METHODS OF THE CONSTRUCTION AND MATERIALS OF THE ANCIENT KHOREZM FORTRESSES

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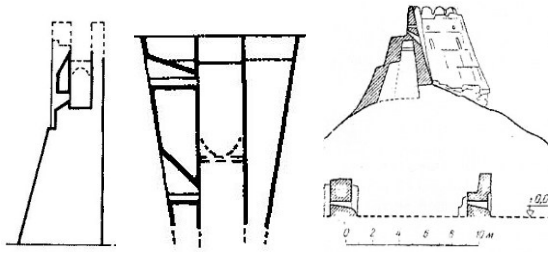
Abstract - The results of scientific-research works provided on studying technical condition of historical-architectural monuments in this article that are located in Karakalpakstan and Khorezm Provinces.

Index Terms - seismic, monuments, archeology, structure, historical monuments, research, samples, methods, kala (fortress), museum-reserve.

INTRODUCTION

There are more than 200 historical and architectural monuments of made by clay and pakhsadevor (clay-wall) in Khorezm and Karakalpakstan provinces, the southern part of the Aral Sea region. Today, scientists from the Khorezm Mamun Academy have been monitoring the technical condition of these architectural monuments and studying the seismic properties of the monuments.

In the past, the role of the fortress in the public life and in the lives of people was of utmost importance and played a key role in safeguarding the country's people. Therefore, the periodic architecture and building culture are primarily focused on the country's defense system. [3].



a) ***b)*** ***c)***

Figure 1. "Kizilkala" wall trim (a); Cutting edge of "Kyrghyzqal" (b); Cross-sectional view of cross-sectional surface (c)

It is well-known that historical sources refer to the historical fortresses of the Republic of Karakalpakstan such as Kuykirilgan kala, Achakhan kala, Tuproq kala, Ayoz kala, Bazar kala, Norinzhon kala, Kyrkkyz kala, Guldursin kala, Kat-Fir kala fortress. [1].

Kyzylkala is located in the Beruni district (Figure 1). The monument's size is 65x63 meters and the fortress walls are well-preserved, in some places the walls reach 13-16 meters. The architectural monument "Kyrkyz kala" of the IV-III century is located in Ellikqal'a district (Fig. 1b), size 250x215 meters.

In order to increase the height of the castle walls, their transversal sections were built to reduce the width of the width because of the height of the wall. The ancient craftsmen were able to prevent the height of the tension in the wall and prevent the increase in inertia forces, (Fig. 1c). [2]

Tuprakal'a was the center of the state of Khorezm. Its location is 17.5 gk. The castle is built on a platform of 2 floors, 14 meters in height and 83,0x83,0 meters in size.

According to the results of the research, it can be said that the use of construction materials as a construction material in the restoration of sand is of a constructive nature. And most importantly, the sand protects the structure from underground waters and the pitched platform will soften the tension in the puddle due to its

free and integral vibration during the earthquake and will not allow it to break.

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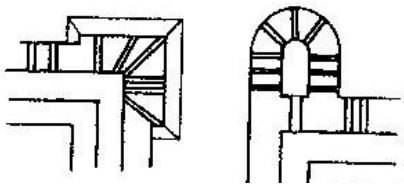
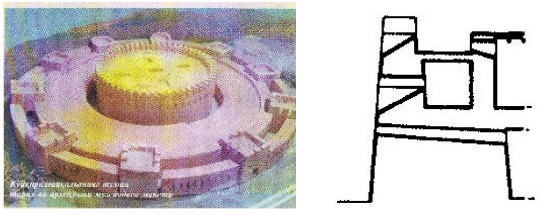
The southern part of the Aral Sea is a crucial element of the peaksadevor fortresses, located in the territory of the Republic of Karakalpakstan and the Khorezm region, which is their burgeons. The Burj is built around the perimeter of the castle walls, which is higher than the wall and typically flips out. The architects of ancient Khorezm have paid special attention to defending the castle corners and symmetry of their architectural composition. The walls have different compositions of corners, some of which are square, rectangular, and some rotated (Fig. 2, a, b) [4].



a) **b)**

Figure 2. a) Ancient paxsadevor castle angles in plan view and b) pictures - Corner Corners;

The architectural monument "Qoqqyrty qal'a" is located in the Turtkul district of the Republic of Karakalpakstan (Fig. 3). The "Fortified Fortress" was built in the 4th century BC and is considered one of the oldest castles in Central Asia in terms of construction and architecture. Its inner circle is 42 meters, its outer circumference is 87.5 meters and its height is about 8 meters. The outer wall was composed of nine boggles, some of which were some distance away from each other. The castle area is about 0.8 hectares, which is a two-storey building.



a) ***b)***

Figure 3. The mold of the "cast fort" (a) and the wall section (b)

The castle's round, central tower was 8 meters high. The depth of the window shelves is up to 7 meters. Because the solid wall, surrounded by a public 42-meter tower, was very thick.

In this castle, built before our era, there are large living spaces and scientific centers along with palace halls, and even the oldest observatory, based on the architectural architecture of the castle.

CONCLUSION

In summary, it is necessary to say that the fortress walls and fortresses are built on their own complex architecture, with great power and labor that we see them as a great intelligence. Without looking at any book, we can see that the ancient city of Horezm has been constructed in ancient times, science, development, and culture of our ancestors. So, these monuments that have survived to our time are not an exaggeration to say about our long history.

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