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Technical Innovations in the Service of Architectural History Continuity

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Abstract. Modern technologies are developing at lightning speed, and in addition to the use of new materials, modern architecture also includes the virtual world and digital technologies. The new virtual "realities" themselves cause changes in people's behavior and attitude to the environment. There is a threat of homogenization of architecture. The issue of preserving historical and cultural heritage and passing it on to future generations is becoming especially relevant. One of the ways to solve this problem is again the use of technical innovations. We consider this issue using examples of projects implemented in Georgia. The examples discussed in the article are evidence of the connection between the historical and the new, the rethinking (continuation) of cultural heritage, which is carried out using the latest

technologies and materials and puts technical innovation at the service of the continuity of history.

Keywords: architecture; heritage; materials; modern; technologies.

Introduction

In the modern world, technologies are developing at lightning speed, and if historically the emergence of new inventions and techniques in architecture meant the formation of new styles and the use of new materials, then modern architecture also includes the virtual world and digital technologies. New virtual "realities" themselves lead to changes in human behavior and attitudes towards the environment. Along with the many advantages that new technologies provide in architecture, due to the abundance of information and the simplicity of visual implementation, there is a danger of homogenization of design. In this situation, the issue of preserving the historical and cultural heritage and passing it on to future generations is particularly relevant; this task is often performed by new technologies. In this context, we would like to discuss several examples from Georgia.

Method of scientific research in this review includes study of existing national literature, research from nature and photo-fixation, interviews with authors of discussed projects and employees employed in buildings, search and analysis of information available on the Internet.

Main Part

Wooden houses (oda-sakhli) in various variations were widespread throughout Georgia. Sumbadze states (1967) that wooden house acquired its final classical appearance in the 19th century:

when sawmills, construction glass, and urban living conditions were created in Georgia. Wooden houses were especially widespread in Western Georgia, where the warm climate, humidity, and the development of new living conditions determined the leading role of the wide balcony in residential architecture[1].

It was a wooden house with windows, a wooden balcony, wooden ceiling and floor. For the roof where used tiles or shingles. The houses where standing on stone or wooden poles. At the end of the 19th century, some houses had their first floors built of stone.Based on the study of relevant literary sources –Sumbadze and Tsintsadze (1948), Adamia (1968), Garakanidze (1959), Kaldani (1990)- we can say that this type of housing is quite diverse in its layout and volumetric-spatial solution:

Three fundamental types can be distinguished, where a more complex space develops from a simple space (one room). The balcony acquired the most important significance in the architectural and artistic solution [2] [3] [4] [5].

The columns of the balconies were decorated with beautiful carving. Over time, hand carving was replaced by ornaments made with a saw. It is worth noting the excellent technique of disassembling and assembling a wooden house. Already built houses were transported on carts from one village to another. Many wooden houses have been given the status of immovable cultural monument. With the emergence of many new materials and technologies, wooden houses do not lose their relevance and keep up with modernity. For example, Latvian architect, founder of the architectural studio “Goodpattern” Guntis Zingis after a trip to Georgia created a prefabricated wooden house, which, according to the author, allows you to integrate with nature and lead a harmonious life, since the wide verandas and terraces characteristic of them are a kind of continuation of the internal living space and a transition zone to the environment. The name of the project is "Veranda". Three models were developed. Wooden frame-panel houses are produced in transportable sizes in the form of modules with a faced facade, windows and a roof. A house of this type is placed on a concrete block foundation, and as for the interior decoration, this part of the work is performed by a builder hired by the customer. The building has triple-glazed windows.

Heat and wind insulation is also used on the walls and roof, which allows for virtually zero energy consumption. The wooden frame construction uses standard length wooden beams to avoid unwanted loss.

Figure 1. House "Veranda", model V102
Retrieved from - https://www.homeis.ge/veranda-house/

In the north-eastern part of Western Georgia, in Racha, you can find centuries-old wooden carved houses in many places. Some of them are still preserved in their original form, while others need restoration. An interesting project is underway called "Write the History of Racha's wooden houses", where modern Internet technologies are at the service of cultural heritage. The goal of this project is the photo documentation of wooden houses, finding their stories and placing them on a single bilingual platform, which will contribute to the creation of a new tourist route in Racha. The authors of the project hope, that the arrival of a tourist will stop the migration from Racha's

Figure 2. Beradze I. Wooden house in Racha. [Photograph].
Retrieved from - https://www.facebook.com/@Rachvelebi/

Figure 3. Anzola F. (2018).The Georgian National Opera and Ballet Theater of Tbilisi [Photograph]. **Retrieved from https://commons.wikimedia.org/wiki/File: National_Opera_House._Tbilisi,_Georgia.jpg**

villages, will develop this beautiful region and will stop the destruction of wooden houses.

Figure 4. Kochladze N.(2024). The Georgian National Opera and Ballet Theater of Tbilisi- stage.[Photograph].

The Tbilisi Opera and Ballet Theatre, located on the main street of Tbilisi – Rustaveli Avenue, is a striking example of the use of modern technologies in the reconstruction of a historical building in Georgia. The appearance of the building is determined by the combination of elements characteristic of Islamic architecture. Its construction was completed in 1896 (architect V. Shreter). The area is a historic district, and the building itself is a monument of cultural heritage. After the fire in 1973, it was reconstructed (architects L. Medzmariashvili, M. Chachanidze), and in 2010-2015, large-scale renovation works were carried out in the theater building (architect L. Medzmariashvili). The main building, the hall, the auxiliary buildings, all wings and levels, as well as the external territory have been completely renovated and reconstructed. Objects and areas with new functions were added to the theater. The stage as well as all necessary communications were equipped with the latest centralized and computerized management system. About the technical arrangement of the theater building Mr. I. Kavsadze (People's Artist of Georgia) and A. Ananiashvili (head of the staging department) talked to us. It was especially noted that the audio-video and lighting system was computerized and updated, and so-called "Safes" were introduced - mobile shelves for storing scenery, arranged under the stage floor (author A. Ananiashvili). The stage is separated from the hall by a curtain lined with fire-resistant material on both sides of the stage portal. An iconic stage curtain destroyed by fire in the 1970s has been restored in Germany and hang behind the main curtain. The railing separating the parterre and the orchestra space and the floor of the orchestra space are movable, which allows to reorganize and increase the stage space. A video projector was considered for modern opera productions, and a subtitle LED screen was also installed. An air conditioning system is provided throughout the building. As a result of the mentioned technical arrangement, the opera theater is a comfortable working space for the employees, and it does not lose its popularity and prestige for the audience.

In the Kakheti region, the Batoni Castle Museum Complex, located in Telavi, is one of the most important monuments of Georgian secular architecture of the late feudal era. In 2012-2018, the complex was rehabilitated, during which two buildings with an exhibition function, built in the 1930s, were dismantled and a new museum building was built, taking into account modern standards, equipped with a modern heating-cooling-ventilation system. The use of clay pots typical for folk crafts as a cooling system on the facade of the modern museum building can be seen as an act of respect for cultural heritage as far as pottery has a great place in the material culture of Georgia. Pottery was even taught at the Ikalto Academy (Georgian higher education institution of the 11th-12th centuries), and it will retain its importance at least because of the Georgian wine “Kvevri” - a Georgian winemaking technology where wine is placed in a large clay bowl.

Figure 5. Kochladze N.(2018).
Telavi historical museum. [Photograph].

Figure 6. Kochladze N. (2018).
Telavi historical museum. [Photograph].

Figure 7. (2021). Green building in Bazaleti. [Photograph].
Retrieved from -https://georgiatoday.ge/the-bazaleti-green-engineering-center/

The three-story Green Architecture and Engineering Technology Demonstration Center building (architect Gvantsa Kheladze) built in the village of Bazaleti, Dusheti district, 60 kilometers from Tbilisi, has been certified by the Green Construction Council of Georgia and has been awarded gold status. This 21st century building uses the latest technologies to absorb heat/electrical energy generated from the sun, wind, and agricultural waste. The entire energy storage and transmission system is registered with a special software package purchased from the American company Honeywell. During the planning, the inner yard, historically characteristic of a Tbilisi house, is preserved, on which the buildings come out with balconies. The solution of the balconies, on which the greenery is arranged, is also interesting, and it evokes the association of houses with a terrace common in Georgia.

Figure 8. Rapava D. (2023). With love.[Photograph].
Retrieved from-
https://www.facebook.com/photo.php?fbid=
740229401443559&id=100063695164062&set=
a.492691899530645&locale=fr_FR

Figure 9. Niko.Khorumi. [Photograph].
Retrieved from - https://on.ge/story/115412-

Modern street painting, which originates from graffiti (and graffiti is widely believed to have appeared during World War II), does not have a long history in Georgia, but it has recently become very popular and many beautiful examples have been created in the cities of Georgia. Techniques and materials for street painting, aerosol spray paint, marker pens, fire extinguishers, etching tools, represent an innovation. Ukrainian artist Sasha Korban's painting of the Khachapuri baker grandmother on the facade of a residential house in Kutaisi, "Khorumi" painting on the wall of a multi-stored building in Tbilisi by the street art movement "Niko" use technical innovation and are an expression of the continuity of history, respect and love for it.

The title of the painting made in Kutaisi by Sasha Korban is "With love", the artist took a photo of one of the elderly women living in Imereti as inspiration. This work has become a business card of Kutaisi. We would like to mention that khachapuri, a dish made from dough and cheese, is included in the list of intangible cultural monuments of Georgia. In the work of "Niko" - "Khorumi" - a shot of the dance performed by the Georgian national ensemble "Sukhishvili" is presented. "Khorumi" is an ancient Georgian folk dance of martial content and has been granted the status of a monument of intangible culture.

Conclusion

In our opinion, the examples discussed in the article are evidence of connecting the historical and the new, rethinking (extending) the cultural heritage, which is carried out using the latest technologies and materials, and puts technical innovation at the service of the continuity of history.

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