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Use of Local Building Materials in the Natural Climate of Central Asia

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Annotation. This article discusses the use of raw brick in the construction of Uzbekistan since ancient times in connection with climatic conditions, as well as the process of preparing and using local building materials used in the repair of patterns and decorations of architectural monuments.

Key words: Raw brick, pottery, tile, decoration, girih, islimi, ganch, burnt brick, product, repair, architectural monument.

Introduction. Since ancient times, the process and methods of using raw bricks in connection with climatic conditions, as well as the procurement and use of local building materials used in the repair of patterns and decorations of architectural monuments, have developed in the construction of Uzbekistan**.** In the 9th and 12th centuries, along with these building materials, brick was also widely used.

Material and Methods. During this period, new buildings appeared: mosques, mausoleums, madrasahs, caravanserais, covered shops. During this period, the roofs of many buildings were covered with domes, while the ceilings of others were reinforced with wooden columns. Gypsum was used to plaster the walls of buildings. Raw bricks have not lost their importance. Houses, handicrafts, shops were rebuilt.[1]

The palaces of the rulers of some cities were also built of this brick. In many parts of Uzbekistan, palace buildings made of raw bricks have been preserved. They were built on high foundations and were two stories high. Defensive walls and towers of cities and castles were built of raw brick. Plaster, metal, and wood carvings are widely used in medieval applied art. The masters decorated the walls and columns of the buildings with rhombuses, triangles, hexagonal star shapes and plant patterns (sticks, leaves, flowers).

The glazed pottery of Bukhara and Samarkand is well known. There was a great demand for colorful bowls among the population. Most of them have good wishes written on the owner of the bowls. Archaeologists excavating in the palace of the rulers of Termez in the 10th century found a wall panel depicting legendary animals. The walls of the room are covered with plaster. They are decorated with geometric floral patterns.[2]

Abdugaffor Hakkulov, the founder and well-known representative of the Samarkand School of Repair in the 70s and 80s, stressed the need for good selection of soil and its composition to improve the quality of bricks used in repair work. The composition of the soil should be checked. The repairman warns that it is necessary to pay great attention to the brick firing process, the preparation of high-quality clay in clean water from the cleaned soil. This indicates an increase in the firing time of the brick, the normal firing temperature and the need to cool the fired brick in the kiln.

This is because if the kiln is opened without cooling, the bricks are ventilated and the bricks weaken, creating an imperceptible crack. He says that the bricks used in the repair work should be in the form of a square (dimensions 20x20, 25x25 cm, thickness 3-5 cm) and he takes the initiative in the production of such bricks and uses them in the repair work. In his book "The Art of Repair" (Tashkent, 1991), master repairman A. Khakkulov writes that some repairs in the country are carried out fragmentarily, of poor quality, without complying with the project. As a result, such low-quality tiles contrast sharply with the original state of the monument and soon become obsolete. the master explains that it is desirable to process tile patterns on its surface no later than 1-2 years during the restoration of the walls of the monument.[3]

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The master architect believes that one of the main reasons for the current reduction in the service life of architectural monuments is moisture emanating from their upper part - the roof. This includes renovating their roofs in a modern style in a simple and economical way against moisture he uses this method in the process of repairing the Nadir Devonbegi ("Sherdori Berun") madrasah in Samarkand. This method of the master is distinguished by the speed of execution and good efficiency in covering the roofs of monuments, in contrast to the khatab method, which was used by Central Asian architects in the past.

The wall is processed at a height of 40-50 cm from the top of the dome of the chamber, on top of which reinforced concrete 8-10 cm thick is laid, vertically cut between concretes from a pipe with a diameter of 10 cm and 50 cm in length. They are designed to allow air to enter the rooms from above, again leaving openings for wind entry from both ends of the common roof. Then, with the help of a cement mixture, a perch on a reinforced concrete slab is treated with a square brick. This method is several times cheaper than the old one, because the upper part of the building is always dry and light, so its life is eternal. The experiment, which took place at the Nodir Devonbegi Madrasah in Samarkand, has yielded good results and is widely used to dry the moisture on the roofs of monuments and prolong their life.

The master also showed how to build and strengthen additional foundations for buildings with shallow foundations, and how to use one-sided slopes and monuments without destroying walls and ceilings. As we can see, Abdugaffor Hakkulov was also a talented engineer.

Abdugaffor Hakkulov, a skilled repairman, knew the intricate art of making tiles, planks and tiles. In doing so, he combined three tasks at once - designer, artist and calligrapher. It is no exaggeration to say that koshinburish is a mirror of architectural art in the creation of the world of sophistication.

The repairman suggests applying 40-50 g of "Shirish" glue to 100 kg of gypsum in order to increase the strength of the gypsum mixture and keep it for centuries. "As soon as the mixture of ganch and shiresh juice hardens, shiresh with its juice will seal the bones of the ganch inside and out. "Shiresh" (glue) is made from a natural plant and was used in antiquity instead of glue. Even if the gypsum mixture prepared on such a mixture is left in water, it will not absorb water for a long time. It is known that ganch never weakens if it does not absorb water.[1]

One of the good features of ganch is its elasticity. Ancient architects, knowing this very well, used gypsum from buildings to domes. Monuments restored from gypsum and brick will last a long time and will not be damaged in any conditions, even during terrible earthquakes. Because the plaster is not brittle, does not break, and thanks to its flexibility it gives significant self-absorption even in the event of a strong impact," explains the architect.

Conclusion. Over the years, the National School of Apprenticeship has been established in Samarkand to study the conservation and study of traditional methods and practices of architectural reconstruction in Uzbekistan. However, due to the death of the master in 1996, this school was closed. The current situation with the repair of monuments requires the repairmen working in Samarkand to gather folk craftsmen and create favorable conditions for the restoration and functioning of this school.

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