Architectural and artistic features of the concert halls’ construction

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Abstract. This study is devoted to the architectural and artistic features of the multifunctional concert halls’ construction. Since, in our time, more and more often use non-specialized objects for the concert halls’ function (stadiums, theaters, clubs), this study is relevant. Also, the interest of researchers in the concert halls’ subject is rather mosaic and fragmented, and the works that systematically study the structures’ origin in Russian culture, from the standpoint of architectural and artistic features, are still not observed. It should be noted that the formation of a unique architecture image of a multifunctional concert hall will contribute to the tourism sector’s development, add prestige to the city and satisfy the growing demand of the population for cultural entertainment and a variety of leisure activities.

The article discusses the principles of designing the multifunctional concert halls that can be adapted to various types of concerts (philharmonic, chamber, pop, choreographic, prefabricated), due to the technical equipment that will contribute to the architectural object’s novelty. The article presents the results of studies on the conceptual model formation of a multifunctional concert hall for the city of Rostov-on-Don, which is proposed to be located on the left bank of the river Don, west of the Voroshilov bridge. This place is promising for the construction of public buildings with an entertainment function.

1. Introduction

1.1 The relevance of the research.
Since, in our time, more and more often use non-specialized facilities for the function of concert halls (stadiums, sports palaces, theaters, clubs), this study is relevant. Also, the researchers’ interest in the theme of the concert hall is rather mosaic and fragmented, and the works systematically exploring the origin of structures in Russian culture, from the standpoint of architectural and artistic features, are still not observed [1].

It should be noted that the formation of a unique architecture image of a multifunctional concert hall will contribute to the tourism sector development, increase the prestige of the city and satisfy the growing demand of the population for cultural entertainment and a variety of leisure activities.
The aim of the study is to search and propose a conceptual model of a multifunctional concert hall for the Rostov-on-Don city. During the research, the main goals and objectives were identified.

1.2 Key findings emanating from the goals and objectives of the study.
Historical analysis confirmed the hypothesis of the need for a concert hall as a separate building. Analysis of domestic and foreign experience in designing concert halls revealed the importance of architectural and artistic aspects of design. The architecture of public buildings and structures is designed to satisfy the diverse aspects of human life, reflecting in an art-shaped form the social processes of the society development [2]. Architectural dominant becomes significant in their architectural and artistic image, public buildings, especially their complexes, regardless of size, organize urban spaces. They play an important urban development role both in the areas of mass development and in the new or reconstructed urban centers in all urban ensembles.

The architectural and artistic aspects are important in shaping the building’s appearance. It is formed by the architectural concept of the author, and creates a unique, artistic image of the building, affecting the feasibility, solution modernity, the choice and use of materials. Since ancient times, the architect creates an aesthetic image of the designed building. A building is considered architecturally finished only when it is functionally thought out, correctly executed and has an artistic image.

The significance of the functional-planning aspect of designing, consisting of a number of functional zones or groups interacting with each other, is also revealed. Proper arrangement of the main functional areas, for easy communication between them, with the possibility of orientation inside the building, creates the basis for a successful, thoughtful plan. To create the correct functional planning structure, it is necessary to efficiently use the areas, compactly and conveniently arrange the main premises, and also fit the object into the development context [3]. The main components of the functional planning aspect are: the main groups of rooms organization, the organization of technical rooms, communication between the rooms and the connection of the building with the environment.

1.3 The confirmed water environment value.
The use of a horizontal surface of water in design is based on the main advantage of the static water state. The ability to reflect architecture on the water surface, instantly responds to the changes in wind power, colors of the sky and the environment, changes the object’s perception. Therefore, the emotional effect of reflection is so great that it occupies a special place among other elements of expressiveness. An open water plane combines the architectural structures by opening the perspectives through a water mirror. The inclusion of the aquatic environment in design is one of the effective means of creating high aesthetic qualities that positively affects the human psyche. Buildings on the water are always the unique pieces of architecture.

1.4 The revealed importance of light installations.
Using light installations, it is possible to achieve a certain vision of objects, while deceiving perception. The potential of such lighting makes it possible to create the unique projects that affect spatial thinking and visual perception. In architectural installations, light, sound, and other effects become part of design and architecture. Thus, the light design, the illumination of buildings, is used as a tool of influence and a source of new impressions.

1.5 The importance of new technologies in the concert halls’ design.
Unique, transformable for any type of concert, the concert hall makes special equipment. The imagination of the architect provides the basis for new fantasies, and technology, in turn, contribute to their embodiment. What seemed impossible a few years ago is being realized today.

The typological model of the stage space as a result of which the recommended number of halls was confirmed – as at least 2 in one complex (large, small), was analyzed, [4]. As well as the location of the so-called “entertainment garden” - a concert space in a park environment, if the facility territory is enough.
2. Design Principles for a Multifunctional Concert Hall.

Several promising places were selected for the object design, and using the natural-climatic, urban planning, transport and pedestrian, functional, compositional analysis and sociological research, the optimal site for the design was selected. As a result of the location study of the objects performing the function of concert halls in the Rostov-on-Don city, the design site located along the coastline was selected, which allows to strengthen the architectural and artistic advantages by combining the architectural structures of the left and right banks by reflecting “Figure 1” in the water mirror. The site for the multifunctional concert hall’s conceptual model formation is located at Rostov Region, Rostov-on-Don, on the left bank of the river Don, western part of the Voroshilov bridge. The area of the site allows to place a large-scale object, without limiting its location on the selected site, becoming an architectural dominant.

2.1. Conclusions of the design territory pre-project analysis.

Based on the urban development analysis and legal documentation of land use and the city development, the concept of the design object is formed. It should be a new architectural landmark in the existing urban fabric; public space for communication, leisure and meetings, rehearsals and games in space; interact closely with the surrounding context.

The choice of a promising building plot is determined by a number of factors: at the moment the plot is empty; in the rules of land use and development, the territory belongs to the public zone, commercial and business purposes; located in an actively developing block. During the development, a comprehensive development of the territory of 6 hectares is planned, of which 2.7 hectares are allocated for the first phase of construction. Landscaping of the site is 68.7%. 83.7% of the total land area will be cleared for construction. 1.2 hectares is provided for compensatory landscaping.

Figure 1. General plan of the projected area.

General plan explication: 1. Multifunctional concert hall, 2. Open air amphitheater, 3. Entrance area with ads, 4. Embarcadero, 5. Open air museum, 6. Open area for reading, 7. Leisure zone, 8. Car entrance, 9. Viewpoint, 10. Bridge for passers, 11. Parking lot, 12. Unloading area, 13. Household zone.
3. The object’s architectural concept justification.
The concept of a multifunctional concert hall is designed for 3600 visitors. The building is planned to be divided into five functional blocks: a small concert hall, a large concert hall, conference rooms, a restaurant and the “Figure 2” museum.

**Figure 2. Plan at + 7.750 m**

The concert hall itself will occupy a 2.5–3-hectare site, the space around it will also change: a part of the Left Bank located within the projected area is designed as the embankment’s continuation.

The space from the Levoberezhnaya street will be used as the area in front of the concert hall and the car access organization. The multifunctional concert hall will not overshadow the space of the embankment, but will fit into it, revealing a transparent glass facade in its direction, offering the visitors beautiful views during both winter and summer seasons.

The new auditorium lobby is free from the unnecessary elements and opens up the space for the public, both for music lovers and other visitors to this modern facility. The spacious lobby will serve
not only as an entrance to the concert world, but also serve as a kind of public platform where the visitors may get together, talk and can feel like part of the community. That is, the recreational spaces of the multifunctional concert hall will function as one of the places of civil, social and cultural life of Rostov-on-Don.

The theatrical approach will extend to the entire building, the surrounding street, and the landscape [5]. Large glass facades will help to improve the visual connection of the interior with the exterior. The structure of the concert hall building is designed to reflect the unity of light and sound, architecture and music. Exterior and interior identify the frozen sound waves, the physical embodiment of endless movement.

The concept of a multifunctional hall involves the location of all auxiliary communications, such as parking spaces and parking for freight vehicles, for the maximum convenience of staff, so as not to distract the visitors from the concert performances. Entrance for the staff and musicians leads directly to the artists ’premises. The space is directly connected with the backstage and thus with the scene, too. The truck unloading facilities are at the scene level. This significantly reduces daily expenses, because there is a very small distance between the unloading rooms and the stage and it is not necessary to use a freight elevator to move the objects to the stage.

The site needs to be again physically and functionally connected to the city. Transformation is needed from a place cut off from the context of the city, forgotten, devoid of functions, into an urban place.

The strategy is aimed at allowing the city to enter the project, strengthening the relationship of the exterior and interior with the environment; proposing the development of a new public park on the left bank of the Don river, capable of restoring the natural essence of the site, giving Rostov-on-Don a new city landmark of the systems in the new concert complex. Thus, the site will become a part of the city, recognizable and actively involved in urban dynamics [6].

The expansion of the city will be manifested in the activation of the Left Bank of the Don river as a new public epicenter and in the transformation of public zones into the spaces for society. By organizing the new green spaces and mitigating the effects of air pollution, a new city square is being formed. This will help strengthen the relationship between people and nature. A new flexible space capable of adapting to various events, seasonal changes and preserving the flora and fauna is being formed. A new architectural landmark will be added to the existing urban fabric with a new cultural landmark.

A multifunctional concert hall is not just a building, but a system closely interconnected with the surrounding context, a public space for communication, leisure and meetings, a space for rehearsals, a space that promotes relaxation on the observation deck and public garden [7].

The long-term sustainability of the cultural center will be ensured with a high level of service to the urban community, music artists and professionals working behind the scenes.

4. Architectural solution

Taking into account all the territorial features, an object of a multifunctional concert hall has been developed taking into account the principles of designing halls that can be adapted to various types of concerts (philharmonic, chamber, pop, choreographic, prefabricated), due to the technical equipment that will contribute to the novelty of the architectural object.

Using a system of platforms, raised and lowered by four special stage lifts, allows to raise the orchestra platform.

With the help of a sound distribution system with controlled panels integrated in the walls and dome, it is possible to achieve perfect sound, and the QSX (Quick Seat Exchange) seat movement system helps to transform the visual rows into a flat floor in just 40 minutes [8].

Today, the scene can suddenly change its height, shape, area, or even begin to soar in the air. However, the complexity of the functionality and characteristics did not make the equipment logistics more complex. Conversely, the structures have become lighter and more mobile, and installation is taking less time.
Technologies allow video surfaces to be moved across the entire space of the stage and the hall in different planes using rotary and sliding mechanisms, as well as dynamic winches, join in one plane and crumble into the small parts [9].

The lighting equipment evolution also does not lag behind the design. Today, one after another, hybrid devices that combine simultaneously different technologies, for example, light and video, appear.

The whole industry of high-tech materials is actively developing in the world. These materials are designed to solve the most complex and incredible tasks. New items can have several, at first glance, incompatible properties: be transparent and opaque at the same time. To be ultra-light and flexible, but at the same time continue to withstand the craziest loads.

Using the new technologies, it is possible to create an absolutely unique and multifunctional object that meets the modern world’s needs [10].

The foyer with high ceilings not only provides a venue for guests to attend concerts, but also acts as a multifunctional public hall (exhibitions, shows, interactive surfaces, children’s programs). The concert hall is seen in the foyer as an internal “core”, the axial orientation highlights the main directions.

The premises of the theater and concert building are divided into two interconnected complex complexes: stage (preparation and implementation of the concert) and spectator (reception, service and creation of the best conditions for perceiving the performance).

The interior space of the concert hall has an entertaining function. Since the architecture and interior of the spectacular buildings are designed to ensure the normal operation of all the functional processes taking place in them, it is necessary to plan and design the interior in such a way that people, the main users of the space, are comfortable and safe to be in it, move around and leave it. The aesthetic component is extremely important, because the path of the audience should be “interesting” in its spatial solution and prepare the audience psychologically for the main space of the concert hall - to the stage. It should be a story about the viewer’s transition from the outside to the auditorium.

The acoustic design of the large concert hall will include the latest ideas, experience and scientific knowledge to provide the optimal conditions for speaking and listening to concerts.

The installation of the suspended adjustable reflectors above the stage, together with the proper formation of the fronts of the balcony around the stage, will optimize the acoustics for musicians to provide good support and mutual hearing, while reducing the risk of excessive noise. The upper reflectors will also improve clarity in the rear row area [11].

Most modern concert halls are equipped with variable acoustics. Some of these areas with variable sound absorption can also be used to fine-tune the acoustics between more modern and older repertoires, for which a less reverberant and cleaner sound may be more favorable. In addition, it can also compensate for any small difference between an empty and a full hall, so that the acoustics for the rehearsals can be made exactly similar or slightly drier than a full-time concert situation.

The multifunctional concert hall is the link between the transport hub, industrial areas and the residential buildings and solves a number of problems: distribution of pedestrian flows; meeting the domestic needs of visitors and residents, protecting the housing estate from the noise of stations and roads, increasing the area of landscaping, organizing leisure activities as well as holding mass events. The complex is conceived as a center with a high degree of sociability between the buildings with flowing space for free space development by the visitors.

The object consists of five blocks functionally dividing the space, forming the inner space of the atrium and protecting it from external negative factors: noise and dust.

5. Architectural and artistic design features
The architectural and artistic image of the projected object is based on a nonexistent figure - the Penrose triangle. Under a single shell there are five separate blocks, interconnected by a common recreational space-atrium. The bends of a multifunctional concert hall form a "nonexistent" triangle. In the building, in fact, the internal space goes into the external and vice versa, so the walls go into the roof, and the roof transforms back into the walls “Figure 3”.

6
Natural light penetrates the inner corridors through geometric holes in the outer shell, creating beautifully lit spaces. The stylistically designed object can be related to parametric architecture. The media facade has been designed from the northwestern part of the facility. Thus, architecture becomes an information medium.

Summary
As a result of the study, the basic principles of the multifunctional concert halls' formation were identified.
1. Designing multi-purpose structures - will save the area of the construction area, since such halls are universal and are able to arrange several types of the spectacular events.
2. It is necessary to apply the innovative techniques that determine the architecture development in the near future (concerning the appearance, function and even the structure of the building).
3. The construction style should be as modern as possible, may belong to such areas as: parametric, kinetic and information architecture.
   The external forms must fully identify the product of the intellectual, social and technical conditions of our century. The use of media facades and architectural lighting is recommended.

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