Trends and Problems in Designing Architectural Image of Modern Sports and Health Complexes Using the Case of the Moscow Region

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Abstract. Over the past 10 years, the population of Russia has had an increased interest in amateur training. There are many wellness and sports complexes being constructed allowing people to comfortably do sport. This article shows the analysis and identification of characteristic features of volumetric planning solutions and architectural and town-planning design of such complexes. The modern sports and wellness center (SWC) should have versatile and multi-functional planning solutions. Analysis of the objects showed that a modern SWC has a small area of up to 2,000 sq.m, and the number of floors vary from 1 to 3. The complexes are aimed at a wide range of users, at different age groups, in addition to multi-purpose gyms, there are some specialized ones included in the layout: tennis courts, gymnastics, volleyball, swimming pools and skating rinks, as well as additional recreation functions: SPA treatments, baths, nutrition. The structural system of buildings is metal frame one.

The volume solution for the complexes varies from simplified to complex forms, facades have various finishing materials and color schemes. The variety of solutions allows to create unique buildings, but at the same time, it makes it difficult to visually identify buildings as sport and wellness centers. The necessity of creating a unified system of visual identities for mass sports facilities was identified.

1. Introduction

Over the past 10 years, the Russian population has changed its attitude toward sport, interest in amateur training, physical training for wellness and prevention is growing. Accordingly, this trend also concerns design, in recent years the number of projected sports complexes has increased. This article is devoted to the study of trends and problems of the development of an architectural image of modern sport and wellness complexes (SWC). The article analyzed features of volume-planning solutions, considered distinctive features and problems of the creation of an architectural and town-planning image of sport and wellness complexes.

1.1. Relevance of the topic

The trend toward increasing popularity of sports among the population and the number of designed sport and wellness complexes has been outlined, among other things in connection with the adoption of measures for its promotion by the Government of the Russian Federation (RF) and of the regions. In 2009 the Government of the Russian Federation adopted the *Strategy for the Development of Physical*
Culture and Sports in the Russian Federation [1] defining goals, objectives and main directions of the implementation of the state policy on physical culture and sports development until 2020. This Strategy was aimed at promoting the development of physical culture and sports, which at that time did not correspond to the overall positive socio-economic changes in the Russian Federation.

A number of state programmes for the construction of sports facilities in Russia were developed, for example, the Construction of physical and health complexes Programme. The federal project 500 swimming pools started in Russia in 2010 [2].

The Governor programme Construction of 50 SWC in the Moscow Region (MR) [3] for 2014–2019 was adopted under the state programme of the region Sport in the Moscow Region to improve the population’s health. The programme Construction of 50 SWC in the MR affected many cities in the Moscow region: 2015 – 21 pcs, 2016 – 8 pcs, 2017 – 14 pcs, 2018 – 17 pcs.

In total, from 2013 to 2017, 89 SWC were built in the Moscow region; until 2020, it was planned to complete the construction of another 52 facilities. Among them there are SWCs with swimming pools, skating rinks, playgrounds, gyms, etc.

1.2. Purpose of the paper:
- to compare the adopted state programs and the number of actually constructed sport and wellness complexes;
- to carry out an analysis of the volumetric, architectural, town-planning solutions for modern sport and wellness complexes;
- to identify characteristic features of planning and facade solutions for these facilities.

Identify the main tasks of the Government of the Russian Federation in the implementation of the above-mentioned programmes; what measures are supposed to be taken to carry them out.

The goal of the Strategy for the Development of Physical Culture and Sports in the Russian Federation [1] included the following tasks:
- creation of conditions that ensure the possibility for citizens of the country to lead a healthy life, consistently foster physical culture and do sports, have access to a well-developed sports infrastructure;
- to increase the competitiveness of Russian sport.

In order to accomplish these tasks, specific actions have been identified to be carried out, including:
- creation of a network of sports clubs near the place of residence, including weekend sports clubs for amateurs engaged in physical culture and sports;
- implementation of new educational institutions projects with compulsory construction of sports facilities (gyms, including fitness centers, swimming pools, multi-profile and complex two-dimensional sports facilities);
- creation of sports and tourist clubs (centers) in educational institutions for children and young people.

The ultimate goal of all these transformations is the contribution of physical culture and sports to the development of the human potential of Russia, to the preservation and strengthening of the health of citizens, and to the upbringing of the younger generation. The relevant performance indicators by 2008, 2015, 2020 have been identified.

The results of government programs are already visible today. In total, from 2013 to 2017, 89 SWC were built in the Moscow region; until 2020, it was planned to complete the construction of another 52 facilities. Among them there are SWCs with swimming pools, with skating rinks, playgrounds, gyms, etc. [4]

1.3. Scientific significance

This paper has established the following task: to identify distinctive features of volumetric planning solutions, facade finishing materials on the basis of an analysis of modern sports, cultural and wellness
complexes, and thereby to describe trends in the development of a modern SWC; to highlight the challenges associated with the development of their architectural and town-planning image.

2. Theory
In this article, the object of the study is modern sport and wellness institutions located in the Moscow region and built since 2018. The subject of the study is volumetric planning solutions and an architectural and town-planning image of sports and wellness facilities.

2.1. Research methodology
The analysis of 12 objects, namely sport and wellness complexes designed in the Moscow region in the last 3 years (table 1) was carried out. The solutions associated with their functional purpose, constructive system, facade materials are considered. The focus is placed on the connection between the architectural exterior image and the main function of the facility. The question was raised whether it was possible for people to identify the building of a sport and wellness complex based on its exterior. The study resulted in the following conclusions.

It is necessary to remember which definition of sport and wellness complexes is established in the legal framework of the Russian Federation: “A sport and wellness complex (SWC) is an indoor specialized or multi-functional facility that includes various sports zones for physical and recreational activities.”

- According to the classification of sports facilities, the facilities under study fall under the following types. By their main purpose all sports facilities belong to the sports and wellness type [5].
- According to the town-planning features on the residential territory, these facilities are district and micro-district ones due to their service principle [6]. All facilities are roofed-in. These are sports halls, buildings, courts, pools, skate rinks, stadiums.
- Types of SWCs intended for sports and wellness classes and compliance of the facilities analyzed:
  - SWCs, including an ice arena, a swimming pool and a multi-purpose gym – 1 pcs, 9%;
  - SWCs, including an ice arena and a swimming pool – 1 pcs., 9%;
  - SWCs, including a swimming pool and a multi-purpose gym – 3 pcs., 27%;
  - SWCs, including a multi-purpose gym – 8 pcs, 72%;
  - SWCs, including specialized gyms –10 pieces, 83%.

According to the regulations, it should not take more than 30 minutes to get to a city sports and wellness facility. The share of sports and wellness facilities located in a residential area should be taken in % of the total norm: territories – 35, gyms – 50, swimming pools – 45.

According to the planning solution, 67% of the facilities considered are multi-functional complexes. At the same time, they can include both multi-purpose gyms (Facilities 6, 7 table 1), and several gyms with various functional purposes. Facilities with a swimming pool, “ski sport”, sports school, volleyball, gymnastics, a fitness center, choreography and aerobics, a multi-functional gym, functional training gym, SPA treatments, gyms, saunas. It should be noted that complexes can have additional functions that are not directly related to sport, for example, nutrition (Facilities 5,8 table 1).

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1 Code of Practice 383.1325800.2018 Sport and wellness complexes. Design rules. Introduction date 2018-11-25
2 CP 42.13330.2016. Code of Practice. Town planning. Planning and construction of urban and rural settlements. Updated version of the BCR 2.07.01-89.*
| No. | SWC | Facades (by design) | Area, sq.m | Special features |
|-----|-----|---------------------|------------|------------------|
| 1.  | Multi-purpose sports complex. Ramensky district, village Zabolotyevskoye, village Ramenskoye Sovkhoz | Total area 1,495 sq.m, construction area 1,570 sq.m | - It is questionable whether it is “multifunctional.” Volleyball court only. - Structural diagram: metal frame - Facade: painted sandwich panels - 2 floors; the height (H) of the building is 16.5m | NOT CONSTRUCTED |
| 2.  | Sports school for children and adolescents. Mytishchi city, district 16. | Total area 3,938 sq.m, construction area 2,520 sq.m | - Gymnastics, fitness center, functional training room. Sports School - Frame-wall system - Facade plaster, steel galvanized sheet, metal panels with crest profile “Wave,” ceramic granite. Stained glass windows. - 3 floors; the height (H) of the building is 11.86m | NOT CONSTRUCTED |
| 3.  | Sports center of a closed type, Mytishchi, Silikatnaya Str. | Total area 3,561 sq.m, construction area 1,725 sq.m | - Multifunctional complex - Structural diagram: metal frame - Composite panels, sandwich panels, ceramic granite. Stained glass windows. - 2 floors; the height (H) of the building is 10.05m | UNDER CONSTRUCTION |
| 4.  | Reconstruction of the Mashinostroitel stadium, Krasnogorsk, Moscow. Yuzhny, Zavodskaya str. 5 | Total area 780 sq.m, construction area 725 sq.m | - In the building there is only a gym, on the site there are many grounds with various purposes, a stadium. - Frame-wall system - Facade: ceramic granite, fiber cement panels, brick tiles, stained glass. - 2 floors; the height (H) of the building is 11.05m | CONSTRUCTED |
| 5.  | FOK “Meteor” with swimming pool, | | - Swimming pool, cafeteria. - Structural diagram: metal frame - Aluminum composite panels, ceramic granite, stained glass. - 1 floors; the height (H) of the building is 10.15m | |
Balashikha, Zarya district
- Total area 2,262 sq.m, construction area 1,802 sq.m

6. Reconstruction of the Trud stadium, Ivanyteevka, Pervomaiskaya Street
- Total area 1,287 sq.m, construction area 1,310 sq.m

CONSTRUCTED
- multi-purpose gym. Skiing.
- structural diagram: metal frame
- ventilated facade: composite aluminum panels, horizontal-corrugated profiled sheeting, vertical-corrugated profiled sheeting, plaster
- 1 floors; H of the building is 9.28m

7. SWC in Zhukovsky, Bazhenov Street
- Total area 4,307 sq.m, construction area 2,167 sq.m

UNDER CONSTRUCTION
- multifunctional complex (gymnastics, gym, choreography and aerobics room, multifunctional gym)
- structural diagram: metal frame
- painted decorative facade plaster, ceramic granite slabs
- 2 floors; H of the building is 15.6m

8. SWC with a swimming pool, Domodedovo, Yusupovo village, Prilessnaya Str.
- Total area 1,493 sq.m, construction area 1,194 sq.m

UNDER CONSTRUCTION
- Skiing. Many outdoor sites for various purposes
- frame-wall system
- fiber cement slabs, fiber cement false wood siding, polymer concrete tiles, weathered tuff
- 1–2 floors; H of the building is 13.72m

9. Stadium Znamya Sports and Wellness Complex, Noginsk, Sanatornaya street
- Total area 1,493 sq.m, construction area 1,194 sq.m

UNDER CONSTRUCTION
- Multi-function complex, including a swimming pool, gyms, aerobics, skating rink, SPA, sauna
- frame-wall system
- fiber cement panels, ceramic granite
- 2 floors; H of the building is 10.5m

10. Orlinue krylya Sports Complex in Istra, Obushkovskoye village, Pokrovskoe village, Pokrovsky district
- Total area 1,493 sq.m, construction area

NOT CONSTRUCTED
11. Dolphin Sports and Wellness Center, Krasnogorsk district, Nahabino village.
- The area of the building is not more than 2,000 sq.m
- swimming pool, sports clubs
- composite facade panels, ceramic granite
- frame-wall system
- 1–2 floors; H of the building is 13 m

CONSTRUCTED

12. Sports complex for playing tennis. Ramenskoye, Krymskaya street, 13
- Total area 2,980 sq.m, construction area 2,600 sq.m
- tennis: lawn tennis, ping pong
- facade cassettes made of galvanized steel, sandwich panels, ceramic granite tiles. Sun-protective aluminum rail.
- structural diagram: metal frame
- 1–2 floors; H of the building is 13 m

CONSTRUCTED

3. According to the results of the analysis, it should be said:
- SWCs are built all over the country: new and old neighborhoods, single-family residential neighborhoods, the outskirts of the city and, relatively, in the city center, this is a definite plus;
  - small facilities, total area up to 2,000 sq.m. - 80% of facilities;
  - floors: from 1 to 3 floors, building height from 9.28 m to 17.4 m.
  - the frame system (metal trusses) in 100% of the facilities providing freedom of planning and rearrangement, which in turn is the most important factor in their operation;
  - these projects were approved in 2018. To date, 5 projects have been implemented, and 4 projects are under construction. Not implemented – 3 projects.
  - different facade systems and materials of facade finishing are used: 20% – sandwich panels, 70% – composite and metal panels, 40% – plaster or fiber cement sheets.

I would like to focus on facade solutions separately. The visual identity of the facility, the correlation between the architectural and town-planning image and its function is seen in all the considered SWCs, but in some facilities their sports and wellness purpose is difficult to see. Several examples of the architectural exterior of the building (Facilities 1, 5, 9 table 1) look quite depressing, in our opinion; the majority are satisfactory, and there are some really interesting exteriors that should be noted (Facilities 2, 4, 8 table 1).

We will try to understand the reasons behind the current situation. Signature look:
- various facade systems: hinged panels, ventilated hinged systems, plaster systems;
- variety of applied building materials: sandwich panels, fiber cement panels, ceramic granite tiles, facade cassettes - composite materials, galvanized, decorative plaster, false wood siding, polymer concrete tiles, weathered tuff, galvanized sheet, metal panels with crest profile “wave”, brick tiles; colored glass;
- materials with different texture;
- materials vary in price (from simple smooth galvanized sandwich panels to brick tiles and voluminous panels, finishing imitating wood texture).

These factors influence both the quality of the general appearance of the facility and the time it takes to construct a building. On the one hand, the diversity of materials, systems, and the color of buildings is undoubtedly a positive aspect. On the other hand, it is not entirely appropriate to use these solutions in the already established, existing neighbourhoods. The totality of these factors leads to
difficulties in the visual identification of the purpose of a facility based on its exterior (Facilities 4, 7, 10, 12 table 1).

Turn back again and remember the main tasks set by the government, among them the important ones are general accessibility for the population, widespread inclusion and involvement of more people in sports, so universality and multifunctionality should become one of the main principles of SWC design. Not all facilities meet these conditions.

These requirements can be implemented in the following way:
- using universal platforms, fields, gyms, skating rinks, etc., which can be transformed, rearranged, adapted, converted to several types of classes and events. Such gyms are used in Facilities No. 6, 7;
- using a frame structural system, large-span structures (trusses, shells) providing for a “free layout” and rearrangement;
- giving SWCs several functions, various sports, as well as other functions, such as, nutrition, possibly, club classes (dance, yoga, Pilates, etc.), as well as SPA-procedures (“water-related”), bowling, sauna procedures, massages, etc.

This is especially relevant in rural settlements, where there is a shortage not only in sports, physical and health facilities, but also in entertainment, intended for “weekend rest.” Design of multifunctional complexes would solve several problems at once.

4. Practical significance
The design of sport and wellness complexes tends to create versatile, multifunctional facilities that also have other functions besides sports, like nutrition and recreation. The structural system is a wire frame, most use metal structures achieving maximum freedom of planning and remodeling. The use of a variety of materials for facade decoration in addition to the possibility of designing a unique facility creates difficulties in identifying the function of the building. Taking into account the fact that a SWC is designed in accordance with state programs, there is a need to create a single system of visual identities of mass sports facilities in the Moscow region.

5. Conclusions
The development of physical culture and sports is undoubtedly one of the priority areas in state social policies. However, the designed sport and wellness complexes have not yet fully implement the idea of multifunctionality and versatility, and in most cases it is difficult to identify the facility by its architectural exterior. In the future, these circumstances must necessarily be considered.

6. References
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