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Typology of courtyards in apartment block development based on planning openness and permeability

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Abstract. In the Russian Federation, the problem of creating a comfortable urban environment is of a national nature. The authors suggest paying attention to the courtyard in apartment block development as this area is one of the most important elements of the urban environment – a buffer space between the apartment and the city. As an important criterion for a comfortable environment is its safety, therefore, it is necessary to understand which courtyards form a sense of security in people, and which do not. The formation of a sense of security of residents is influenced by many different factors. Courtyards, having a different planning arrangement, create different conditions for the comfort of living inhabitants and the degree of use by other people. The authors propose the development of a typology of courtyard spaces based on a sense of comfort and security. As basic characteristics they propose to use: planning openness of the yard, which characterizes the degree of built perimeter of the yard, as well as the permeability of the territory, indicating the accessibility of this area for other residents and their activity. This typology will be the basis for further determining how each type affects the formation of a sense of security among residents and what measures from an architectural point of view can be applied to ensure the formation of this feeling.

1. Introduction

In recent years, the problem of creating a comfortable urban environment in the cities of the Russian Federation has acquired a national character. An important step in changing the attitude to the urban environment was the development of the priority project “Formation of a comfortable urban environment” (in the first edition approved by the Presidium of the Presidential Council for Strategic Development and Priority projects (Protocol No. 10 of November 21, 2016) [1]. Following the Decree of the President of the Russian Federation from May 7, 2018 No. 204 “On the national goals and strategic objectives development of the Russian Federation for the period up to 2024” secured the establishment of mechanisms for the development of a comfortable urban environment as one of the strategic tasks of the state in the development of national project in housing and the urban environment [2]. Pursuant to this Decree, in 2018, the federal project “Formation of a comfortable urban environment” was developed and approved as part of the national project “Housing and Urban Environment”, which is conceptually a continuation of the previous priority project [3]. Despite the significant negative impact of the new coronavirus infection (2019-nCoV) on the economic situation in Russia, improving the quality of the urban environment remains a priority for the state (Decree of the President of the Russian Federation No. 474 of July 21, 2020 “On National Development Goals of the Russian Federation for the Period up to 2030) [4].



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Referring to the presentation of the priority project of 2016, it can be noted that one of the main principles of creating a comfortable urban environment in this document is formulated as follows – everything starts with courtyards [5]. In this case, we are talking about courtyards in apartment block development. This point generally correlates with A.E. Gutnov's understanding of the function of the courtyard [6] as a “first stage”, a buffer space between the apartment and the external urban environment. In addition, the yard is a place that actively contributes to building social relationships between residents [7], and for new members of society, the yard is also a place of primary socialization [8]. These factors make the yard one of the most important elements of the urban environment that require attention in the first place.

Quite a lot of theoretical works are devoted to the research devoted to the formation of a comfortable living environment. The works of O. Newman [9] and I.N. Ilyina [10] are devoted to the methodology of assessing the quality of the urban environment, where one of the criteria is safety. The importance of this parameter is also emphasized in the federal project of 2018, which developed a methodology for assessing the quality of the urban environment, where one of the evaluation criteria is safety [11]. I.N. Ilyina emphasizes the importance of safety in assessing the quality of the urban environment and focuses on safety as an element necessary for sustainable urban development of the territory [10]. In this context, we can recall that A. Maslow, in his diagram of the hierarchy of human needs, placed the need for security on the second level after physiological needs [12]. In turn, P. Kidwell, referring to this idea, says that it explains how the place of residence affects a person, emphasizing that after gaining security, there is a need for communication [13].

Accordingly, the courtyard as an element of the urban environment must also provide security in order to fulfill its social function.

It is important to note that in the federal project of 2018, when assessing the quality of the urban environment, the assessment of courtyards according to the safety criterion is not carried out. The authors consider this an omission and propose to introduce an indicator that assesses the safety of courtyards in apartment block development. To include this indicator, the authors propose to study the existing typology of courtyards to determine the criteria that contribute to the formation of a sense of security, as well as to develop measures to ensure a sense of security among residents. As in the context of the urban environment, the formation of a sense of security is influenced by many factors, the authors suggest paying attention to its connection with the architectural and planning arrangement of courtyards and the availability of these territories for other citizens (hereinafter referred to as transients).

2. Methods and materials

The object of the study is a residential courtyard in apartment block development of Russian cities.

The subject of the study is the architectural and planning characteristics of courtyards that determine the safety and comfort of living for residents of adjacent houses.

The authors conducted a full-scale survey of residential courtyards of apartment block development, using photo-fixation and mapping methods, in three cities of Russia: Lipetsk, Moscow and Fryazino. Analysis of the architectural and planning arrangement of the studied territories and their position in the structure of cities based on the data of the Google Maps mapping service. Systematization and generalization of the information obtained in order to determine the most comfortable types of courtyards based on the selected characteristics.

Residential courtyards formed by both ribbon and perimeter development were selected for the study. By courtyard, the authors understand the territory belonging to residents on the rights of collective property, adjacent to their residential house/houses, partially or completely bounded along the perimeter by buildings, fences, transit driveways, transit pedestrian communications and arrays of green spaces. The authors' understanding of the definition of this territory is based on the common interpretation given in the Explanatory Dictionary of the Russian Language edited by D.V. Dmitriev [14], as well as on the basis of the definition proposed by A.V. Krasheninnikov [15].

A different arrangement of buildings forming a courtyard, and the degree of isolation of a building affects the formation in its inhabitants a sense of security due to the formation of the feeling of control space [7]. In the case of open spaces, their protection from other territories also contributes to the emergence of social control. In the case when the courtyard is actively used by citizens for transit passage, and the courtyard is not protected by any architectural means, it is negatively perceived by the inhabitants of these courtyards [7]. In this regard, as architectural and planning characteristics that will form the basis for the formation of the typology of courtyards from the standpoint of comfort and safety of living, the authors propose to use two parameters:

- planning openness of the courtyard, which characterizes the planning arrangement of the buildings that form the courtyard, and the degree of development of its perimeter;
- the permeability of the territory of the yard, which characterizes the accessibility of this territory to other people and the degree of their interference in this private space, based on the presence/absence of various enclosing constructions, structures and small architectural forms.

3. Results and discussion

Differentiation of courtyards by the parameter “planning openness” in the course of the study was based on the following characteristics: the number of built-up sides of the perimeter of the courtyard; the presence of minor gaps in the front of the building.

As a result of the analysis of the planning arrangement of courtyards and generalization of the obtained data, it is proposed to distinguish 4 types of courtyards according to the parameter “planning openness” (Fig. 1) Symbols: red shows the building surrounding the courtyard, orange highlights the boundaries of the courtyard.

- a) open courtyards – characterized by the presence of buildings on one side of the courtyard;
- b) semi-open courtyards – less than half, or half of the sides of the courtyard are built up, there may be gaps in the front of the building;
- c) semi-closed courtyards – more than half of the sides are built up, there may be gaps in the front of the building;
- d) closed courtyards – characterized by the presence of continuous development along the entire perimeter of the courtyard (it is possible to enter the territory through a gap in the front on one side, or through an arch).



Figure 1. Types of courtyards based on the “planning openness” parameter.

Differentiation of courtyards on the parameter “permeability of the territory” was based on the following data and characteristics: the availability of the yard to outsiders through undeveloped sides/angles due to the presence/absence of building envelopes and other small architectural forms (hereafter SAF), hindering free passage to the territory. The activity of using the courtyard by outsiders for transit passage was taken into account based on the results of a full-scale survey and observation of the place during the day.

The survey of the residents of the studied houses showed that the violation of privacy of life is felt mainly by the residents of the ground floor - 92% of the respondents. And to the question about safety,

which is checked by the possibility of independent walking of younger schoolchildren and preschoolers in the courtyard, the residents of the studied courtyards answered as follows. In open-loop courtyards, 83% of respondents cannot allow children to walk independently in the courtyard without an adult accompanying them. And in courtyards with a closed circuit and a protected area, 76% of respondents allow their children to walk independently in the courtyard.

The analysis of the studied territories and generalization of the obtained data the authors were allocated 4 types of courtyards in the parameter “permeability of the territory” (Fig. 2). Legend: the surrounding courtyard buildings are shown in red, orange is the conventional boundaries of the courtyard, a yellow dotted line – active pedestrian communication, white dot and letter “A” - bus stop, white dotted line – easily crossed fence (low fence with gaps), white solid stripe – formidable structures (solid high fence).

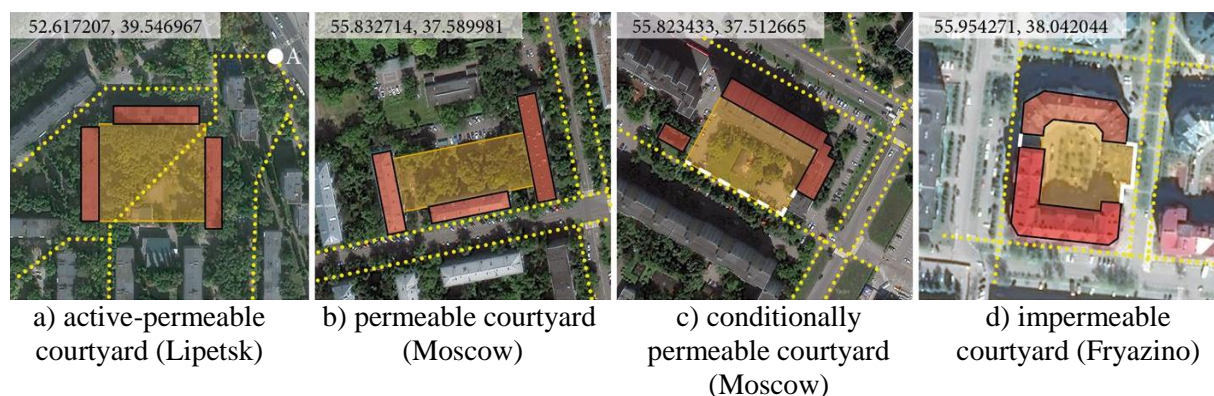


Figure 2. Types of courtyards on the basis of the parameter “permeability of the territory”.

a) active-permeable courtyards are characterized by the absence of enclosing structures and other SAF, active pedestrian communication passes through the territory to a significant focus of attraction of the population (social object, bus stop, shopping center, etc.);

b) permeable courtyards – characterized by the absence of enclosing structures and other SAF, the territory is not actively used by other residents for passage;

c) conditionally permeable courtyards are characterized by the presence of easily surmountable, difficult-to-overcome enclosing structures and other SAF with open gaps, the passage to the territory of strangers is possible;

d) impenetrable courtyards – characterized by the presence of difficult-to-overcome enclosing structures, the passage to the territory is possible only for residents.

Based on the selected types of courtyards according to the considered parameters, the authors formed a typology of courtyards that differentiates courtyards in accordance with their planning openness and permeability. The authors identified 15 types of courtyards: open active permeable; permeable open; open conditionally permeable; impermeable semi-open; semi-open active permeable; permeable semi-open; semi-open conditionally permeable; impermeable open; semi-closed active-permeable; semi-closed permeable; semi-closed conditionally permeable; impermeable semi-closed; closed permeable; closed conditionally permeable. Possible schemes of courtyards of each type are shown in Fig. 3 (closed active-permeable ones are not highlighted due to the impossibility of transit passage in them).

The symbols for Figure 3 can be read as follows: red indicates residential buildings; orange – non-residential; pale orange – a courtyard; black long dotted line – active pedestrian communication; black short dotted line – easily surmountable fences; black solid line – difficult to overcome fencing. According to this classification, it is possible to distinguish the safest, and therefore comfortable for living courtyard territories. These are open, semi-open, semi-closed and closed, conditionally permeable and impenetrable courtyards. The least comfortable, from the point of view of privacy, can be considered open, semi-open, actively permeable and conditionally permeable courtyards.

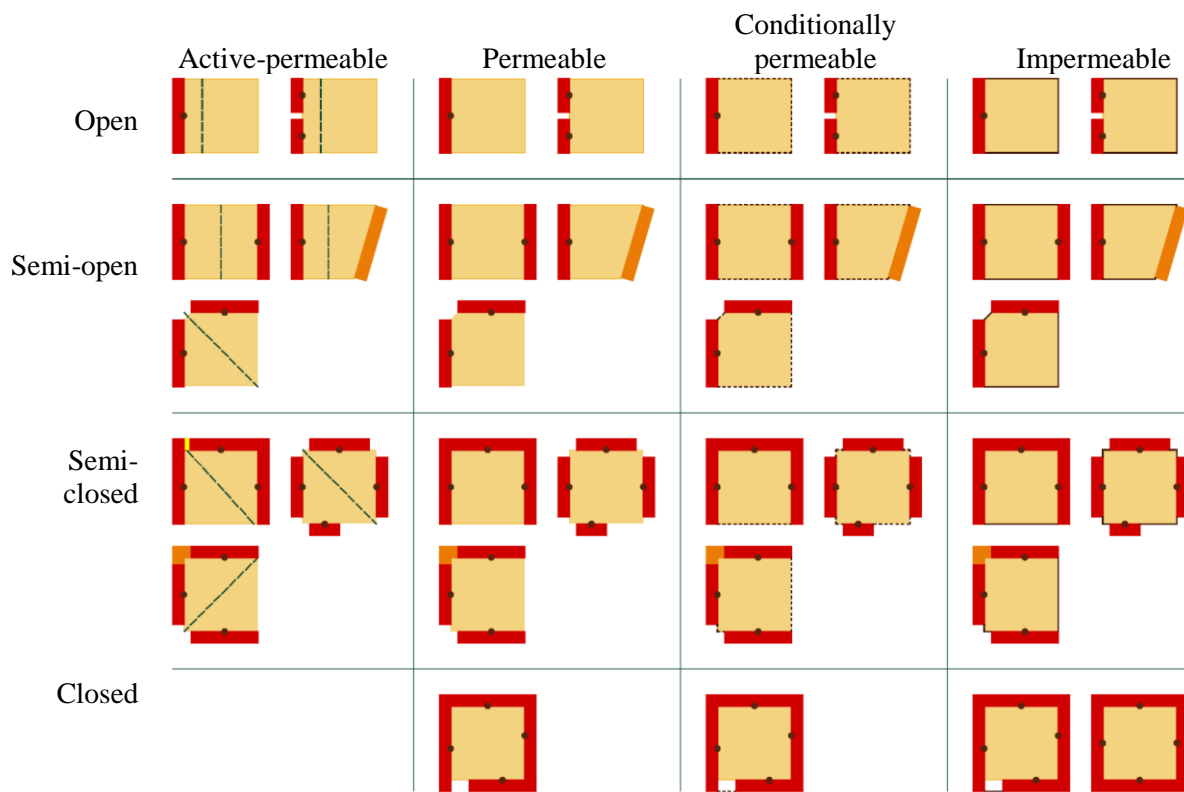


Figure 3. Typology of courtyards based on the parameters “planning openness” and “permeability of the territory”.

4. Summary

Based on the parameters “planning openness” and “permeability of the territory” and influencing the formation of a sense of security and comfort of living, the most favorable types of courtyards for the implementation of these parameters are identified. These include: closed and semi-closed courtyards, conditionally permeable and impermeable. They minimize the possibility of the appearance of foreign transients, the territory of such yards is controlled by its residents. Of course, these studies should be supplemented with statistics on observations of the behavior of residents and transients at different times of the day. The created typology on the example of the characteristic development of three Russian cities allows recording the influence of the planning parameters of courtyards on the safety and comfort of living. This, in turn, can serve as a basis for creating an indicator scale that characterizes the degree of privacy of courtyards, which can later be used to develop tools to improve the quality of the urban environment.

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