

# Water Supply System in the Mountain Castles of Koguryo and Its Advantages

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The great leader Comrade **Kim Jong Il** said as follows.

**“Koguryo was a mighty country with a large territory and a highly developed culture. Its people were very courageous and passionately patriotic. Its great strength and its high cultural standard are of great pride to our nation.”** (“KIM JONG IL SELECTED WORKS” Vol.1 P. 31)

Mountain castles, representative of the powerfulness of Koguryo, played a great role in the anti-aggression, patriotic struggle of our nation in defence of our dignity and sovereignty.

In the Middle Age gates to a castle had to be closed in order for it to be defended; for a protected battle, not only plenty of troops, weapons and grain but also a large quantity of water had to be kept in store in the castle. Therefore, water can be called an important element that shows the defence capabilities of the mountain castle.

This paper is aimed at showing the high level of patriotic spirit and creative talent of the Koguryo people through the water supply system established in the mountain castles of Koguryo and its advantages.

At the time of a battle to defend a mountain castle, in it were not only troops but their family members, civilians who had taken refuge in it and a large number of war horses and other domestic animals. This gives rise to the problem of water.

The Chronicle of Three Kingdoms, with regard to the numbers of troops, civilians and domestic animals in the Liaodong, Anshi and other castles at the time of the war between Koguryo and Tang in 645, there were 60 000 guards and civilians in total in the Liaodong Castle, 100 000 troops (except the civilians) in the Jianan and Xin castles, and 150 000 volunteers and 100 000 head of horse and cattle in the Anshi Castle, which means that there had already been similar numbers of troops, civilians and domestic animals there. (April, 4<sup>th</sup> year of the reign of King Pojang, 9<sup>th</sup> Volume of Koguryo, 21<sup>st</sup> Book of Chronicle of Three Kingdoms)

If it is supposed that a man drinks 1L of water a day, about 60 000L (about 60t) of clean water had to be available for the troops and civilians in the Liaodong Castle.

In view of the fact that there were about 100 000 guards and civilians in the Anshi Castle, the clean water needed would have been more than hundreds of tons a day; the amount would have been greater than that if the amount of water to be consumed by the horse and cows numbering 100 000 and the domestic animals in the castle was added. As water for people's living was needed as well, the amount of water needed was enormous.

Water was also a powerful means of fighting in the battle to defend a mountain castle in the Middle Ages. Boiled water was poured over the enemy troops climbing up the castle walls; water was also used for extinguishing fire when the wooden structures in the castle were burning.

Therefore, water was an important element in judging the defence capabilities of a castle.

The Koguryo people established a well-regulated water supply system in building a castle because there were little sources of water in it.

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A water supply system is, in general, a sequential system of drawing water from a source and supplying a necessary amount of it to an object.

The water supply system in a mountain castle of Koguryo consisted of sources, catchment facilities and channels.

First, they made a maximum use of water sources.

Water sources, in general, consisted of water above and under the ground.

Mountain castles of Koguryo were built across several valleys, along which streams meandered. These streams could be used as sources of water.

The part of Koguryo of Chronicle of Three Kingdoms reads in part, “In the Koguryo region there are many high mountains and deep valleys and no vast plain and swamp area. Its people live in mountain valleys, drinking water running along them.” This shows that Koguryo people, from olden days, drank water flowing down the valleys.

However, streams in the valleys are affected by the weather conditions: in the drought season they almost dry up and in the rainy season their water quality deteriorates. Therefore the Koguryo people used underground water as much as possible in the mountain castles,

Underground water is a good water source as it is clean and its quality and quantity does not change all the year round.

The pond that does not dry all the year round, pond called “Tianchi” in the western are in the Yunushan Castle, two spring still jetting out water in the Shanchengzishan Castle and the seven springs and Ingo(carp), Sasum(deer), Kuryong(nine dragons) and Jangsu Ponds in the Taesongsan Castle demonstrate the fact that the Koguryo people actively used the underground water, whose quantity is great and whose quality is good.

And they built many water catchment facilities in the castles to put every drop of water into effective use.

These facilities can be divided into those for catching underground water, water above ground and seeping water.

The facility for catching underground water was intended to catch a necessary amount of water in borehole, well and others.

No borehole has been discovered in the mountain castles of Koguryo, but the fact that there were 50 wells in the Cholong Castle in Nyongbyon show that the Koguryo people made maximum efforts to utilize underground water sources.

The Koguryo people most used water of well in peacetime. The well of the Koguryo period discovered in Kosan-dong, Taesong District, Pyongyang and the remains of wells around it show this.

The springs and ponds in the Yunushan, Shanchengzishan, Taesongsan and Jangsusan castles of the Koguryo period show the structures of spring catchments. The seven springs in the Taesongsan Castle still jet out large quantities of water, and the quality is still good.

Structures for gathering water above the ground were closely distributed in the mountain castles of Koguryo. ·

The facts that there were carps in the ponds in the encircled Yunayanshan Castle during the war against Han and sites of 170 ponds were found in the Taesongsan Castle show that there were many

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facilities for collecting stream water and rainwater and they stored large quantities of water.

There were also facilities for catching water seeping down the earth.

There have been found 3 wells about 40cm deep around pond No.3 at the foot of Jangsu Peak in the Taesongsan Castle and 2 wells around pond No.7; they were structures for catching water that was seeping down the earth after being filtered through the pond walls.

It is considered that such facilities were installed around big ponds for obtaining water of high quality.

The water sources and catchment facilities were connected by channels.

The 170 ponds in the Taesongsan Castle were connected by channels with stone and gravel beds. The channel beds shows the wisdom of the Koguryo people who, in order not to waste the water overflowing a pond situated above, drew it to the pond below through a channel, whose bed was so made as to purify the water.

The water supply system in the mountain castles was quite advantageous in those days,

First, it could supply necessary water in a sufficient amount for its usage.

Drinking water was supplied on a high standard.

In order to get drinking water of high quality, the Koguryo people invented a developed water purifying technology.

For example, the beds of entrances to almost all the ponds in the Taesongsan Castle, including ponds No. 1, 2, 6, and 10, were covered with gravel, to purify water for the first stage. The ponds were surrounded double and treble by ditches, so that water could go down to a pond below after flowing to the edges of the pond above through ditches. While passing through the ditch walls, the water was purified for the second and third times and then gathered in the pond below. This water was not used for drinking directly, but was purified again in the 2 to 8 shallow wells around the outer ditch, like in ponds No.3 and No.7. It was then consumed.

The stream water meandering through valleys were so clean that there was no need to purify it. What was necessary was to prevent it from being contaminated as there were so many people in the castles.

Horses and other domestic animals were provided with clean water. As cavalry played an important role, it was essential to ensure that no germ was mixed in water for horses. Therefore, it is believed that such water was as clean as that for human being. The name of the pond, Yinmachi, near the site of the command post around the Nam Gate of the Shanchengzishan Castle shows that there were ponds exclusively for war horses in the period of Koguryo.

In a castle water was used to be poured over the enemy troops climbing the castle walls after being boiled, for extinguishing fire when a building caught fire, and for irrigating vegetable plots.

In order to obtain such a large amount of water, the Koguryo people gathered water in places where there were streams and built deep artificial ponds. The sites of 170 ponds, large and small, in the Taesongsan Castle show that a large volume of water was kept in store in it.

The second advantage of the water supply system is that the water catchment facilities were so distributed that the defence capabilities of the mountain castles were enhanced to the maximum.

All the water catchment facilities, like those aimed at gathering underground, seeping water

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and water above ground were built near barracks, castle gates, command posts and castle walls, so as to accommodate the command posts and castle walls, so as to accommodate the convenience of both soldiers and civilians in battle and living.

For example, the 12 ponds at the foot of Somun Peak inside the Nam Gate of the Taesongsan Castle were intended to be used by the gate guards, and the 7 ponds near the command post on Jujak Peak were sources of water for those guarding the post. There are sites of 11 ponds on the top of Somun Peak, an important point in defending the castle, and there are sites of 3 ponds on the top of Kuksa Peak and near the peak where Puk Gate was situated. There are 11 ponds on Jangsu Peak and 2 ponds and 1 spring on Ulji Peak, both of which were strategic points in defending the Taesongsan Castle.

Inside the castle and along its walls there are 1 or 2 ponds at a regular interval, which are believed to be used by Koguryo soldiers for defending the castle walls during battles. They would boil water in large iron pots and poured the boiling water over the foreign aggressors who were attempting to climb the castle walls.

The third advantage of the water supply system is that the water supply facilities could perform their functions and duties even under unfavorable climatic and weather conditions.

To take 170 ponds in the Taesongsan Castle, their edges were built with stone pieces, which were used for building the castle, double and treble and ditches were dug around them, so that muddy water would not flow directly into the ponds and the ponds would not be filled up with earth or mud in the rainy season.

To take pond No.2 in the southern valley of Jangsu Peak, the four sides of its are all sloping, so water gather in it if it rains; if it downpours in the rainy season, the pond is in the danger of being filled with mud. In consideration of these topographic and weather conditions, the Koguryo people piled stone slabs on its western edge quadruple and two ditches between them; and the eastern edge was built treble. If it rained heavily in the rainy season, the muddy water, instead of flowing directly into the pond, could be channeled into other directions through the spillways or seep into it after being purified through the stone slabs of the pond edges. This prevented the pond from being filled with mud and made it easy to remove the mud as it gathered in the ditches.

This is a form of pond edge invented in consideration of the topographical conditions of the pond being situated in a hollow place, not in a flat place, and the weather conditions of our country, where it rains much in the rainy season. This form of pond edge can be found in other ponds in the Taesongsan Castle.

In order to obtain water even in the dry season, the Koguryo people found water sources in the high places in the mountain castles.

The pond, called Heavenly Lake, on the western tableland in the Yunushan Castle, Ingo(carp), Sasum(deer), Kuryong(nine dragons) and Jangsu ponds and the ponds on the top of Somun Peak in the Taesongsan Castle were famous for brimming over with water even in the dry season.

As these water catchment facilities in high places provided water to ponds below the ponds in the castle were all filled with water all the year round. Such facilities can be found in other mountain castles of the Koguryo period.

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As the Koguryo people, with soaring patriotic spirit and creative talent, built solid mountain castles as defence bulwarks and secured not only weapons and grain but also water sources, they could defend the castles in the protracted battles with the predatory enemy troops and emerge victorious.

The water supply system in mountain castles invented by the Koguryo people, for its advantages, still strikes people with wonder and demonstrates the resourcefulness and talent of the Korean nation.