South Ural State University Campus: Architectural Development Concept in Accordance with International Standards

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Abstract. The article deals with the vital problem of the implementation of the Program to enhance the competitiveness of the South Ural State University (SUSU) among other scientific and educational centers, which defines the main objective – to form a world-class university. According to the set objective, the most important task is to build a landscaped campus, which can be efficiently solved by the architectural means. The solution of this task is based on the scientific methods of the territorial and architectural improvement of the main university building complex development in the northern academic area and the architectural and aesthetic improvement of the space structural arrangement of the buildings. The author analyzes the global practice of modern campuses in Russia and abroad based on the Internet resources. The author carried out some additional on-site surveys of foreign campuses in Australia, Canada and China. The essence of the architectural concept of the first university campus development stage lies in the science-based achievement of a harmonious architectural and space unity of solid and plane elements of the site development, landscape arrangement of the main building’s courtyard and the adjacent territories with an efficient use of the relief, water areas and planting, allotment of additional spaces for landscaped areas due to a split-level arrangement, including a landscaped platform, increase of the underground space utilization share with the arrangement of an underground car parking and an underground walkway considering the environmental requirements. Further, it is planned to use the author’s methodological approach for the southern academic and the northern residential university areas, which will allow to create a duly completed landscaped SUSU campus with a developed infrastructure according to the international standards.

Keywords: city of Chelyabinsk, South Ural State University, main building, architectural concept, landscaped campus, ecology.

1. Introduction
The program of enhancing the competitiveness of the SUSU among other scientific and educational centers sets the main objective – to form a world-class university focused on reaching the global leading position. In order to implement such program one of the most important tasks is the SUSU campus development according to the international standards, using the tools of the modern architectural science.
2. Body

The optimization of the human living environment is inextricably connected with architecture, which covers many issues of a comfortable environment establishment by virtue of its specifics. It is particularly important for university campuses characterized by vast areas of the occupied territory, simultaneous staying of lots of people, etc. Therefore, the scientific methods of the territorial and architectural improvement of the main university building complex development in the northern academic area and the architectural and aesthetic improvement of the space structural arrangement of the buildings are used to solve the set task.

A theoretical premise of the architectural concept of the first SUSU campus development stage is an analysis and generalization of the global experience with on-site surveys of the known university campuses in view of the scientific studies in this field [1-5]. It was also preceded by the author’s scientific research and project designs on the reconstruction of the SUSU facilities [6-8].

The SUSU department of architecture has been performing a long-term focused work on the architectural renovation of the university campus. Over the period since 1995, 65 projects were implemented under the auspices of the author, 20 of them were completed. Concept designs “Architectural Formation of the SUSU Campus Development”, “Architectural Development of the SUSU Campus”, etc. were developed in 2016.

The most famous implemented project is the reconstruction of the main university building, which central part was built in 2001-2003. Before the reconstruction it was a 28-meter high 7-story building with an inclined roof. After the reconstruction the building reached the height of 86 m by the top of the emblem above the spire. In 2008 the western annex was erected, in 2012 – the eastern annex with the landscaped yards, after the construction of which the architectural image of the main building was completed. The author’s methodological approach to the campus development was tested in this project [7].

An analysis of the global experience allowed to outline positive examples of advanced campuses in Russia and abroad. In our country one of the best acknowledged campuses is the Far Eastern Federal University campus arranged near Vladivostok on the shore of the Pacific Ocean. It consists of academic and laboratory buildings and the entire necessary infrastructure to organize academic and scientific activities and ensures a high living comfort level. Favorable conditions for physically disabled people have been created in the campus [9]. Singapore architect Thai Liu Ker developed a master plan of new Innopolis town near the city of Kazan, as well as a campus of the cognominal university, which consists of an academic and laboratory building and 4 dormitories interconnected by a pedestrian gallery. There is a developed sports and recreational center on the campus territory to stimulate a healthy lifestyle among students and citizens [10].

Among foreign campuses it is worth noting the famous Massachusetts Institute of Technology in Cambridge, USA. It consists of many buildings erected in different architectural styles, although most of the facilities were built in 1961 (figure 1). Architects F. Gehry, S. Holl and F. Maki, who created a unique architectural and artistic image of the new university buildings, took part in the design of the campus [11]. Nanyang Technological University in Singapore located in the natural environment is original. Its architectural feature is the School of Arts, Design and Media built in a futuristic style with a grass-covered roof [12]. FORBES magazine noted the most beautiful campuses in the world. For example, the University of Cincinnati in the USA consists of 6 academic and laboratory buildings, a gym, a stadium and a dormitory harmoniously interconnected by the landscape design elements under the project of architect D. Hargreaves (figure 2) [13]. Tsinghua University in China represents a picturesque campus where artificial ponds, small architectural forms and planting in the traditional Chinese style are actively used. It is located near Beijing University in a parkland, on the area of the former emperor gardens [14].

The author made on-site surveys of the modern foreign campuses in Canada, Australia and China, as a result of which he identified peculiar features of their architectural and landscape organization [15-17]. For example, the University of British Columbia in Vancouver (Canada) is located on the shore of the Strait of Georgia on the town development border and constitutes an independent
The essence of the architectural concept of the first university campus development stage lies in the science-based achievement of a harmonious architectural and space unity of solid and plane elements of the building development, a landscape arrangement of the main building’s courtyard and the adjacent territories with an efficient use of the relief, water areas and planting, allotment of additional spaces for landscaped areas due to a split-level arrangement, including a landscaped platform, increase of the underground space utilization share with the arrangement of an underground car parking and an underground walkway considering the environmental requirements [22].

As a result of a pre-project analysis it has been established that the SUSU territory is divided by Lenina avenue into the southern and the northern areas, which was historically formed. The northern academic complex was built in the beginning of the 1950s, and the southern academic university complex and the northern block of dormitories and residential buildings for students and lecturers were erected in the 1960-70s.

The offered concept developed on the basis of the multiple-option design is grounded on the symmetry of the main building, in a compositional subordination with which the architectural and planning territory structure is arranged, with the preservation of the capital facilities and demolition of the old buildings and structures (figure 3).

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A new architectural ensemble is based on the layout arrangement and improvement of the four- and five-story premises reconstructed and erected along the perimeter of the main building. A new five-story academic and laboratory building will be symmetrically placed from the eastern side. It will be of the same height as the existing building of the research institute of digital systems in the western part of the complex. This academic and laboratory building is interlocked with the volume of the arts center and the adjacent open amphitheater, which is ensured by a drop of the relief with its decline westwards.
Figure 3. Layout of the general plant of the first SUSU campus development stage: 1 – main building; 2-7 – laboratory and academic buildings; 8 – arts center; 9 – platform; 10 – construction department; 11 – publishing center; 12 – electric power plant; 13 – square in front of the main building; 14 – Lenina avenue; 15 – underground walkway; 16 – second academic building; 17 – park; 18 – chapel of Saint Apostle Andrew the First-Called (design).

A planted platform considerably increasing the landscaped area for recreational purposes is arranged in the middle part of the yard. It is united by two crossings with the main academic building by the third-story level. Additional landscaped platform areas are placed symmetrically and emphasize the main architectural axis of the main building’s complex, which is accented by an increased volume of the central laboratory building in Kommuny street. An auxiliary area with warehouse and garage facilities, which are interconnected by a developed network of highways and walkways, is arranged under the entire platform. All the yard sections, which are free from the site development and
passages, are landscaped and planted considering the environmental requirements to the selection of types of trees, bushes and lawns, as well as to road surfacing materials.

A two-level underground parking ensuring a rated number of parking stalls and being an efficient technique of the underground space development is provided for in front of the main building. From its western side there is an underground walkway from the main to the second building, enabling a split-level safe movement of transport and pedestrians with the preservation of capital improvement at the ground level [21].

The architectural composition of the main building is developed by the symmetry of the square in front of it, which concept is solved originally. The square used for solemn diploma delivery ceremonies in summer represents a picture of the main building’s silhouette in the plan (see figure 3). The architectural and landscape organization of the square is developed by a triradial planning system focused on the compositional center – the Monument to the Eternal Student. Areas for placement of graduates, which are accented by the landscape architecture and divided by landscaped sections, are provided for in the orthogonally related directions between these rays.

A symmetrical architectural and planning composition of the park, where the chapel of Saint Apostle Andrew the First-Called will be built, is preserved in the subordination with the volume of the main building and the square in front of it.

The compositional principles of the reconstructed main building based on architectural neo-classicism with a step-wise tower-shaped completion of the spired building influenced the architectural formation of the chapel itself (figure 4). The adjacent territory is additionally landscaped using the advanced environmentally-friendly materials with the maximum preservation of the existing planting, including lawns and all the blue spruces.

The reconstructed main university building and the chapel’s architectural composition are arranged in one style with the achievement of a space interconnection of educational and spiritual facilities belonging to different times.

![Figure 4. Fragment of the general view of the SUSU landscaped campus with the chapel of Saint Apostle Andrew the First-Called in the foreground (design).](image)

3. Conclusion

A system phased implementation of the architectural concept will allow to create a science-based modern landscaped SUSU campus complying with the strategic objective of “5-100” program. It will ensure the university’s entering and strengthening its positions among the leading world-class universities with obtaining of a high status in the main international ratings of THE or QS. It will enable to form a unique academic and research complex of a new type, which is not only attractive to the students from Asian and African countries but also from the countries of Europe, Australia and America. In the future it is planned to use the author’s methodological approach for the southern
academic and the northern residential university areas, which will allow to create a duly completed landscaped SUSU campus with a developed infrastructure meeting the international standards.

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