

Basics of architectural typology of modern fitness centers

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Abstract. The article pays attention to the increased interest to sport not only between professionals, but also the people who are doing fitness. The requirements for design and construction of sports facilities are changing. Due attention is paid for application of environmentally innovative solutions and satisfaction of requirements of modern consumer. However, there is no document in Russia that meets the modern requirements of fitness center design. Generalization of various factors made it possible to formulate the basis of architectural typology of fitness objects: taking into account the requirements of accessibility of a low-mobility group of the population; consumer orientation of different social groups; ensuring multifunctional facilities; transformation's possibility not only of halls, but also of public spaces; incorporating the natural environment into the interior and exterior and providing energy-saving technologies. As a result, it was concluded that it is necessary to develop in Russia a new architectural typology of fitness centers, oriented to the needs of the modern consumer and meeting the requirements of "green" standards. The results of the study can be used to develop the regulatory framework and used in course and real design.

1. Introduction

Recently, there has been a trend in the sport's development in the Russian Federation in the field of design and construction of sports facilities. In this direction, the state policy aims to create special conditions that will motivate citizens to maintain a healthy lifestyle, exercise physical culture and sports, as well as qualitative improvement of sports infrastructure and increase the competitiveness of Russian sports, as well as taking into account environmental requirements [1 - 4]. Undoubtedly, in Russia the impetus for the construction of sports complexes was the major international sports events (University games in Kazan in 2013, Winter Olympic and Paralympic Games in Sochi in 2014, the World Cup in the cities of Russia, including Samara in 2018), which were held in Russia. The revival of the construction of sports facilities in Russia is also facilitated by the federal target program "Development of physical culture and sports in the Russian Federation for 2016 - 2020 years," the State program of the Russian Federation "Development of physical culture and sports," the Strategy for the development of culture and sports for the period up to 2020.

According to Rosstat and WMTOM, positive dynamics can be traced, showing a stable increase in the number of sports facilities (on average by 4-5% per year), including sports halls and swimming pools. The number of people engaged in physical education and sports (on average by 10-18% per year) at the place of residence and in sports clubs is also increasing, which confirms the demand in fitness centers.

In Russia, the majority of fitness visitors are young people aged 20 - 29. More than 56% of all



fitness clubs in Russia are women and they prefer group programs and cardio. Recently, however, this indicator has changed, resulting in the formation of a consumer of fitness services of the older age group (13.2% of clients over 40 years of age). According to official data Samara is on the 8 place in the top 10 fitness capitals.

As a result, the need to form new approaches in the typology of fitness centers that focus on the modern consumer and determined the relevance of the work.

2. Materials and Methods

The problems of formation, development and design of fitness objects, with peculiarities of their typological aspects, have recently received close attention. This study is based on works that consider the following issues: history of formation and development of sports complexes (FSK) (R Vershillo, M M Posohin, N M Resnikov, G V Yasny, etc.); Basic design of FSK (V V Adamovich, P A Alexandrov, Z E Archangelskaya, B G Barkhin, N P Bylinkin, A L Gelfond, I A Ilin, etc.); Typological aspects of the design and modernization of the FSK (L V Aristova, I A Viculin, I A Emelyanova, M G Zobova, S G Zmeul, A Y Kistyakovsky, N N Kiryanova, V A Mashinsky, B A Mahanko, etc.); Complex issues of development of sports industry and material and technical base of FSK (J Anderson, A A Goeder, L V Zhestyannikov, R Ye, V B Myakonkov, D Ovens, A B Perlov, O Reilly, M Tomich, K Triki, Z Hoyman et al.). Introduction of new approaches into the practice of design and construction in the organization of architectural typology of fitness centers will improve consumer properties of the object, increase ecological qualities and level of comfort and improve architecture of buildings [5 - 7].

The study sets out the following tasks: to study the regulatory documents in force in the Russian Federation on the design of sports and sports complexes, to analyze the advanced international and domestic experience in the design and construction of modern sports and sports complexes and to identify the specifics of their functional and spatial structure; to define features of modern architectural typology of fitness objects. Therefore, the subject of research in this work was functional and planning features affecting architectural and planning organization of modern fitness objects.

3. Results and Discussion

Today, there is no document that fully meets the modern requirements of fitness facilities design. In the current document SP 118.13330.2012 "Public buildings and structures" only requirements to design of sports complexes are given. Introduced from June 1, 2017 the first GOST (document) in the field of fitness services (GOST R 57116-2016 "Fitness services. General Requirements for Fitness Facilities, GOST R 57138-2016 Fitness Services for Children and Adolescents. General requirements "and GOST R 56644-2015" Services to the population. Fitness services. General requirements "), determine the location of fitness facilities, distribution of functional zones, etc., and are more focused on entrepreneurs providing fitness services, address issues of organization and safety, etc. As a result, consideration of the domestic regulatory framework of architectural design of sports and sports complexes shows that it needs modernization.

During the study the comparative analysis was carried out of advanced foreign experience of design and construction of modern sports complexes. The most indicative of them, with features of functional-planning structure, are presented on figure 1. For example, Kiel sports complex (Belgium, Antwerp, Arch. UR architects, 2013) (figure 1 a). The planning structure of the complex is built on the principle of inversion - all sports halls of the complex (large sports hall, dance hall and multifunctional hall) are located along the outer perimeter and are as open as possible in all directions, and the halls are connected by a service area (public entrance area with a rental point of sports equipment and clothing, auxiliary area with locker rooms and showers, technical premises), which has connections with the surrounding landscape. White steel construction and multi-layer polycarbonate contrast with dark service area material. The complex uses energy-saving measures, namely: floor heating in a large hall; lighting sensors; the use of rainwater that accumulates and is stored on the green roof of the service area; system of air purification and cooling with rain water. The opportunity to transform

sports halls is available in the sports complex "Three-in-One" (France, Parse-Mele, Arch. Savioz Fabrizzi Architectes, 2016). The complex includes three separate athletic fields with their own entrances, locker rooms and stands. The roof of the complex resembles the teeth of a saw. Since the interior space has no partitions, and there is only a visual restriction of the halls due to the complex roof, this makes it possible to use athletic fields, both for large open events and for small ones requiring accommodation in separate halls. Thanks to the complex design of the roof with panoramic windows, a lot of sunlight enters the sports complex. Outdoor play grounds are located in the area adjacent to the sports complex. The building of the complex meets the Swiss standard Minergie on environmental friendliness and energy efficiency. The roof of the complex is completely covered with solar panels (figure 1 b). Complex of multifunctional facility in dense urban environment – is the sports center Jules Ladoumegue (France, Paris, Arch. Dietmar Feichtinger Architectes, 2014). The four-story building includes a covered climbing wall, gym, dance studio, multifunctional spaces, offices, and a conference room. Sports grounds and multifunctional fields are located on the roof of the complex. Small fields are placed between large fields, which are separated by plantations and have a pedestrian connection on perforated concrete slabs. An outer monumental staircase leads to the roof of the sports center, which also links the street level with all floors of the complex. Accessibility of different floors of the complex for low-mobility visitors is possible thanks to the elevator located in the lobby. Sun protection is provided by horizontal panels and movable vertical lamellae, which in turn are also visual protection of halls. On the southern facade of the sports center there are photovoltaic panels (figure 1 c). The sports complex (North Carolina, Charlotte, Neighbouring Concepts, 2010) actively uses the connection of the natural environment with the internal structure. The complex was awarded a LEED gold certificate, because in construction and finishing were used secondary treatment materials, and a special metal silver roof coating is aimed at reducing heating of the interior premises. The lighting system is built on the principle of actual stay and level of natural lighting, using of anti-aircraft lights, large glazing areas and special orientation of the building - techniques aimed at minimizing the amount of artificial lighting. The through public space in the entrance group divides the complex into different functional zones: a sports area with locker rooms and service, and a public area for visitors with a cafe and shop. The multifunctional hall is convertible, which allows it being used at the same time under several different trainings (boxing, trainers, fitness), as well as the possibility to use the whole space (figure 1 d).

The analysis of the experience showed a developed composition of functional zones of the considered objects, with identification of additional accompanying maintenance, use of adjacent territory, taking into account the requirements of MGN and mandatory compliance with "green" standards.

The study of national experience of design allowed identifying classification of fitness centers taking into account differentiation by level of income of consumers - Economy class (for low-income consumers with the minimum and necessary number of functions, without additional amenities, the maximum number of visitors per unit area is allowed), Business class (for middle-income consumers with increased quantity of services) and Premium class (for high-income consumers, intended for a specific target audience, the object is saturated with additional functions and refers exclusively to multifunctional fitness centers).



Figure 1. Foreign experience in the design and construction of modern sports facilities: a - sports complex Kiel, Belgium, Antwerp, arch. UR architects, 2013; b - Sports complex "Three-in-one", France, Pars-Mele, arch. Savioz Fabrizio Architectes, 2016; c - Sports Center Jules Ladoumegue, France, Paris, arch. Dietmar Feichtinger Architectes, 2014; d - Sports Complex, North Carolina, Charlotte, arch. Neighboring Concepts, 2010.

The generalization of urban planning, volume-planning, functional factors made it possible to formulate the following features of architectural typology of modern fitness objects, which can be reflected in the design of fitness centers: taking into account the requirements of accessibility of a low-mobility group of the population; consumer orientation of different social groups; ensuring of multifunctional facilities; possibility of transformation not only of halls, but also of public spaces; incorporating the natural environment into the interior and exterior and providing energy-saving technologies.

In this study, the identified features of the architectural typology of modern fitness objects were tested on the experimental project of the fitness center in Samara (figure 2). The experimental fitness center is a family-run premium facility. Focusing on the design site and social affiliation, the functional structure of the fitness center is a combination of such basic functions as: fitness room with all necessary areas, sports pool, children's pool, thermal pool with hydro massage, research area, locker rooms, entrance unit, recreation areas, children's fitness and leisure, administrative unit. Multifunctional gym, without stationary partitions, includes area of boxing and single combats, cardio-zone (including for MGN), zone of free scales (including for MGN), zone of functional training, zone of cross training, running track and zone of strapping. If necessary, the gym can be divided by transformable partitions into two or more halls. Large public space illuminated by light wells can also be divided by mobile partitions or furniture for various activities. In the interior of the complex, the restaurant hall uses green walls with moss, succulents and ampel plants. Part of the roof is operated, arranged according to extensive type, and part of the roof is technical, with the energy-saving equipment on it. The volume-planning structure is formed by a fitness hall block and associated zones (2 floors), a pool block (2 floors) and a corridor-gallery connecting the blocks and illuminated by light wells.

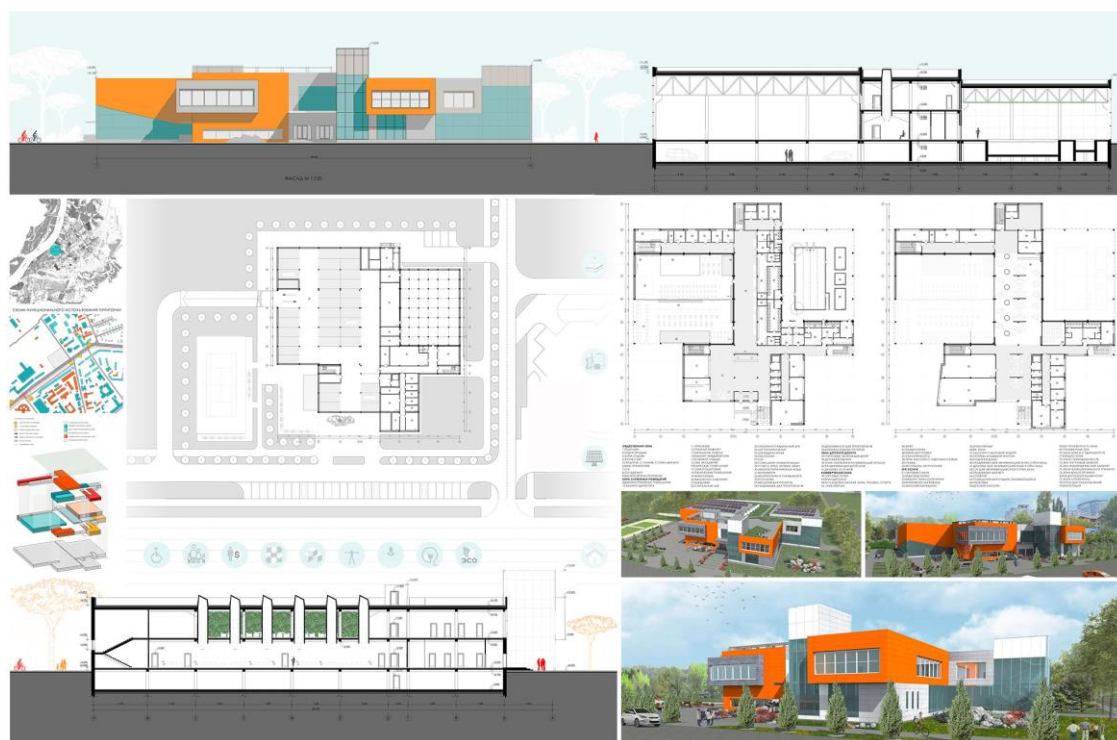


Figure 2. Experimental project of a fitness center in the city of Samara, completed at the Chair of ARPB AACE SSTU, students Aseeva Anastasia, Mikhailina Polina, lecturer Ph.D., Assoc. I V Zhdanova, Ph.D., Assoc. A A Kuznetsova.

4. Conclusions

As a result of the study, the following conclusions are drawn:

- The current regulatory documents of the Russian Federation on the design of fitness facilities are outdated and do not meet modern requirements and need to be modernized;
- The analysis of best practices in the design of fitness facilities made it possible to discover a developed functional composition, including main, additional, auxiliary, public, commercial and service areas, as well as measures to use the adjacent area and take into account environmental principles;
- The analysis of domestic design experience revealed the classification of fitness centers taking into account differentiation by the level of income of consumers: economy class, business class and premium class;
- Summarizing the received information, it was possible to identify peculiarities of architectural typology of fitness objects: taking into account the requirements of availability of MGN; consumer orientation of different social groups; ensuring multifunctional facilities; possibility of transformation not only of halls, but also of public spaces; incorporating the natural environment into the interior and exterior and providing energy-saving technologies.

The identified features of the architectural typology of modern fitness centers were tested in the experimental project of the fitness center in Samara, in which the authors proposed a concept aimed at premium consumers with a developed children's leisure and sports area, with a research area dedicated to sports and nutrition issues, a spa service area, outlets, a multifunctional cafe hall, a developed public space and multifunctional fitness halls.

In conclusion, it should be noted that in Russia it is necessary to develop a new architectural typology of fitness centers, oriented to the needs of the modern consumer and meeting the requirements of "green" standards [8 - 9], it will promote energy-efficient use of resources, satisfaction of the principles of sustainable development, modern development of the architecture of the city, as well as to involve in cultural ways of leisure and health improvement of the nation.

The results of the study can be used in the grounding of standard recommendations for the design of fitness facilities, used in the experimental and educational design of fitness centers of different classification.

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