

About Several Infrastructure Constructions Of The Great Silk Road

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Abstract

This article is dedicated to the principles of the formation of complexes service along the Great Silk Road, the principles of architectural and typological solutions of artificial reservoirs and their importance in the system of service. Pools, sardobas and koriz have been most significant among the Great Silk Road route's structures. Especially, sardobas played the main role. Sardobas, which have located in the different places of the Great Silk Road, were built based on every zone's national architecture. Namely, sardobas was built on the differently styles of architecture, cause of various regions. It sure from the fact that they were one of the highest roadside structures with they have always had cold water in summer and warm water in winter for caravans.

Keywords: *the Great Silk Road, sardoba, caravansarai, rabot, hazora, yomkhana, well, pool, koriz, qulfak.*

1. Introduction

The Great Silk Road –is considered as a great importance of phenomena in the evolution history of humanity. It is characterized with as a piece of the different cultural traditions, and the market of the interconnected countries. The buildings along the Great Silk Road were the essential piece of the communications at the continent. Their construction and development had directly belonged to the activities of the ancient roads. On this transcontinental road was built different dimensional destinations for the daily and weekly stops of the caravans.

Abdurazaq Samarkandi had written in his own work the “Matlai sa'dain va majmai bahrain” (“The two happy stars' rising and the connecting point of the two seas”): Tourists of Shohrukh had visited to the caravan-stop-points after a daily road and to the big cities a weekly road. Besides this, he wrote that Mirza Ulugbek had travelled from the capital Herat to heavenly Samarkand for a week. In our opinion, that distance was 250-300 km, as well.

2. Review of International Scientific Researches on the Theme.

In the XVth century Spanish tourist and embassy Rui Gonzales De Klavixo, had visited to the castle of Amir Temur, wrote that he had travelled from Samarkand till Bukhara for the six days.

If we consider the fact that the average distance completed by caravans was 35-40 kms a day, new cities came to existence in about each 7-day distance after 6-day travel. Indeed, the settlements, which were called *charshanba, payshanba, juma*, -had located mutually at the several days travelling distance of the caravan, or between Samarkand and Bukhara cities. In juma, which is the main holiday of the muslims or another definition is-important market day, they travelled from Bukhara to the another large city Samarkand.

As we noted at the above, caravans travelled to 35-40 kms at the hottest days of summer, and 16-24 km at the coldest days of winter. It is indeed, there were road builds like settlements or caravansaries, rabods, hazoras, yomkhanas, sardobas on the road of caravans' one day gap.

Hydrotechnic buildings (wells, ponds and sardobas, ect.) were the important elements of the the ancient communication system of the roads for the provision with water of trade caravans and their passengers, camels. Ancient water buildings are significant as the architectural heritages from our ansectors and one of their typological bases.

The hydraulic structures, such as special pools, cisterns, water reservoirs, bridges, which are the examples of the complex engineering culture, had been built on evidence.

Methods of establishment of wells in the steppe and desert regions, their forms and structures had developed from the Bronze Age to the beginning of the XXth century, in Central Asia. The experiences in this sphere have beeing passed down from generation to generation. The salinity of underground waters, invalid consumption and the need to preserve freshwater resources in some parts of the region, especially in the desert and steppe caused to be

built natural wells, pools and cisterns in the form of the sophisticated hydraulic structures.

One of them is artificial reservoir pool-havuz, which is deep dug depth in order to reserve water, has been widespread along the Central Asia and Middle East.

Pools are also considered as the reserves of beverage water. There are variety of types of pools: rectangular, round, hexagonal and octagonal, and other species. The surroundings of pools have been decorated with the stones, wood, brick, grass and planted trees for the shade. Sometimes, they have been decorated with fountains. At the ancient times pools were significant for the architecture, particularly for the creation of ensembles.

3. Several water infrastructure constructions

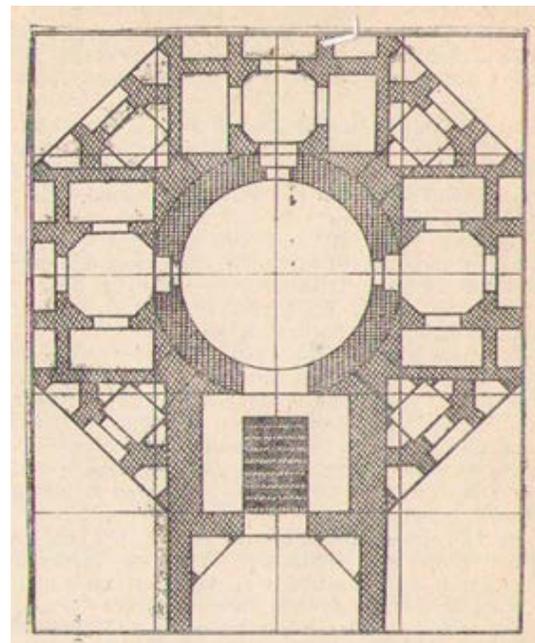
3.1 The pools

The pools had been widely used at the roadside structures of cities and towns which had located along the Great Silk Road. For example, Sitorai Mohi Khosa, Labihavuz, Bolohavuz and others in Bukhara city were not only public water supply, but also inimitable sightseeing places of the city. To be more precise, the largest and beautiful Labihavuz pool, which is situated near Shahrud ditch, can be characterized in Bukhara. The biggest pond of Central Asian has a rectangle plan,

36x46m bulk, 5m depth, it was planned for the 4320 cubic meters of water, and its stairs were made of the large stones at the half-cut form angles. It is known by the the historical sources that in the XIX th centuries documents noted that there had been more than 300 pools in Bukhara city.

In the first half of the twentieth century, the majority of pools had been drained and instead of them buildings constructed, due to the requirements of sanitary. Nowadays, pools (water reservoir) are being made taking into account the climatic conditions of the territory of Uzbekistan, they are in harmony with the fountains built in shady parks.

Another type of pools “qulfak” is different with their construction from the ordinary pools. The qulfak is made by not digging the earth, but on the hillock or any coast of stream. In order to build this type of pool it is made a small square with 60m height, 40m width and built 2m high wall which is surrounded stone and grass over its three sides. The basement of the wall should be 3m and the top 1,5m. At the opposite sides: top and low of the pool have two ears that are used to inflow and outflow the ditch-water. This smart devise for outflowing water of the pool is called “qulfak”. Their main function is like a lock as to agglomerate water of the pool and discharge it.



The plan of sardoba (cistern) in the XVI th century, drawn by an unknown engineer of Bukhara.

For the construction of pools used grass, grindstone, brick and wood. To illustrate, in Samarkand city Kosh havuz was built vertical bicameral two ponds with wooden edges.

One of the most considerable water structures along the caravan roads is sardobas.

3.2 Sardobas

Sardobas- were built for the support of trade-caravans caravans and their animals, which had travelled to the foreign countries over the absolutely deprived deserts and steppes of Kizilkum, Karakum, Mirzachul, Karshi and other deserts in Central Asia, as the special water structures.

The word of “sardoba” means- a room with cold water or ice room and in usual, it is a pond covered with the special dome. Considerably, sardobas are built complicated. They have different volumes.

Sardoba, in the form of a cylindrical dug earth built depth is from 10-15m to 38-40m depending on the place, and wall diameter is 12-16m, wall thickness is 1-1,5m on basement, flat with the level of the surface of the pool. The dome of sardoba is made by the qualified bricks, and a special blend which is named *Qir*. The hole had on the top outer had also holes which had made water drop to the pool. To enter to sardoba had a door, its front side covered with a wall, the reason of saving the clean water.

The previous situation



the present situation



Rabati Malik sardobas

That wall had the way of flowing water into the sardoba pool that had equipped with filter with *kigiz* and charcoal.

There was a special water flow line into sardoba, and also an arch entrance to take out water from there. Also, there was a path with stairs, which was used to go into the pool.

Several sardobas had even rooms of workers for the cleaning and observing it.

The great Spanish embassy Rui Gonzales De-Klavixo had written about the variety of buildings, which is difficult to comprehend either it was *rabat* or *hazara*:

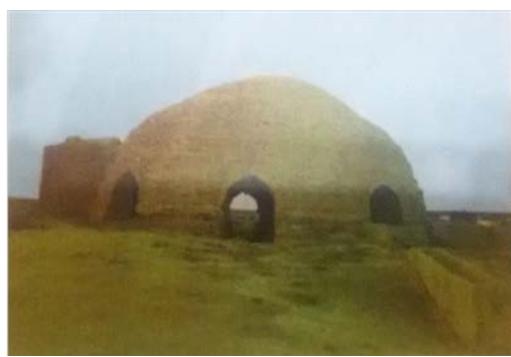
«... the next day, in the Monday many passengers stood in lodging, these night spending places for the passengers are unique camps here, cause of in this distance of two days, hot and arid places have not any settlements. Water was brought through the pipes which were laid under the one day distance earth until this camp».

Thus, rabats and their one part-sardobas were considered as the high engineer structures. It is indicated by the long distance water supply system and excellent performance of sardoba construction.

We have known that water have been provided through ditches or sardobas at the usual rabats. However, in that position water has provided by pipes for one day distance. The number of caravansarais have had their own 1,2,3 or more courtyards, wells and sardobas depending on the sizes. The large dome-shaped construction- Malik sardoba, which have situated near Rabati Malik caravansarai (in the 145-150m southern west), had always supported it with water.

That sardoba is domed, its pool's diameter is 12,8m and high is 20m.

Two-thirds of its bricks, carved to the ground. In the northern part of sardoba have water down stairs, its side at the top of the roof and the ceiling lights and



Sangir Suvloq sardoba

ventilated room detaching. The water into the sardoba was flowed through the Zarafshan river with the help of the special channel.

There were a number of type of sardoba, due to geographical location, nature of the place and landscape: Snow-rain water, water and irrigation water, underground water (holes) completed in cisterns.

Choosing an appropriate place was very important to the type of snow-rain water cisterns. The reason is those cisterns have been poured by snow-rain water which have flowed through ramps, actually in autumn, winter and spring times. To give an example, “Wooden” sardoba, that is located in the 35 km north-east from Djizzakh city, have built by durable rectangular bricks with the size of 25x25, 27x27x5-5,5 cm, its diameter is 15,2 m and 1,4 m thickness of wall. There were three ventilation holes of the three sides on the dome of “Wooden” sardoba, and on the outside was the chimney. The ventilation trumpet and holes have constantly cleared inside air of the building



Wooden sardoba

giving it coolness. There was a special water flow line into sardoba and also an arch entrance to take out water from there. Also, there was a path with stairs which was used to go into the pool. There was Sangir Suvloq sardoba at the ancient caravan road of the Sandikli desert of Turkmenistan, which connected two cities Kerki and Karshi. That cistern was situated at the downhill place, so that surrounded with ramp which assisted to be filled with snow-rain water.

The diameter of pond was 17m. The tier, high dome of sardoba was built by the durable bricks, and it had holes on the top and sides. For the recreation of the passengers had terrace arches. It had watering grooves for the pets. The architectural composition of Sangir Suvloq sardoba is specific: it differs with its tier dome, terrace arches like altar for the rest of passengers, and portal.

A briefly note regarding a sardoba which is located in Karavulbazar. The main entrance of the cistern has built like an arch. There are 9 windows except of the entrance, high of the dome is 6,5m, on the top has a round hole with the diameter 16m for the ventilation. Its pool diameter is 16m. Currently, it is filling with snow-rain water in the seasons of winter and early spring, as well. This cistern has serviced to support with water trade caravans, military detachments, passengers and shepherds at the road of Karavulbazar in the beginning of the XVI-XX centuries.

Such kind of constructions were widespread at the trading roads and settled places which had crossed the regions of desert and steppe, they were especially evolved in the Middle Ages. By the collected experiences in the sphere of building complicated hydrotechnic structures used special technology in the constructing cisterns. That technology serviced preserving water of sardoba from the effect of the underground waters, and its developing durable and inviolable. Given the great attention to build special windows on the sides of sardobas and a hole on the top side of it. They helped to preserve water without staling for a long time. If in usual at the territory of desert and steppe sardobas were filled through snow-rain water, in the cities water brought by the special ceramic pipes.

Nowadays, it can be appeared with an example of Karshi sardoba, which is hitherto preserved among the cities of our country.

To build sardobas were in a large scale in the period of Temurid and Shayboni. It is indicated by the sardobas which were built on the roads of the shallows from Djizzak to Sirdarya, from Bukhara throught Karshi to Kerki and Kelif shallows at the medium stream of Amudarya.

The steppe zones of the Great Silk Road known as a complicated climate condition with the hottest in the days of summer and the coldest in the days of winter.

In the steppe zones of the Great Silk Road is accounted as it has complicated climate condition with the hottest in summer days and the coldest in winter days. To this purpose, sardobas have built with taking all climate conditions into consideration.

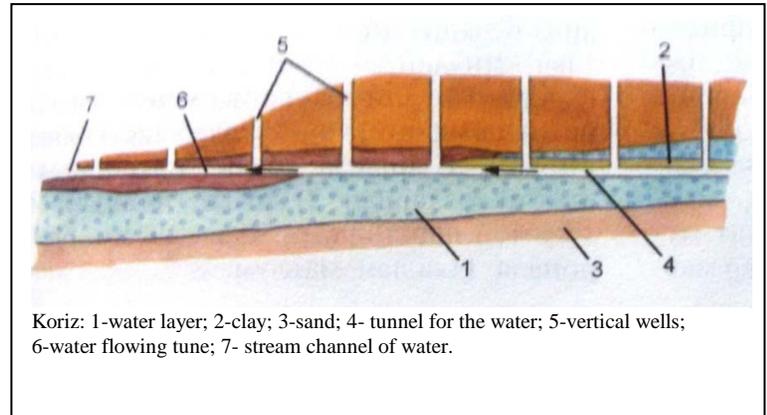
Thickness of the walls of cisterns are extremely important, because of moderating temperate climate in the months of winter and summer.

In general, according to the sources, in the middle ages in Movarounnahr were available hundreds of

sardobas, there are information nearly 50 of them. 29 from that were in the desert of Karshi. Notwithstanding, all of those cisterns haven't scientifically researched, yet. Their places have not clarified. Partly utilizing of sardobas in some deserts of Central Asia is still continuing. Another water structure of the Great Silk Road is koriz.

3.3 Koriz

The persian word of koriz, which is an underground construction, has used to collect underground water and get out of the surface of the land. Koriz has widely spread in the Middle East and in Southeast Asia. The most common is in mountain and foothill regions of Central Asia. The construction of koriz was widely used in the history. Historical cities of Uzbekistan–Samarkand, Bukhara and Navoi had been dug almost 200 korizs. In Central Asia till the beginning of the XX century koriz water used in the irrigation of crops. The art of excavating koriz is required to know the changes on the surface of the underground water, and to determine pointing of the ramp of terrain. It was done with the particular tools. After signing routes of the koriz along those highways dug wells in every 5-40m. The depths of the wells were from 14-15m sometimes to 60-70m. Water wells are united into one layer circuit through the tunnels. The tunnel's high was 1,5m, width was 1m, its walls were made from wood and



stone, and the length extended to a few meters depending on the ramp of terrain.

For instance, koriz, which has been called Maston, had 280 wells with the depth of 15m and length of 3kms in Nurata district, Navoi province.

Koriz is used to get out of soil and gravel at the period of construction, in the working time of koriz is used to control, reconstruct it and exchange of the air. Average counting 1m length of water filling wells have 0,3-0,6 l/c.

In our opinion, sometimes water should have brought from korizs to sardobas which are located in the steppe zones.



New sardoba in Shakhrisabz city and its interior

4. Conclusions

As of today, in our Republic the program of Restoration of the Great Silk Road route roadside repair work is being carried out in the field of water. To conclude, pools, sardobas and koriz have been most significant among the Great Silk Road route's structures. Especially, sardobas played the main role. Sardobas, which have located in the different places of the Great Silk Road, were built based on every zone's national architecture. Namely, sardobas was built on the differently styles of architecture, cause of various regions.

It sure from the fact that they were one of the highest roadside structures with they have always had cold water in summer and warm water in winter for caravans. In particular, we can give an example of the restored cistern in front of "Oq saray" which is situated in Shakhrisabz city. In the year of 2015, the restored sardoba illustrates historical architecture of other sardobas in Uzbekistan. The interior of the building is decorated in a modern style with national patterns, which attract the attention of all.

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