

Regional specific features of modern residential compounds. Affordable housing in the city of Samara, Russia

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Abstract. The identification of modern approaches and the specifics of the improvement of architectural solutions for residential buildings of an affordable price category in non-capital cities of the Russian Federation has become the main task of the research. From the generalization and analysis of the overall results of the development of the housing sector in the Russian Federation, the authors proceed to the consideration of the situation in one of the megacities of the country - Samara. With the example of seven residential compounds being built or newly built in this city, the approaches to the formation of architectural solutions that are characteristic of local conditions at the present stage of housing construction have been shown. A particular attention was paid to the social infrastructure and the functional and spatial organization of residential complexes, environmental and social aspects. The conclusion about the gradual increase of consumer properties of affordable housing was made. The main unresolved problems are enumerated.

1. Introduction

More than 85.3 million m² of housing was put into operation in the Russian Federation in 2015. In the total gross fixed capital formation, the share of housing construction costs in the country is gradually increasing: in 2000 it amounted to 11.3 %, in 2005 – 12 %, in 2010 – 12.2 %, and in 2015 reached 15 %. In some other countries, these figures are higher, for example, in 2015 in Austria – 18.5 %, in Spain – 24.8 %, in France – 26.1 %, in Germany – 28.3 %, in Canada – 31.7 % [1]. At the same time, the results of sociological surveys conducted in Russia in 2016 show that a significant part of the population is ready to improve housing conditions in the next 2–3 years. It should be noted that in the same year 6.1 % of Russian households assessed existing housing conditions as excellent and 44.5 % as good. These figures were even higher in cities – 6.5 % and 45.8 % respectively [2]. If we compare these data, it can be concluded that for various reasons the quality of the housing stock in operation is gradually ceasing to satisfy the population. Currently, the analysis of consumer preferences of people and the search for new approaches to improving the architectural solutions of residential buildings both in the reconstruction and in the new design are necessary. In the present study, an attempt to analyze the experience of the real design of houses in residential compounds (RC) belonging to the segment of affordable housing (AH) was undertaken. Also, progressive trends in architectural approaches to ensure the comfort of living have been identified.



2. Materials and Methods

The study examined articles and dissertations of Russian and foreign authors published in the 21st century. Modern theoretical concepts of architectural design of AH have been studied. To obtain results, we used in-situ observations, collection and systematization of Internet materials, including official sites of international organizations, architectural portals and sites of architectural bureaus. The special attention of our research was focused on the analysis of new affordable residential compounds built in Samara. It is one of the largest Russian cities in the Middle Volga. At this time, about 1.2 million people live there. It is a typical center of the country's highly urbanized region.

3. Results

3.1. Scientific basis for the design of affordable housing

Over the past years, a number of papers devoted to the problem have been published outside of Russia. Analysis of their content shows that the major emphasis is placed on the adaptation of AH to regional resource, to natural, climatic and socio-demographic features, as well as issues of gentrification (Gianfrate, V., Moore, T., Zhang, Y., O'Sullivan, D., etc.). A significant portion of the studies have been devoted to energy efficiency and safety (Noguchi, M., Copiello, S., Rid, W., Gan, X.-L., etc.), to methods of extending the life cycle of buildings, to search for new forms of spatial organization of residential compounds and buildings, to optimization the industrial technologies of their construction (Nanyam, V. P. S. N., Chen, J., Eerola, E., Milwicz, R., etc.) [3-14].

The theme of AH is one of the most relevant in the construction practice of Russia. However, the scientific basis of its architectural design is not well understood. The observation of the actual Russian dissertation's thesis shows that strong focuses are on the economic aspects. Some works was addressed to the sociological and lawful aspects. Several theses were defended by Russian scientists, who conducted research in the field of technical sciences, in particular, on construction (2002 - E. Mayorova, 2009 – O. Dyachkova) and on the architecture of multi-apartment RC (2010 – T. Asafova, S. Korotkova, 2012 – K. Grebenshikov, 2013 – Yu. Skoblitskaya, I. Zhdanova, Y. Usov, A. Rodimov, 2015 – M. Blagova). In these investigations, the main attention was paid to the improvement of consumer properties of housing and taking into account social factors. A new scientific direction for Russia is the justification for the construction of AH with high environmental properties. It is reflected in the works by S. Molodkin (2007), A. Voronin (2012) and P. Semikin (2014).

In Samara region the area of residential premises per inhabitant was higher than the average for Russia (in 2015 – 25.0 m² in comparison with 24.4 m²) [15-17]. In the city of Samara the characteristics are even greater - 26.7 m² / person. At the same time, a higher level of housing improvement was achieved in relation to Federal and regional values (table 1). In 2015 33.155 apartments were put into operation in the Samara Region (10.5 per 1,000 people). This is more than in many other subjects of the Russian Federation. Of these, 37.6 % of the region's constructed housing is in the main region's center [18].

Table 1. Comparison of housing improvement level in Russia, 2016, % [17]

	Share of total area equipped with ...						
	water supply system	sewerage	heating	bath (shower)	gas (network, liquefied)	hot water supply	floor electric cookers
Russian Federation	81,9	77,1	85,6	69,5	66,3	68,7	22,6
Central Federal District	84,8	81,6	89,1	76,4	69,5	74,7	23,8
Southern Federal District	81,2	76,2	82,3	65,4	84,0	65,0	4,0

North-Caucasian Federal District	82,4	72,6	83,9	66,2	90,9	63,3	3,0
Volga Federal District including:	82,9	76,1	90,4	65,6	84,4	66,9	9,3
Republic of Bashkortostan	81,3	75,4	91,4	57,3	85,6	68,2	7,7
Republic of Tatarstan	88,9	82,9	96,9	72,0	90,4	75,6	8,5
Nizhny Novgorod Region	81,5	78,9	88,9	70,7	83,7	69,7	8,2
Samara Region	90,3	87,4	96,3	80,5	74,9	81,2	22,1
Ural Federal District	81,9	78,9	84,0	72,3	53,1	70,7	32,9
Siberian Federal District	75,9	68,8	78,1	59,1	28,9	59,9	51,4

3.2. Location of the new social and affordable housing in the city of Samara

Currently, in Samara, the construction and commissioning of residential buildings and compounds is carried out mainly on reserved sites, as well as in the areas of renovation of dilapidated and emergency housing stock (figure 1).

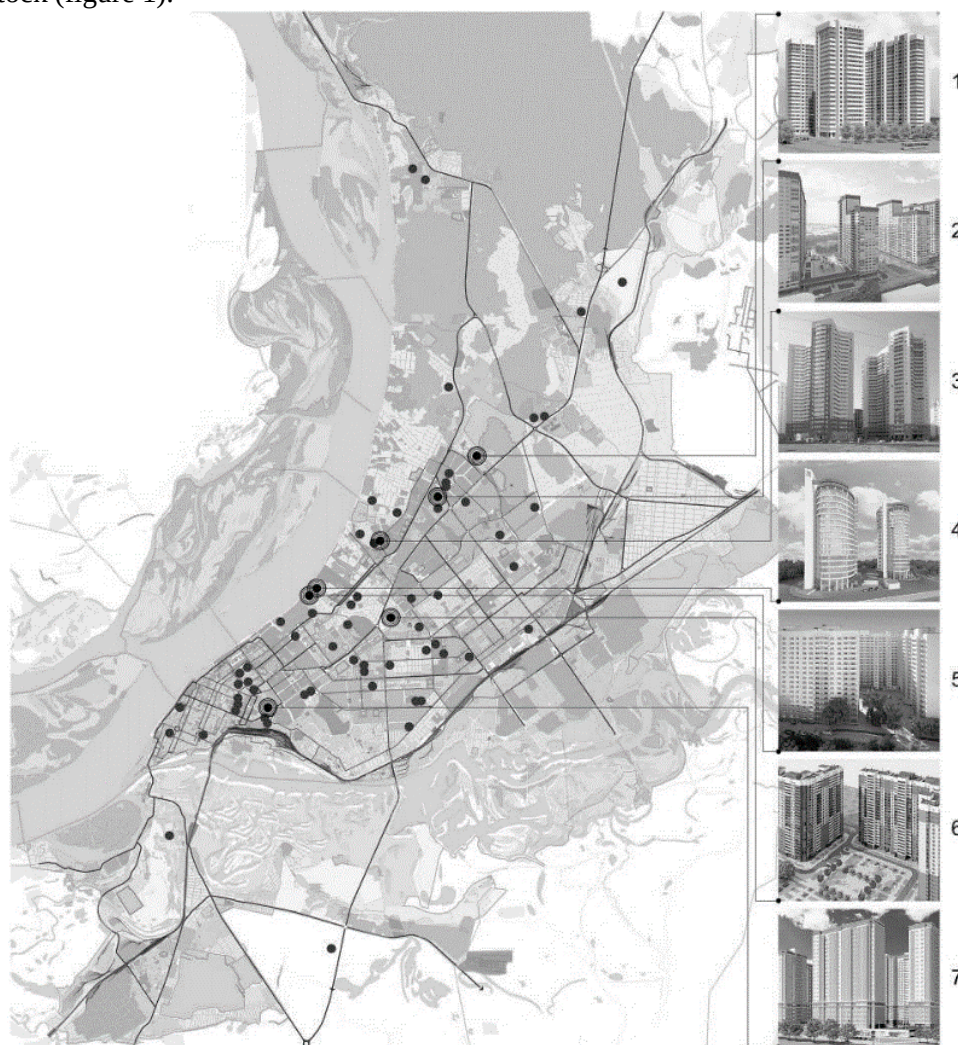


Figure 1. Allocation scheme of new housing in the city of Samara (residential compounds: 1 – "Olimpiya-park"; 2 – "Favorit"; 3 – "Raduzhnyy Lyuks"; 4 – "Volga"; 5 – "Volzhskiy Parusa"; 6 – "Tsentrallyy"; 7 – "Zhelyabovo RF").

The next seven RC are located in different parts of the city were selected for a detailed study:

- «Olimpiya-park» (A. Gerasimov's creative workshop, architects V. Lavrentiev, A. Nikolaeva, engineer - D. Gerasimov, developer - construction company "Russian Bazaar");
- "Favorit" (architectural and construction company "Arcada", architect S. Balabanov, developer - "Premier Investstroy");
- "Volzhskiy Parus" ("Workshop of modern design GRAD", Cheboksary, the chief architect of the project - C. Nazarov, chief engineer - N. Gavrilova, developer - "Strojprojectservice");
- "Raduzhnyy Lyuks" (designer - "Project-2000A", chief architect of the project - T. Himchak, chief engineer of the project - V. Fedoseyev, developer - "Dom-75");
- "Volga" (A.Gerasimov's Creative Workshop, A.A. Gerasimov, the main project architect, A.Gribanov and D.Gerasimov, the main project engineers, "Strojprojectservice" construction company);
- "Tsentral'nyy" (chief architect of the project Yu. Zaitsev, chief engineer of the project I. Zlotnikov, developer - "Transgruz");
- "Zhelyabovo RF" (designers - "Basis", chief architect of the project - O. Yu. Tretyakov, chief engineer of the project - Ivanov A., "VolgaRegionProject", chief architect of the project Nasibulina Yu, chief engineer of the project - Semashkin D., developer - "Zhelyabovo").

Realtor agencies of the city include compounds "Olympia Park", "Favorit", "Volga Sails" and "Rainbow Luxury" into the category of "economy", and others are included into the category of "comfort".

Taking into account the strategic tasks of Russia related to the need to upgrade the quality of life, we must recognize the fact that the search for promising areas to improve the consumer properties of the living environment requires a thorough analysis of not only the Soviet, but also of the modern Russian experience in the architectural design of affordable housing. New RC and facilities differ from the mass building of the 1970s and 1990s, which was built according to standard projects. Now they have individual quantitative and qualitative characteristics [15,16].

3.3. Infrastructure and features of accomplishment in the territory of residential compounds

Extensive social infrastructure is considered one of the necessary conditions for the formation of a comfortable environment. The placement of spaces for rent in the structure of RC corresponds to the principles of "green" economy, which is focused on the development of small business. This fact contributes to the approximation of functions to their consumers, for example, trade, consumer services, etc. The study showed that the premises for rent are completely absent only in one of the new Samara's RC (table 2).

Table 2. Characteristics of infrastructure and features of accomplishment in plots of new Samara's residential compounds.

Residential compound's title	Premises for renting		Parking lot			Accomplishment of the yard	
	Ground floor	Basement	Guest chamber	Ground structure	Underground structure	Children's playground	Sports ground
Olimpiya-park	+	+	+	+		+	+
Favorit	+		+		+	+	+
Raduzhnyy Lyuks	+		+			+	+
Volga		+	+			+	+
Volzhskiy Parus			+			+	+
Tsentral'nyy	+		+		+	+	+
Zhelyabovo RF	+		+		+	+	+

The table also shows that the problem of parking lots for residents was solved only in three RC. It should be noted that in Samara there are problems associated with complex geological conditions. And in all examples, children's and sports grounds were designed.

3.4. Design features of residential compounds

At present Samara's designers provide for the use of modern resource-saving technologies in most buildings of the categories "economy" and "comfort", including analyzed RC [19]. As structural elements are primarily used monolithic framework or wall. The external walls are made of reinforced concrete, or hollow ceramic stone, or brick with mineral wool insulation and solid plastering surfaces. In some cases, ventilated facades are used. The safety of living is provided by strict requirements for compliance with the rules of design of escape routes: unflattering stairs are designed in all examples. Height of dwellings in most of the compounds is equal to 2.7 m. In RC "Zhelyabovo RF" it is 2.6 m, in the RC "Volga" – 2.85 m.

Table 3 gives a general idea of the most important architectural and typological features of the buildings.

Table 3. The main spatial characteristics of residential compounds in Samara.

Residential compound's title	Number of floors	Number of apartments on the floor	Number of variants of apartment layouts					Peculiarity of summer premises	
			Studio	Studio apartment	Two-roomed studio	Two-roomed flat	Three-roomed flat	Unglassified	Glassified
Olimpiya-park	24	6-8	8	14	1	13	4		+
Favorit	20, 27	8-10		31		10	6		+
Raduzhnyy	25	8		4		4	2		+
Lyuks									
Volga	17	4-6		15		12	6		+
Volzhskiy	14, 17	4-5		4		1	2	+	
Parusa									
Tsentrallyy	24	6, 8		6		5	3		+
Zhelyabovo RF	18, 20, 24	4-7	7	25		18	8		+

Comparison of key indicators shows that significantly modern RC of Samara at the number of floors exceed the housing of the XX century. This approach corresponds to usual practice of urban land management and the need to prevent spatial sprawl of cities [20].

In a single section, the number of apartments on the floor ranges from 4 to 10. The result depends on their size: if the number of rooms in the apartments is less, the number of living cells is greater. The number of elevators corresponds to the current Federal standards. The plans of the sections show a great variety of apartment options (table 3). Five basic types of layouts are used. The largest number of planning options was developed for one-room apartments, in second place at the number of options is two-room apartments. In some design solutions we can see the innovative inclusion of studios, which are not provided by the current design standards.

4. Discussion

The study allowed not only to identify regional features and positive trends in the design of affordable housing, but also to detect certain problems. Here are some of them:

- lack of knowledge of the needs of residents of the city at integrated social infrastructure; in affordable housing, this fact is directly related to the willingness of residents to conduct their business and use an expanded range of services;

- a high car ownership level, which is caused by the growth of income of the population and can't be solved without more active use of underground space;
- compossibility of size and layout of apartments with the needs and economic opportunities of people.

Each of these problems is associated with the lack of scientifically based recommendations adapted to regional characteristics. One of the effective ways to optimize the quality of project documentation is to conduct special sociological research, which should be carried out at the pre-project stage of work. Unfortunately, currently in Russia scientific justification is not an obligatory part of the design procedure. Improvement of methods of substantiation of design decisions is a necessary condition of dynamic increase of living comfort and economic efficiency of use of city territories and real estate objects.

5. Conclusions

Conducted architectural and town-planning analysis of the current affordable housing in Samara allows to make a conclusion about the presence of positive trends. Firstly, it's an increase the area of social services enterprises and the expansion of their functional composition. Secondly, it is the use of advanced architectural techniques and construction technologies. All these methods contribute to the improvement of consumer properties of housing and the extension of the life cycle of objects.

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