Assessment Of the Ground and Construction Condition of the Arch "Ak-Saray" in Shakhrisabz

T.F.N., Dots. Shadmanova Z.S — Tashkent Institute of Architecture and Construction
Master Karaboev D. A. — Tashkent Institute of Architecture and Construction

ABSTRACT

As a result of a comprehensive approach to the engineering problems of the arch "White Palace" in Shakhrisabz, their technical condition is determined, the physical and mechanical properties of the soil and the state of materials are studied.

Keywords: White House, engineering analysis, technical condition, research, monument, dome, column, gypsum mix

Introduction. Architectural monuments are unique works of art created by human hands, which embody the history, culture, art, scientific achievements, ethics and philosophy, customs and national values of the people.

Architectural monuments as a national treasure of the people

The architectural monuments of our republic are radically different from the architectural monuments of other nations, distinguished by their charming beauty, each of which has its own important features, uniqueness and dissimilarity.

One of such historical monuments is the building of the "White Palace" arch in Shakhrisabz. It is one of the largest and rare monuments of the XIV-XV centuries, it is the arch of Shakhrisabz. Construction of the White Palace Arch began in 1380 and lasted until 1404. Since the construction of the White Palace Arch, many tourists have written about this magnificent building. The building attracts the attention of visitors to Kesh-Shakhrisabz both during the reign of Amir Temur and the Temurids, and even today.

To date, only two foundations of a huge roof have survived from the White Palace arch. However, this surviving part of the roof is a testament to the majesty and grandeur of the White House arch.

Purpose: The technical condition of buildings and structures can be assessed based on the information provided in their design documents, as well as the dynamic characteristics obtained experimentally. In determining the technical condition of buildings, their dynamic characteristics play an important role. Determining dynamic characteristics requires the implementation of specific complex engineering processes. In engineering research it is necessary to carry out a number of scientific researches on the basis of a special program. In order to determine the technical condition of structures, the most reliable information about their dynamic characteristics can be obtained by experimental testing of the structure in the natural environment using special seismometric instruments. There are several such experimental test methods that cannot be applied directly to architectural monuments. Architectural monuments are radically different from modern buildings and structures in that they have their own history of construction, significance, use and many other important features. Since architectural monuments are a delicate matter, they should not be damaged in any way in determining their technical condition. Therefore, it is necessary to study in depth the experimental methods used to determine the technical condition, analyze them correctly and find the optimal option to determine the technical condition of the structures of architectural monuments. This issue will be considered on the example of determining the technical condition of the arch "White Palace" in Shakhrisabz.

The eastern roof has been preserved to a height of 35 m above ground level. The White Palace arch is built of a simple square-shaped baked brick mixture of gypsum. The brick walls of the roof are in good condition, but the brickwork of the small porch is preserved in an unsatisfactory condition. As a result of the deflection of this block from the main roof to the south, a change of the upper part caused a crack of 60 cm. The crack was deep and continued to the foundation. In the southern part there are cracks up to 10 cm. Due to the lack of roofing, the upper part of the brick pile lost its load-bearing capacity due to natural impacts (precipitation) of 1-1.5 m.

West Roof This roof has survived to a height of 38 m above ground level. The brick walls of the roof walls are in good condition. In the preserved part of the large porch, there are 2 cracks visible from the courtyard facade. Here, too, the upper part of the roof brick pile has lost its initial load-bearing capacity. The brickwork of the foundation of the bouquet is well preserved. However, the original marble coatings of the foundation were lost.

Foundation. It is mainly made of natural stones. The lower part of the foundation is made of large and small stones in a dirty mixture (na kyrovom rastvore). The foundation is buried from 2 meters to 2.70 meters. The upper part of the foundation is made of baked brick in a mortar mixture (na ganchkhakovom rastvore). The pits consist of 9 rows of bricks in the excavated areas.

Ground ground. The ground of the White Palace arch consists of paved soils and lyossimon suglinok and supes lying at the base of ulariiig. The bed soils lie directly under the foundation, the lyoss soils forming the lower part of the compacted thickness. The thickness of the substrate (moshchnost) is 4-5 meters. By determining the physical and mechanical properties of soils by geophysical methods, it is possible to determine the structure of the ground state up to 40-50 m. with larger variations, the amount of mixing is from 0.0066 kg / cm2 to 0.0083 kg / cm2, the internal angle of friction is from 25 ° to 28 °, the modulus of deformation of the soil at natural humidity is from 20 mPa to 83 mPa. The compaction coefficient of non-homogeneous paving soils varies from 1.65 t / m3 to 1.88 t / m3. The design resistance of the western roof soil is 3.21 kg / cm2 and that of the eastern roof is 3.19 kg / cm2.

The level of groundwater is 3.05-3.10 m. This means that the lower part of the foundation and the groundwater table are located in a zone where subsidence can occur under the influence of groundwater.

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