Conceptual Design of Russian Modern Monotowns' Architectural Space

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Abstract. The paper presents a historical perspective on the emergence and development of Russian monotowns. It also studies the lack of a case-by-case approach to the modern Russian monotowns architectural appearance formation of as well as contemporary creative approaches to the design process of architectural works and design. This paper makes the case for creative approaches to the creation modern objects in the monotown's architectural space. It provides an example of a creative approach to the architectural object design, at the initial designing stage enabling to individualize a future project, reflecting a part of the author's creative self-identity. A “self-concept” is given as an example of a design approach. That approach ensured the use of a graph unit - a prototype-based visual component formation of the organization corporate identity, reflected both in the building architecture, small architectural objects, and in design items. The visualization, accompanying the paper, is made by students - future architects.

1. Introduction
A monotown is a settlement depending on one or several town-forming enterprises. The first Russia's monotowns were founded back at the time of Peter the Great. During the said period, new production facilities appeared throughout the country, such as: clothing and sailing clothing textiles, powder, mining and smelting plants, etc. A lot of town-plants were founded in the Moscow area, Astrakhan, in the Urals. Some towns and villages of that age exist even now [1].

In its modern appearance, Russia's monotowns formed in the Soviet era. The active construction of new production facilities in small and medium-sized towns, where such enterprises became town-forming, was due to the direction of Soviet capital construction focused on the new facilities construction, rather than the old facilities reconstruction [2].

2. Rationale
The "restricted-access" towns with entry and exit control were founded under the defense policy implementation, resulting in the special supply support organization and separation into self-governing administrative units. Thereby, there was no other production in the above mentioned towns. Similar towns include Leninsk (Baikonur), Arzamas-39, Snezhinsk, etc. [3].

The phenomenon of "Science Town" appeared due to the development of the country's scientific engineering potential. The Akademgorodok town in Novosibirsk region acted as a testing site at the forefront of this concept implementation. Then, the following towns appeared: Dubna, Obninsk,
Protvino, Troitsk, Chernogolovka, Zelenograd, etc [3] In 2017, there were 313 monotowns and urban-type settlements in Russia.

A monotown's defining feature is the inseparability of a settlement and town-forming enterprise implementing both economic and social functions, thereby ensuring the living environment [4].

Modern monotowns have a number of problems, including social instability, dependence on the town-forming enterprise, environmental problems, the investment attractiveness of the territory, the architectural appearance formation, etc. We will consider the problem of "featureless" and "typicality" of modern monotowns and try to find solutions.

The construction of the majority of Russian modern type monotowns dates back to the mid-20th century. At that time the mass in-line construction of standard housing began. The buildings with enlarged concrete parts appeared in all USSR towns and urban-type settlements. The construction progressed rapidly, people were provided with apartments. But such buildings were absolutely featureless and identical. The typical architecture of the Soviet region (created by a standard project) in any town was identical with that of other settlements. Certainly, especially noteworthy architectural objects were built, but generally speaking the architecture was in crisis [5].

3. Research objective
From our point of view, the "facelessness" and "typicality" problems should be solved at the beginning of the design process, in particular at the stage of concept selection.

The paper further considers an example of such personalized approach to the objects and architecture design.

4. The theoretical part
Hegel also pointed out that: "Though the artist’s talent and genius contains a natural element, yet it is essentially in need of cultivation by thought, and of reflection on the mode in which it produces, as well as of practice and skill in producing” [6]. Creative personality, capable of managing associative thinking towards the designing an object, becomes the most important character of the creative process. A number of tasks precedes the result of the creative process: background creation for the future artistic character; the creative process itself using associative thinking, metaphors, hyperbolization, characterization (prototype development), etc., professional work execution, not only from an engineering side, but, importantly, with emotional and spiritual evaluation, expressed in public opinion [7]. The important point is interest cultivation in artistic and creative activity as the basis for professional self-determination of students — bachelors in architecture, art and design [8]. Permyakov M.B., Chernyshova E.P. identify this problem in their research papers [9]. A lot of research is devoted to the problem of forming the creativity of students — university bachelors at the professional level [10]. Professor Tkachev V.N. claims that "Reveal of the psychological aspects of creation demonstrates the loss of humanitarian milestones for designing in the field of architecture and design." In addition, he emphasizes that the visual assessment is given by the viewer according to a number of key points: "a formed sufficiently monochrome building in calm orthogonal forms causes the most favorable impression"; "... that amenities are achieved if it is unnoticeable"; there is a demand for focuses (included in the general visual climate of small forms and means of decorative art in architecture), since the monotony of the space does not give a sense of harmony. In addition to the above, he also indicates the demand for dosing, included in the elements environment carrying "... aesthetic potential" in order to present the possibility of "mental development and completion of the artistic character" to the viewer, thereby including the viewer in the co-creation [11].

5. The practical part
The creation of architectural and design objects involves an integrated approach to the development of creative ideas. Let's consider an example of the personalized approach to designing objects and architecture, based on the use of the "Self-concept" and associations technology in the design creative process [12].
Stage No. 1. Work with the "Self-concept" (Figure 1).
At this stage, the variants of compositions-associations are created by combinatorial manipulations with simple geometric figures (circle, square, triangle). The task to compare ourselves as a creator, with the invented variants, presented graphically and reflected in figurative characters is set. The work to form a further developed prototype is carried out [13]. The author offers his own variants for self-understanding through the lens of characters-associations. (in our case this is: "animate object", "hiding", "balancing", "movement") [14].

![Figure 1. Work with the "Self-concept".](image)

Stage No. 2 The analysis and correction of graphic variants, consideration of unity constituting issues: the future construction, its plastic solution and composition.
At this stage, the correction of the future project's module-prototype takes place using a modular grid (the prototype was chosen: "The steps of the balancer in the mask"), then we develop the module based on the graphic prototype [15]. It should be noted that at this stage the prototype-association can be quite contrasting with respect to the functional tasks of the designing object. The contrast associations designed to character accents, emphasizing the integrity and composition harmonious usefulness in architecture and design (according to Hegel, harmony is unity, development, combination with disharmony, internal contradiction) [16].

Stage No. 3 Formation of metrical and rhythmic decor stylistics. The technology of combinatorial compositions is applied here.
At this stage, further developed (for example in decor) architectural compositions are created based on the resulting module.

Stage No. 4 Transformation of the graphic module into the architecture object — the children's sports school building. At this stage, the design of the children's sports school and the adjacent
The territory is directly created on the basis of the developed module. The building follows the module from its plan, also the module elements are reflected in the facade finish, glazing and exterior details.

The sports school is a single-storey construction made in the constructivism style. Most of the area of the walls, as well as the roof, are glazing. The glazed part of the building roof follows the module elements. The building roof is made with a slope, prevented precipitation gathering. The roof glazing performs not only an aesthetic function, but also reduces the cost of heating and room illumination.

The difference from standard sports school buildings and typical health and fitness center is the advantage of this project. The building external appearance and urban location fits into the architectural appearance of the modern monotown. The sports school will correspond the surrounding architecture by style. The fact that, the most residential and administrative buildings in modern Russian monotowns are built above five floors should be taken into account, so we consider how original the view from the upper floors to the sports school will be. The technological execution of construction works can be solved both by the method of prefabricated modular buildings, and using modern additive technologies in construction [17].

Stage No. 5 The transformation of the graphic module into a small architectural form - a fountain (Figure 2), as a way of organizing a single stylistic environment of the territory adjacent to the sports school.

At this stage, a fountain design is created on the developed module basis. This object can be used in decorating the sports school building. The module was partially modified for a more careful combination with the surrounding environment under the design development. The fountain is located in a small recreation area, fenced off from the building of a sports school and racetracks with green spaces, designed for six people. The recreation area is equipped with benches from eco-friendly materials and illumination devices.

The appearance of a small architectural form and surrounding environment is combined with the sports school building by style. At this point the issues related to the color environment of the architectural space are being addressed [18].

Stage No. 6 The transformation of the graphic module in small plastic — design project of the desk organizer [19].

At this stage, the desk organizer is being created on the basis of the developed module. The desk organizer is made of two types of high-quality plastic (color and transparent), contains three compartments for small stationery (erasers, clips, etc.), two compartments for business cards and a compartment for pencils, pens, scissors, etc. The desk organizer dimension: 17cm x 17cm x 15cm (Figure 3). This desk organizer can reflect the corporate style of the children's sports school, including the company's color range [20].
6. Conclusions
To sum up, it is worth emphasizing once again that one of the main problems of modern Russian monotowns is the problem of architectural monotony, "featureless" and "typicality." We made an attempt to find ways to solve this problem. We examined the technology of designing a single complex of design and architecture objects using the means of the "Self-concept". We demonstrated the forming method of personalized character of a visual elements complex of the Russia's modern monotown environment by passing the way from "specific-to-general" and from "general-to-specific". In this case, the interior design elements reflecting the concept of the entire complex of design and architecture objects presented herein can be a style-forming start point, a forming method of visual component of the organization's corporate culture - a children's sports school, where, individuality and imagery have already been laid even at the beginning of the formation process.
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