



CONSTRUCTIVE CONSTRUCTION-TECTONICS OF HISTORICAL MONUMENTS

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Abstract

In the article, the constructions used in the restoration of buildings are studied; the physical-mechanical properties of the constructions, their importance in ensuring durability are studied. In addition, in the historical monuments of Uzbekistan, the appearance of the dome constructions of the upper part of the building, the diameter of the outer dome and the materials are indicated. In historical buildings, the characteristic features such as the expansion of vaulted rooms, their efficient use and the creation of convenient opportunities for making the interior more beautiful have been revealed.

Keywords: construction, vertical, horizontal, reinforced concrete structures, dome structures, construction-tectonics, interior.

I. INTRODUCTION

Constructions used in the restoration of buildings are installed in vertical and horizontal directions. Vertical structures include columns, walls, horizontal beams, trusses, arches, intermediate and closed structures. Vertical structures act as a core for the building, while dividing it into sections and rooms. The horizontal ones serve to cover the upper parts of the building. Instead, all vertical structures work in compression and compression, and horizontal ones work in bending. Tensile stresses are generated in the lower part of the cross-section of bending structures. In wooden constructions, these stresses are absorbed by the fibers of wood, and in reinforced concrete covering, cross-section and beam constructions, the tension is absorbed by their metal reinforcements. In reinforced concrete structures, compressive stresses are absorbed by concrete, and tensile stresses are absorbed by metal. As a result, one structure has to be made from two different materials. If the structure is made of different materials, equal strength is not ensured due to the fact that their physical and mechanical properties are different. Ensuring equal strength in the construction is done by making it from materials with the same or similar physical and mechanical properties as much as possible. This does not always correspond to the working conditions of the structure.





II. MAIN PART

In the past, since the technology of making one construction from different materials was not mastered, such constructions were necessary for covering the upper parts of buildings, whose working conditions should correspond to the physical and mechanical properties of the construction material. The main building material for the construction of the building and its constructions is baked brick, which is selected using a special mixture - ganch. The physico-mechanical properties of these two materials are very close to each other and they are active in compression and passive in stretching. Therefore, achieving the formation of only compressive stresses in the structure built from them was the main part of the problem.

In almost all historical monuments, the upper part of the building is closed with the help of dome structures. The base of the dome is circular, but it must cover a rectangular, square or hexagonal surface area. For this, the problem of turning the polygonal surface into a circle also arises. The problem is solved by combining constructions of several different views. These constructions are arched, odd and additional intermediate constructions, and by their appearance and in which order they are arranged, they form the basis of construction-tectonics in the construction of monuments, making the area circular. Construction-tectonics also includes the issue of covering the top of the building with one or two domes.

III. RESULTS AND DISCUSSIONS

Architects have developed several ways to make a polygonal surface into a circular shape. One of them is the method shown in Figure 1, in which a square surface is made into an octagon by means of central and mutually symmetrical arches on the four sides of the square and odd constructions on the four corners. The surface is brought closer to the circle from eight sides to sixteen sides by means of auxiliary intermediate constructions built between the porch and the ridges. The space between auxiliary structures, archways and arches is filled spherically to form a full circle, and this surface serves as the basis for the base of the inner dome and outer dome in double-domed monuments (Fig. 2). This method is the most used in the closure of the upper part of the double-domed monuments, it was used in the construction of the main hall of the Bibikhonim mosque in Samarkand and small mosques in the North and South, the Tillaqori mosque, the Amir Temur and Bibikhonim mausoleums, several mausoleums in the shohi Zinda complex, the blue-dome mosque in Shahrissabz, the Ulugbek mausoleum, the Chorsu trade dome and other buildings.



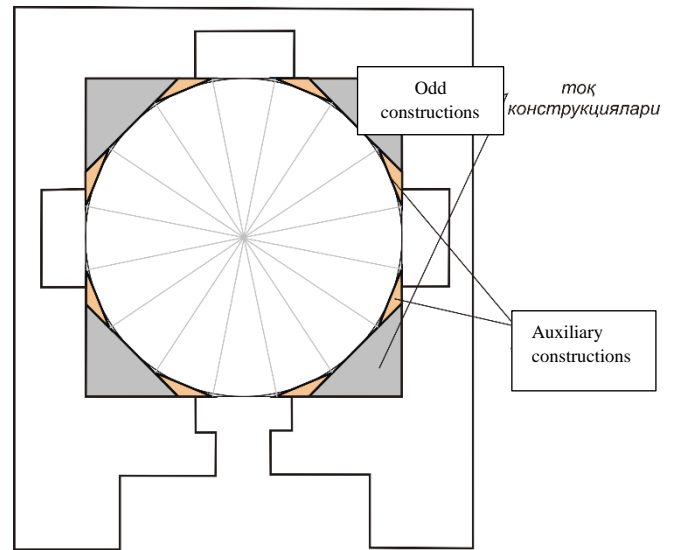
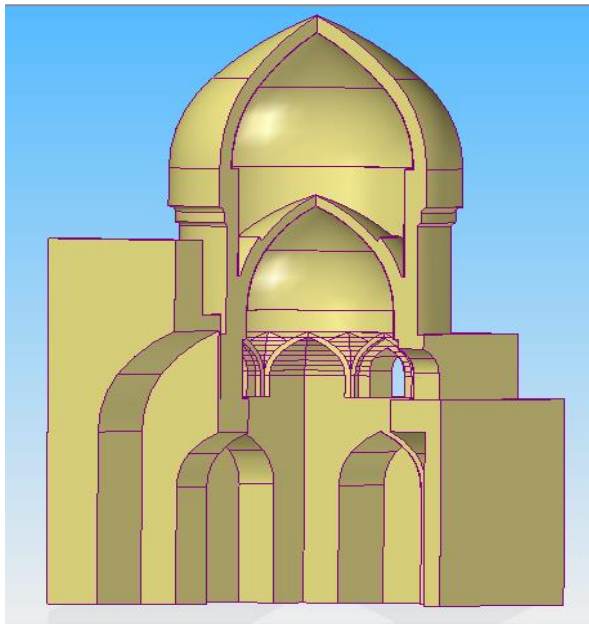


Figure 1. The plan of the monument and its tectonic construction Ridge.

The plan is based on the hexagonal shape of a hexagonal surface on some monuments (the mausoleum of Our Lady of Torabek, which dates back to the 15th century), on the basis of six-sided arches of the shape and six-sided arched structures, twelve corners, the arches and the interval of the arches are filled in spherical view and brought into a circle (Figure 3).

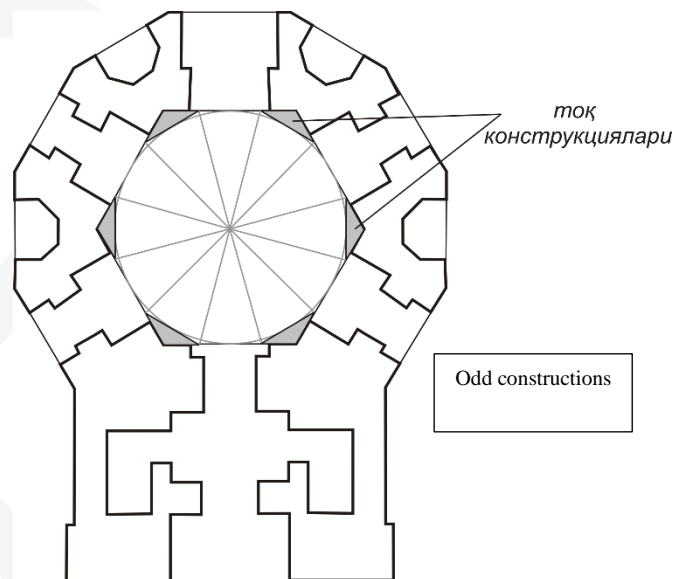
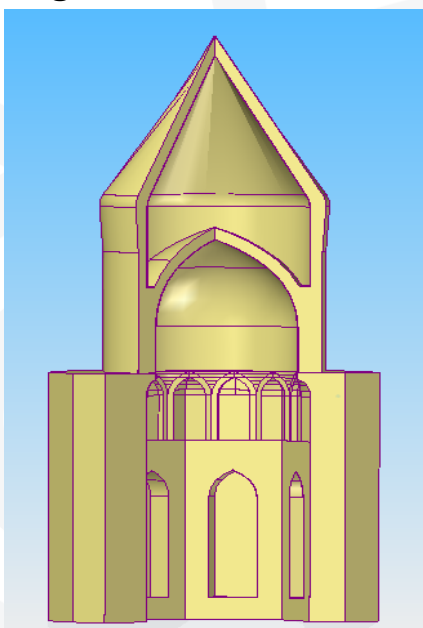


Figure 3. The plan of the mausoleum of Our Lady of torabek and the trim of the building.



A closed tectonic solution can also be seen inside the monuments by building an inner dome, parallel to the walls of the building and on intersecting avoks built symmetrically between them (the mausoleum of Shaykh-Shamsiddin kulol in Shakhrisabz). When the building is closed in this way, the inner dome is smaller in diameter than the dimensions of the room. In its place, the diameter of the racing circuit and the outer dome is smaller than the dimensions of the structures of the buildings closed in the first and second ways, and the building receives a more compact appearance. A different aspect of this method from the previous two methods is that the following sequence process is performed so that the square surface can form a circle. In this case, without applying odd constructions, it is necessary to build directly auxiliary intermediate constructions into the interval of intersecting arches, bringing the surface to eight corners, and then to the appearance of a circle.

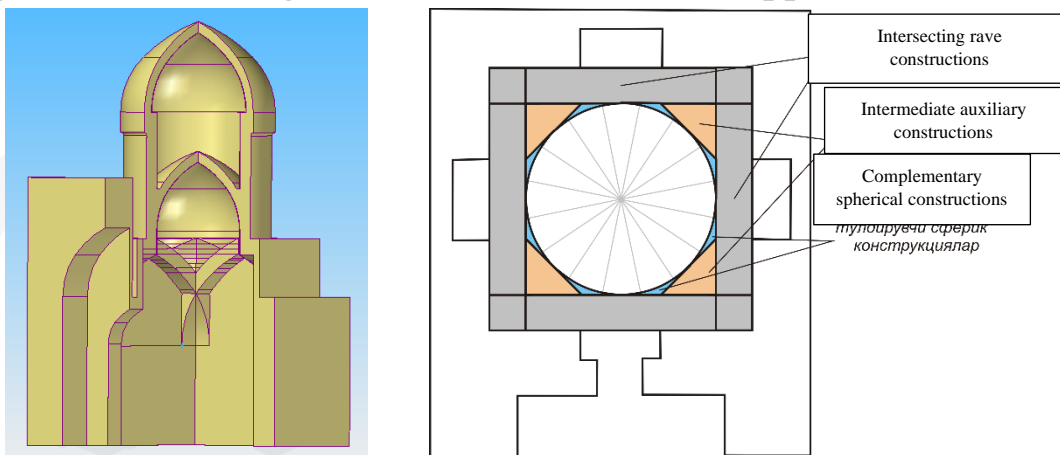


Figure 4. Shaikh-Shamsiddin plan of the Potter's mausoleum and the shearing of the tectonic construction.

M. S. Bulatov describes the closure of buildings in such a way as the following three: the smaller the size of the domes in relation to the size of the building; the equal distribution of the load falling from the beams to eight points along the walls of the building and their fading through thick walls parallel to each other; the expansion of building rooms, the [1, 39]. A. Urolov, too, touches on the above features of the closure of buildings in such a way, noting that the method was first used in the Shepherds' mausoleum in Samarkand, and later perfected in the premises of the workshop and Oksaroy. [2, 169].



While the above methods used spherical constructions of rive, odd, intermediate auxiliary and complement to bring the surface into a circle, there is another method that differs from them in that the square surface is brought to twelve angles by constructions in the form of an odd built into its four corners. The difference of this construction from the above beams is that its surface in the form of a rave lies in intersecting planes, and not in the same plane. Such a method was used in the construction of the one-domed Serakse and the 11th-century mausoleums of Abul Fazla and Abu Said in Mean (Figure 5).

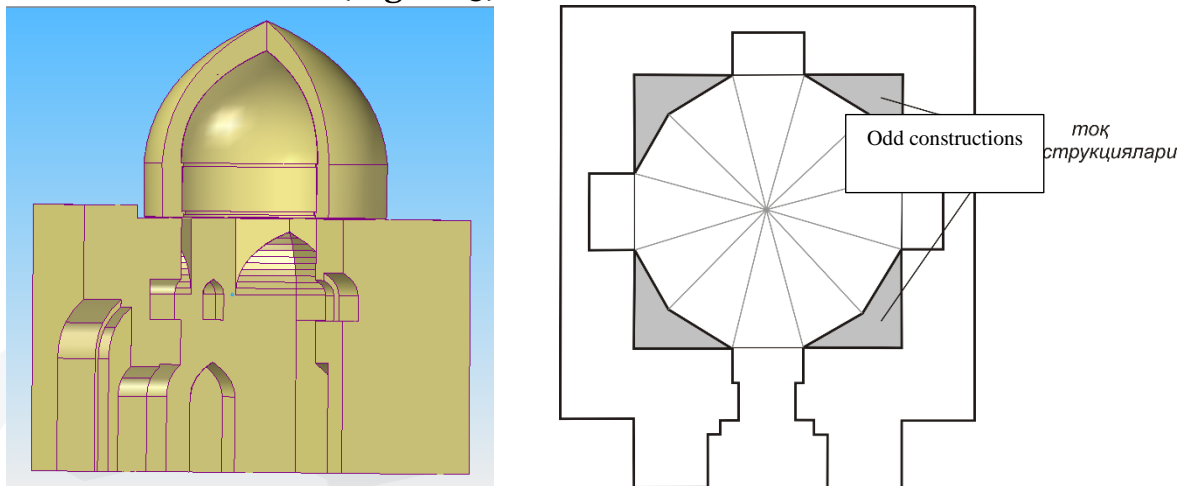


Figure 5. The plan of the Abul Fazla mausoleum in Serakse and the ridge of the tectonic construction.

IV. CONCLUSION

In short, the constructions used in the restoration of buildings are of great importance, and we should pay attention to their physical and mechanical properties and aspects of ensuring durability [4; 6; 8; 10; 14]. In the historical monuments of Uzbekistan, it is important to pay attention to the fact that the upper part of the building is in the form of dome constructions, the internal and external structure, diameter, and materials of the dome are repaired with modern technical methods. Today, it is an important task to expand the dome rooms of historical buildings, to use them effectively and to create convenient opportunities for making the interior more beautiful. [5; 7; 9; 11; 12; 13; 15]



REFERENCES

1. Булатов М.С. Геометрическая гармонизация в архитектуре Средней Азии IX-XV вв. Москва, «Наука» 1978, 382 с.
2. Ўролов А. Меъморий шаклларни уйғунлаштириш ва безаш. Самарқанд, 2003. Мирзо Улуғбек номидаги Самарқанд давлат архитектура қурилиш институтининг нашр маркази. 16.3 б.т. 262 б.
3. Холмурадов Р.И., Хасанов А.З. Конструкции архитектурных памятников Самарканда. Полиграф центр «GRAFITI» 2003. 136 с.
4. Ismoilovich, M. M. (2023). TARIXIY YODGORLIKLARNING ARKA KONSTRUKIYALARIDAGI ICHKI ZO 'RIQISH KUCHLARINING TAHLILI. Journal of new century innovations, 20(1), 143-150.
5. Nazarova, N. J. R., & Abdurahmonova, S. A. (2023). "TEMUR TUZUKLARI" DA IJTIMOYIY ISH MASALALARI. Oriental renaissance: Innovative, educational, natural and social sciences, 3(1), 637-643.
6. Ismoilovich, M. M. (2023). TA'LIMNI TEXNOLOGIYALASHTIRISH VA FANNI O 'QITISHDA KEYS TEXNOLOGIYASINING O 'RNI. Journal of new century innovations, 20(1), 159-164.
7. Ramatov, J. S., Nazarova, N. J., & Hasanov, M. N. (2023). AMIR TEMUR VA TEMURIYLAR SALTANATIDAGI IJTIMOYIY TARKIB. Oriental renaissance: Innovative, educational, natural and social sciences, 3(1-2), 205-210.
8. Рожкова, Е. В., & Мирзахмедов, М. И. (2022). УЧЕТ ВНЕШНЕГО ЗАТУХАНИЯ КОЛЕБАНИЯ МАТЕРИАЛЬНОЙ ТОЧКИ НА ОСНОВЕ РЕКУРРЕНТНО-ОПЕРАТОРНОГО МЕТОДА.
9. Назарова, Н. Ж., & Абдурахманова, С. А. (2022). ЭФФЕКТИВНОЕ ИСПОЛЬЗОВАНИЕ ОБРАЗОВАТЕЛЬНЫХ ВОЗМОЖНОСТЕЙ В ОБЕСПЕЧЕНИИ КОНКУРЕНТОСПОСОБНОСТИ МОЛОДЕЖИ. Экономика и социум, (12-2 (103)), 475-481.
10. Mirzahmedov Mirzohid Ismoilovich. (2023). SAMARQANDDAGI BIBIXONIM MASJIDINING XAJMIY REJAVIY VA KONSTRUKTIV LOYIHALANISHI. <https://doi.org/10.5281/zenodo.7528870>
11. Gafarovna, A. S., Jo'rayevna, N. N., Sobirovna, A. N., & Abdusalamovna, A. S. (2023). YOSHLAR MADANIY BEGONALASHUVINING OLDINI OLISHDA IJTIMOYIY ISH VA SAN'ATNING O 'ZARO HAMKORLIGI. World scientific research journal, 12(2), 100-104.
12. Saminjon o'g'li, M. S., & Jo'rayevna, N. N. (2022). PEDAGOGIK FAOLIYATDA AXBOROT-KOMMUNIKATIVTEXNOLOGIYALARDAN FOYDALANISH. PEDAGOG, 1(4), 105-108.





13. Kurganovna, K. D., & Jo'rayevna, N. N. (2023). YOSHLARDA AXBOROT VA INTERNET MADANIYATINI SHAKLLANTIRISH MASALALARI. World scientific research journal, 12(2), 105-109.
14. Mirzahmedov Mirzohid Ismoilovich. (2022). STATIK ANIQMAS TEKIS RAMALARNI KUHLAR USULIDA HISOBLASHDAGI MUAMMOLAR PROBLEMS OF THE FORCE METHOD IN THE CALCULATION OF STATICALLY INDETERMINATE FLAT FRAMES. <https://doi.org/10.5281/zenodo.6614608>
15. Juraevna, N. N., & Sapparbaevna, J. N. THE ROLE OF FAMILY ON PREVENTING THE YOUTH'S DEVIANT BEHAVIOURS.

