

**ARCHITECTURAL CONSTITUTIONS AND DEFORMATION STATE OF THE MAUSEUM OF SHODI MULK AQO (ON THE EXAMPLE OF THE SHAHI ZINDA COMPLEX, SAMARKAND)**

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**Abstract.** This work is devoted to the study of the architectural structures of the Shodi Mulk Aqo mausoleum, which is part of the Shahi Zinda complex located in Samarkand, and their deformation state. During the study, the architectural and structural features of the mausoleum were analyzed, the main types of deformations that occurred in the structure and the causes of their occurrence were identified. Also, the current technical condition of the monument was assessed, and proposals were developed for its preservation and restoration.

**Keywords:** Shahi Zinda complex, Shodi Mulk Aqo mausoleum, Samarkand, architectural structures, deformation, cracks, subsidence, technical condition, restoration, historical monuments, architecture.

**Introduction.** The city of Samarkand is one of the most ancient and rich historical and cultural heritage regions of Central Asia. In particular, the Shahi Zinda complex is distinguished by its unique architectural solutions and high artistic decoration [5]. **The Shodi Mulk Aqo mausoleum, which is part of this complex**, is of particular importance as one of the brightest examples of architecture of the Timurid era of the 14th century. This mausoleum is distinguished by its complex architectural and constructive structure, elegant mosaic decorations and engineering solutions. At the same time, various deformations have occurred in the structures of the building over the centuries under the influence of natural and anthropogenic factors.

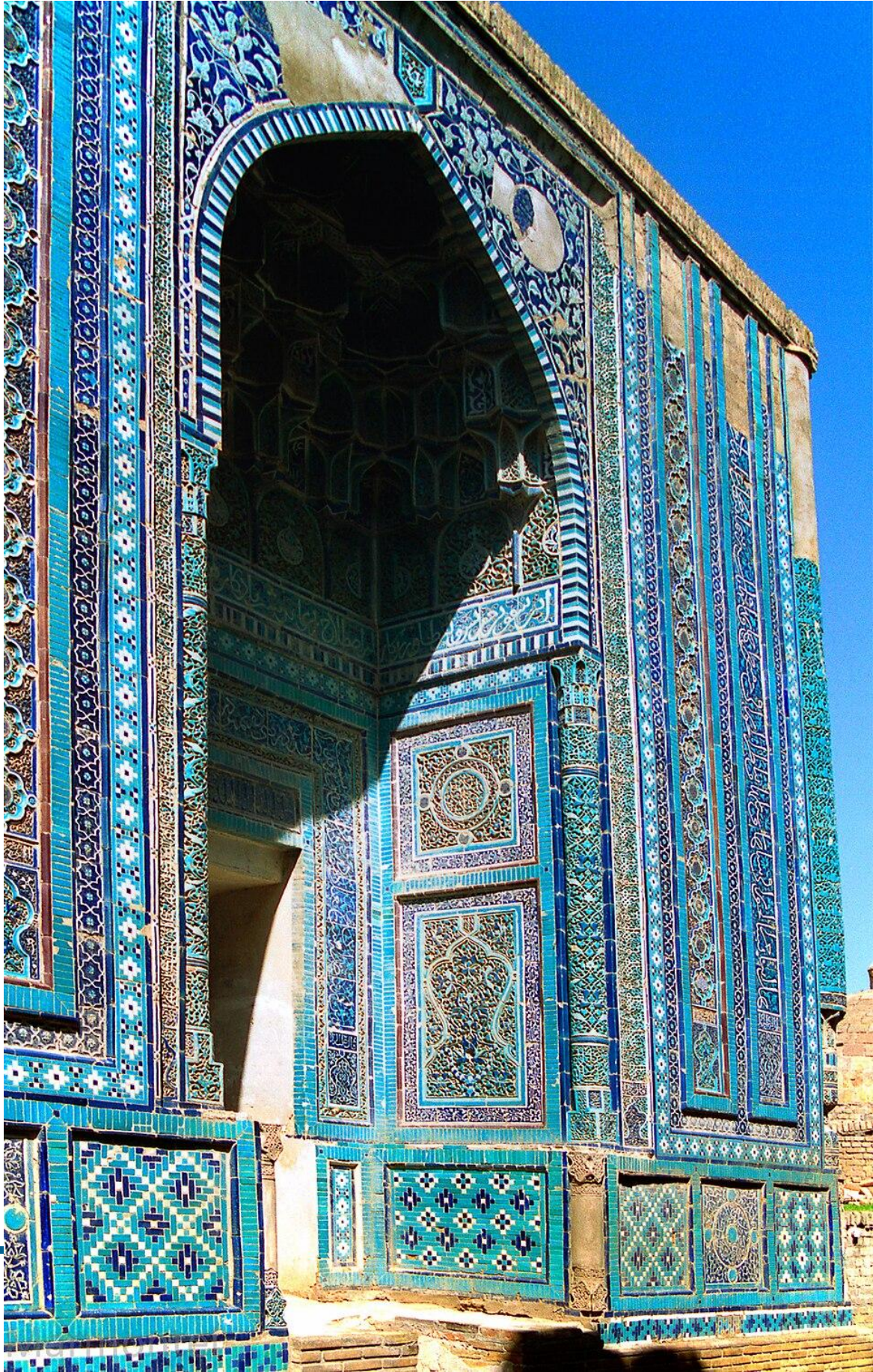
Studying these deformations, identifying their causes and developing preservation measures is one of the urgent issues in today's restoration practice.

Samarkand is a city that flourished during the reign of Amir Temur, becoming one of the cradles of human development and world civilization. The science and culture of the era of Amir Temur



and the Temurids found their place as a national value. The mirror of the great past is the heritage left by our ancestors, historical monuments. Historical monuments testify to the great past of the people, their eternal traditions and values, and their national identity. Therefore, great attention is paid in our country to further improving the functioning of historical monuments, strengthening their material and technical base, meticulously repairing them, and increasing their durability[4].

As our leader said, one of our main tasks is to radically improve and perfect the functioning of historical monuments, as well as to leave them as a legacy for future generations . It is necessary to implement large-scale, clearly targeted measures in our country to raise a healthy and harmonious generation, to realize the creative and intellectual potential of young people, and to create the necessary conditions and opportunities for our country's young men and women to become comprehensively developed individuals who fully meet the requirements of the 21st century.



**hodi Mulk Aqa Mausoleum**

**Research objective:** To study the architectural structures of the Shodi Mulk Aqo Mausoleum and develop scientifically based proposals for assessing and preserving the technical condition of the structure by analyzing their deformation state.

Recommendations for architectural elements found in monuments. A mausoleum is a special building built over a grave. It consists of a simple four-story room, which can be entered through a door with a roof. Sometimes the room is in the form of a porch with a porch on all four sides. In a complex type, there are also special rooms such as a pilgrimage hall, a tomb, and a basement, and architectural complexes have also been created. A mosque, a place of worship, a place where Muslims pray in groups, a place of worship. In the courtyard, there is a khanaqoh, on its qibla side there is a mihrab, on the right side of the mihrab there is a pulpit for preaching, and special places for reciting the Quran are allocated. A courtyard is a stage, the courtyard is surrounded by aviaries, and the main style is a turban, built with a roof and a dome, and there are minarets for calling the call to prayer.

A dome is a dome-shaped roof, a hemispherical roof of buildings and structures of circular, rectangular and other shapes, in Central Asian architecture, mainly made of wood, brick, and baked brick. There are balkh, charkh, chortark, chorkunjak, mirzai, kulohi, shalgashi and other types of domes.

Peshtoq is a high, arched, ornate part of a luxurious building, such as a madrasa or mosque, at the entrance. The peshtoq plays a significant role in the composition of the building, giving it grandeur and beauty. It is decorated with tiles, cutwork, and Islamic patterns. It is decorated with bookshelves.

A porch is a semicircular part of a building, inside or in front of it, with a circular top, a shelf, or a walkway.

Muqarnas is a complex decorative form consisting of overlapping arched bowls, widely used to give the upper part of mihrabs, takhmoms, or arcades a semi-domed appearance. The correct type of border is called sharafa.

A bookcase is a written representation in the decoration of buildings, a place where a piece of wisdom or a historical date is written. Often, this is the name of a long line of writing on the roof, or a writing board above the doors of a garden. Guldasta – 1) A pattern resembling a bulwark. 2) A tower-like structure attached to the corner wall of a building from the outside as a support. Usually, a bulwark is installed at the outer corner of monumental buildings such as a mosque or madrasa. The bulwark is sometimes called a burj dab.

**Research objectives.** To study the historical and architectural significance of the Shohi Zinda complex and the Shodi Mulk Aqo mausoleum; To analyze the architectural and structural structure of the mausoleum; To identify the main types of deformations occurring in the structure; To study the causes of deformations; To assess the current technical condition of the structure.

According to the research of sources, Shodi Mulk Aqo was the daughter of Amir Davud Duklat, and her mother was the daughter of Amir Kutlug Turkon Aqo, the mother of Amir Temur. Shodi Mulk Aqo died in his youth on the 20th day of the month of Jumada in the year 773 AH (December 29, 1372 AD). The mausoleum was built by Kutlug Turkon Aqo. This history is given in the Arabic inscription that has been partially preserved on the right and left steps of the mausoleum.



### Shahi Zinda Complex

Although the mausoleum does not differ much in its architectural form and decoration style from the mausoleums of Shahi Zinda built during this period, it was used as an architectural and artistic solution for many mausoleums built after it. The cubic volume with a high roof is covered with a vaulted dome. The tomb is located under the Ziyaratxana. The entrance hole is behind the stairs leading to the mausoleum. The walls of the Ziyaratxana are divided into a series of arches and arcades. The gajaks installed at the corners of the dome are built on sixteen edges placed in the niches of the arcades.

All parts of the mausoleum open to visitors are covered with mysterious tiles. For the first time, in Shahi Zinda, the mosaic was used in this mausoleum. The shrine's niches, rows of arcaded shelves, gajaks, and domes were used in some small rows. Apart from the mysterious carved tiles, they are decorated with mosaic. The roof, which occupies the entire eastern style, is mainly decorated with mysterious carved tiles and mysterious bricks.

The architects created another masterpiece of Central Asian architecture using the above-mentioned architectural solutions and artistic decorations. Over the past period, the mausoleum has undergone partial weathering. The upper part of the main style roof has collapsed. The unknown (No. 32) mausoleum to the north of the mausoleum has been completely destroyed. As a result, rainwater seeped under the unprotected foundation of the northern style and subsided. This in turn led to the building cracking along the east-west axis[7].

The fact that the foundation was mainly laid on the shabby foundations of the Afrosiyob fortress wall saved the building from even greater damage. Most of the northern and eastern walls have collapsed. The roof has fallen into disrepair. The 87 cm gap between the tombs of Shodi Mulk Aqo and Amirzoda is filled with construction waste and soil. The upper part of the steps placed on the steps of the roof has collapsed. As a result, the shrine's icons have been destroyed by the influence of moisture and salt. Some of the decorations on the walls have also

collapsed. The leveling work carried out during the opening of the southern road to Shahi Zinda, the construction of the Silsila forty steps and the attic led to the foundations of the tombs of Amirzoda, Shodi Aqo, To'gli Tekin and Shirinbeka Aqo being much higher than the corridor, and their chambers being level with the ground level. At that time, their roofs were strengthened by building a wall under the base. From the second half of the 15th century to the second half of the 19th century, the preservation and repair of the mausoleum was carried out mainly at the expense of the funds allocated for it, partly from the funds allocated by pilgrims and later generations of the Timurids. After the Russian conquest of Central Asia, the funds of cemeteries such as madrasas and mosques were confiscated. Despite the lack of funds, some repairs were carried out on the roof and exterior in the 1970s. The exposed parts of the Saklizkirra and northern styles were rebuilt in clay with old bricks. In 1924-1928, some minor repairs were carried out in Shahi Zinda by "Sreda zkomstaris", "Uzkomstaris". In the Shahi Mulk aqo mausoleum, the damaged upper part of the roof was leveled, and the missing decorative fragments were covered with bricks. During the work carried out between 1938 and 1949, only scientific research was conducted at the mausoleum.

The last major renovation of the Shahi Zinda complex took place between 1960 and 1975. During this period, all the structures of the complex were rebuilt. Large-scale architectural and archaeological research was carried out. Based on these studies, conservation and partial restoration work was carried out.

An expositional architectural analysis (muqarnas, izora decoration,  $\frac{3}{4}$  column of the tachkursi) was carried out in the mausoleum of Shahi Mulk Aqo. Archaeological research was carried out in part of the 32nd tomb on the north side. Very little repair work was carried out. The torn brick coverings were restored. The base of the tachkursi in the eastern direction was strengthened, and the  $\frac{3}{4}$  column was restored from clay. Work was carried out to strengthen the general structural structure of the building, stop the subsidence process, restore the missing parts, and prevent the effects of heat and humidity.

Analysis of archival materials and published works led to the following conclusions:

1. None of these studies provides a comprehensive approach to the engineering analysis of the structural condition of the architectural monuments of the Shokh Zinda ensemble;
2. There is no assessment of the stress-strain state of the structures;
3. There is no in-depth analysis of the hydrogeological conditions of the foundations, nor is there any calculated data on the stresses acting on the soil at any given time;
4. There are no specific structural measures to strengthen the deformed structures of the mausoleum;
5. There is no calculated data on the seismic resistance of the remaining parts of the Shokh Zinda ensemble of mausoleums;
6. There is no in-depth analysis or instrumental measurements of the slope and settlement of the structures, as well as no information on the dynamic parameters of the structures. Therefore, a comprehensive approach to the overall engineering analysis of the structure is necessary to reliably assess the technical condition of the structure.

The condition of the external architectural structures of the building is as follows:

1. Foundations and socle. In all three building styles, the socle is hidden under cultural deposits and is damp throughout its perimeter.
2. Walls. A crack has formed between the entrance door and the window openings in the central part of the eastern style. The integrity of the wall structure is damaged. The lower parts of the walls are in a damp state.
3. Drum and dome. The drum and dome of the building are in satisfactory condition. In some parts of the drum and dome, there is a separation of the brickwork.
4. Stairs. The stairs leading to the roof of the mausoleum are partially damaged.

Condition of internal architectural elements: Walls. Partially carved elements on the internal walls have fallen off. Floors. There is no floor in the tomb. Engineering studies and photo-fixes show that the tomb structures are in good condition.

**Conclusion:** In this work, the architectural and structural features and deformation state of the Shodi Mulk Aqo mausoleum, which is part of the Shahi Zinda complex in Samarkand, were analyzed. According to the results of the study, the mausoleum is a mature example of the architecture of the Timurid era and has complex structural solutions. This with together, in the building time tooth and external factors under the influence to the surface arrived cracks, crevices and material decay such as deformations. The structure has been identified. general status satisfactory although some in parts reinforcement and restoration works necessity based on was given.

#### References:

1. Abdurashidov K.S., Kabulov F.R., Rakhmanov B.K. *Injenern y e problemy arhitekturnyx pamyatnikov*. Monograph. Tashkent, izd-vo "Fan", 2011. 354 pages.
2. Abdurashidov K.S., Rakhmanov B.K. *Determination of the technical condition of architectural monuments by instrumental methods*. //Architecture and construction problems. Samarkand, SamDAQI-2004. No. 2, 3-4 p.
3. Abdurashidov K.S. *Engineering analysis of construction, engineering and technical development, construction and construction of memory architecture* . Materialy republicanskoy nauchno- prakticheskoy conference "Engineering problems of architectural monuments". Tashkent, TASI - 2009 . -P . 5-11.
4. Shadmanova Z.S., Maksudova G.A. and Kholtaeva A.K. (2021) "Analysis of Construction of Architectural Monuments in Shahrisabz." Zien Journal of Social Sciences and Humanities. In Volume 1, ISSN NO: 2769-996X(2021) pp.126-129 <https://zienjournals.com>
5. Journal of Innovative Studies of Engineering Science, 30-34. Shadmanova, ZS, Maksudova, GA, & Kholtaeva, AK. Legal and constructive analysis of monuments of architecture in Uzbekistan. Galaxy International Interdisciplinary Research Journal, 10(2), 477- 481. Volume 10, Issue 2, February (2022).
6. Maksudova GA (2023.) Technical Condition of the "Jahongir Mirza Mumble" in the City of Shahrisabz.
7. Shadmanova Z.S., Maksudova G.A. PHYSICAL AND MECHANICAL PROPERTIES OF BUILDING MATERIALS OF ARCHITECTURAL MONUMENTS IN THE CITY OF SHAHRISABZ. Manuscripts on the Innovative Research and General Scientific Studies. Vol 2, Issue 11 (2025) | ISSN 3064-8556. <https://manuscriptology.org/index.php/IRGSS>
8. <https://uzbekistan.travel/uz/o/shohi-zinda-memorial-ansambli/>