic and economic effect are of particular relevance. The objectives of the article is to identify the most characteristic features of the projected models of residential complexes in largest cities on the basis of pre-project analysis of the objective prerequisites of the construction site – landscape, historical-stylistic and, above all, urban planning prerequisites. The conceptual solution of any residential complex in large urban agglomerations must be based on the fact that the majority of residential areas form a discrete urban «fabric» - a polystructure into which residential complexes of increased urban planning importance, that is, complexes-reference points or monostuctures must be embedded. The different town-planning role of these residential areas in the city’s system determines a fundamentally different approach to shaping their appearance, from volume-spatial and silhouette solutions to solutions to their facade planes. The conclusions given in the article and related recommendations can be useful in the real design of residential areas of the largest cities.

1. Introduction

The problem of architectural and artistic expressiveness of residential areas is a permanently relevant problem for all times and for all regions, regardless of political formations, national prerequisites and forms of ownership.

Twenty - fifty years ago in Russia, as in many other countries, this problem was aggravated by the monotony of architectural and artistic means. This was due to the active dictatorship of in-line industrial construction technologies and standard design in order to increase the volume of mass public housing construction and reduce its cost. Examples of a kind of residential architecture on the territory of our vast country then could be counted on the fingers. Such objects were born in most cases not thanks to, but rather contrary to the state policy of housing construction.

The situation has changed radically with the arrival of private property and market relations in the housing stock. The factor of architectural and artistic expressiveness in the construction of Russian cities gradually transformed from a purely aesthetic phenomenon into one of the factors determining
the consumer quality of housing. The appearance of residential buildings began to largely determine their price and the success of their marketability. Thus, in the conditions of the growing housing market, the factor of architectural and artistic expressiveness of residential areas gradually became widely demanded and received the strongest economic stimulus for its development. It is noteworthy that this phenomenon has affected the construction of housing of all categories - from luxury housing to standard-class housing.

This circumstance prompted all participants in the construction process (investors, architects, designers and technologists of the construction industry) to jointly search for and find new tools and new solutions to aesthetic architectural problems.

2. Theoretical Part
The appearance of any city is primarily formed by its highways and streets, which are the original «business cards» of the city [1]. They act as a kind of "joint seams" between separate residential complexes. The originality and expressiveness of these complexes is an integral part of the originality and expressiveness of these highways [2].

Since the late 80s of the twentieth century, the volume-spatial solution of new residential areas, the typology of housing and the layout of apartments have not undergone significant changes in their essence. Accordingly, these minor changes could not dramatically affect the appearance of new residential areas. But the approach to the formation of surfaces that limit urban living spaces, that is, the approach to the facades of residential buildings, has changed significantly. This is due to the fact that it is the unfolding panoramas of the facades of multi-storey residential buildings that form the inter-quarter "interiors" of residential areas in large cities. Facade surfaces of multi-storey buildings are constantly in the field of view of the people living here and create a particular psychological atmosphere. The possibility of changing facade solutions is largely due to the use of new constructions and technologies in residential architecture, new materials that allowed to free the outer wall of the house from the load-bearing function.

But, as you know, the variety of colors of the artistic palette does not mean a guarantee of creating a good picture. Also, the use of quite a variety of means of architectural and artistic expression does not always lead to the expected aesthetic result and the creation of a comfortable living environment [3]. And as the experience of recent years shows, this fact is not so much dependent on the customer's ambitiousness and the cost of the pledged funds, as it may seem at first glance. There are examples of new buildings of elite housing with a lot of architectural "frills", where the "picture" as a whole does not lead to psychological comfort. On the other hand, a lot of successful solutions of standard- and comfort-class residential complexes have appeared [4], where the visual atmosphere in the intra-quarter spaces makes you want to live here and enjoy life. The analysis of such residential complexes shows [5] that successful examples are observed exactly where the design is carried out taking into account all the features of the construction site and its surroundings - landscape, city-planning and historical-stylistic (if any) features. Of great importance is also the analysis of the preliminary model of the spatial solution of the future residential complex, the analysis of possible promising species both within the complex and from its external boundaries.

Residential areas are heterogeneous in their urban significance, which is most noticeable in the largest cities. The modern developing large city, gradually surpasses that certain "critical mass" for which organization it is enough to have a number of considerable architectural ensembles of public appointment. In large cities, in addition to the "fabric" of residential areas of ordinary importance, there are residential complexes-accents, designed to serve as support nodes in the system of landmarks of the city, as architectural ensembles of public purpose.

In the second half of the twentieth century, the diversity of the spatial environment of a city was reduced in town-planning theories to a set of rigid and discrete systems, or, in other terms, to a set of monostructures and polystructures [6, 7, 8]. By rigid systems (monostructures) were meant such town-planning objects in which the elements are rigidly connected by functional and formal relations, and the change of one element entails a change in other parts of the system. In this context, large
residential complexes should also be considered, playing the role of powerful landmarks in the city's composition. They represent a new level of integration, a transition to a single “organism” with a natural and interdependent development of not only its functional, but also formal-compositional aspects.

Discrete systems (polystructures) assume unstable interconnections of relatively independent elements that easily penetrate and fall out of it. Systems of this kind include a residential area in its traditional representation.

The requirements to the level of originality and degree of compositional integrity imposed on various city-forming objects are ambiguous because of the ambiguity of these objects in the city system.

3. Suggestions and recommendations
Complexes of rigid type, as a rule, occupy a somewhat isolated from other areas, the island position. This contributes to the strengthening of internal links between the elements of the complex compared to external links and enhances the impression of its integrity. Most often, the isolation of such complexes is explained by the specificity of the topography of the building site - location on a hill or restricted by a pond, square or park. The dimensional inequality of external and internal spaces in such complexes creates fundamentally different conditions of perception inside the complex and outside it. This necessitates a corresponding definite contrast solution of the facades facing the outside and inside of the complex. In residential areas of discrete type such a strong contrast is not logical.

The necessity of compositional integrity presupposes the establishment of rigid connections of subordination between the elements of complexes-monostructures. As a result, there is a need to identify compositional accents - either in the complex of buildings (if there are several), or in the structure of a large single building-complex. Differentiation of residential buildings into background and accentual in the monostructure system predetermines fundamentally different methods of forming their facades.

The volume-spatial structures of a discrete type complex most often represent compositions of a homogeneous nature. In them, the formal-compositional subordination of buildings may be absent altogether due to their equivalence in morphology. In the presence of buildings of different heights and in combinations of elongated and compact in the layout of houses, formal compositional subordination may manifest itself, but not actively. In accordance with this, the differentiation of houses into background and accent is not necessary in complexes of this type.

The increased requirements for the architectural and artistic expressiveness of the accent element in the composition of the city suggest the relative exclusiveness of its image. This is possible provided that the personality traits in the appearance of the complex substantially prevail over the signs characteristic of the surrounding ordinary buildings. At the same time, the most memorable elements of the architecture of buildings that determine the uniqueness of the complex and its recognition are limited to its territory, not repeated in the same set anywhere else.

The contrast between the two types of residential complexes - monostructures and polystructures - can also be manifested in relation to any external factor - to the natural environment or to the historical part of the city. Such a factor can become a peculiar source of originality of a residential complex.

For example, ordinary residential areas can be solved by analogy with the natural environment - in amorphous arrhythmic forms, with rich use of finishing textures and colors close to the natural surroundings. In this case, the architecture of the monostructures is advisable to solve in contrast with the natural environment - that is, in emphasized geometric and rational forms with ascetic smooth surfaces, using saturated local colors. The opposite solution is also possible: ordinary buildings are in contrast to the natural environment, and the “oases” among them are dynamic and picturesque residential monostructures in shape.

A similar approach is also possible in relation to the architecture of the historical part of the city. For example, residential complexes of a discrete type are performed in contrast to the architecture of the historical part of the city, and complexes-monostructures are performed with the active use of
retrospective techniques and forms in modern interpretation. In this case, the historical part of the city itself will be perceived as an accent area. The reverse solution is also possible: residential areas of discrete type gently support the theme of the historical environment of the city - in the proportions of parts, in detail and decoration; at the same time, the monostructure complexes stand out against their background with their dimensions and ultra modern forms.

Differentiation of residential complexes, based on the contrast and subordination of polystructures to monostructures, should also be carried out at the level of information indicators of the artistic image. When perceiving accent objects (monostructures), it is not the detailed information that is crucial, but the most important, key information that instantly forms an easy-to-remember, holistic image.

First of all, it concerns the silhouette construction of the monostructure, which depends on its volume-spatial solution. The sharp silhouette - relatively compact, striving for symmetry, the correct geometry of the outline, with ascending and descending lines - is the most memorable characteristic of any object claiming to be an urban landmark. On the contrary, the silhouette of a polystructure should be more diffuse, fractional, and in the presence of elements of different height, arrhythmic and, as it were, unorganized [9].

Another factor that determines the artistic informativeness and memorization of the urban object is the nature and degree of complexity of the compositional organization of its facades. The assimilation of visual information with complex rhythmic organization of elements requires more time, and the composition as a whole is more difficult to remember at the associative level [10]. From this it follows that the organization of the main structural components of the facades of the monostructure should be very clear and concise, and the facades of the polystructure is desirable to organize through complex rhythmic relationships close to arrhythmic. Currently, in the conditions of the widespread practice of use of constructive systems with curtain facades, purposeful creation of variant compositions of facades with the different rhythmic organization [11] becomes available a task even for houses with the same volume-planning scheme.

Another fundamental difference between the complex-monostructure and the complex-polystructure is the significance of the architectural scale of its entire volume-spatial structure and the scale organization of its facades, which is natural for the dominant element.

As a rule, the significance of the architectural scale of the complex-monostructure is achieved by a substantial enlargement of the physical dimensions of its constituent elements [12]. The enormous, hypertrophied scale of such buildings is often achieved through the use of pure rectilinear or curvilinear geometric forms with uniform facade surfaces. Multiple times repeated small elements of the facade are perceived in its structure not as architectural elements, but as the surface texture. The most common method of achieving hypertrophied scale in modern architecture is the use of flush glazing of suspended facades. In the architecture of residential buildings such a solution is rarely used (under certain urban circumstances) and is more typical for the architecture of office and hotel buildings. Usually, balconies and loggias, as some functionally determined indicators of a dwelling house, create additional articulations on its facades and do not allow to create a hypertrophied scale. Different grouping of balconies and loggias in large and small components of facades allows to obtain large-scale compositions with different rhythmic organization, even if the planning basis is the same repetitive floor scheme. This is achieved by selective arrangement of balconies and loggias on the facade, as well as their differentiated solution in form, type, decoration and color of fences.
| Type of residential complex | Complex - monostructure | Complex - polystructure |
|-----------------------------|-------------------------|-------------------------|
| **Comparative feature**     |                         |                         |
| The value of the complex in the city system | Separate complexes for largest cities serving as town planning accents along with complexes public purpose | Complexes form urban fabric, which includes architectural public ensembles or residential purpose ensembles |
| Ratio of elements in the complex | Rigid subordination of elements of the complex, according to the compositional principle of building ensembles - the principle of eurythmy | Subordination of elements of complex is not required. Changing any of the elements does not result in changing other elements |
| Character of differentiation of elements | Differentiation on background and accent elements. Additional differentiation is possible by functional purpose and morphology of the intra-quarter spaces | Differentiation by functional purpose and morphology of the intra-quarter spaces. Differentiation by morphology and formal-compositional relations of buildings |
| Volume-spatial solution | Clear, easy to read compositions with a minimum number of intra-quarter spaces formed by enlarged elements of residential complex | And amorphous, and regular compositions in which the number of items exceeds Miller number 7 + 2 |
| Architectural scale of the complex | Large, sometimes hypertrophied scale, if the shape and silhouette of the elements of the complex is crucial | Scale to fit with the size of urban spaces and the size of the buildings themselves |
| Character of organization of elements of complex | Somewhat simplified organization, easy-to-understand and memorable | Complicated rhythmic and arrhythmic compositions of facades. Sometimes - simple metric compositions if buildings serve background for another accent building, |
| Degree of ambiguity of complex | The presence of imaginative and artistic individuality. The most effective means should be limited to the boundaries of the complex. | A certain commonality imaginative solutions, component the peculiarity of a particular city. |

**Figure 1.** The fundamental differences residential complexes of the hard type (monostructures) and complexes of discrete type (polystructures).
In the largest cities, more and more often, multifunctional residential monostructures are built in the form of a single building with an impressive size. Such buildings suggest a significant proportion of the diversity within its facades. The choice of neutral and accentuated compositional elements is carried out within one such building. The increase in such components commensurate with the building itself (through the compositional union of its facade elements) creates a significant architectural scale necessary for the landmark building.

4. Conclusions

The formation of the appearance of a multi-storey residential complex should be approached, based on the analysis of the features of the construction site and its environment, and first of all – from the analysis of the specific urban situation and determining the importance of this site on the city plan. The predicted model of the appearance of the projected residential complex should be formed depending on the value of this complex in the composition of the city – as a monostructure-landmark or a polystructure-background. This circumstance determines its volume-spatial and silhouette solution as a whole, the solution of its facades at the level of the required architectural scale and nature of the structural organization. Concretization of this model, taking into account other objective factors of the construction site (landscape and architectural-stylistic), imposed on the subjectivity of the author's creative preferences, will lead to the final architectural and artistic solution, which is certainly most suitable for each particular case.

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