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Preservation work for the section of the embankment of Sayamaike Pond, oldest existing earth-fill dam in Japan

Le travail de conservation pour la section du remblai de l'étang de Sayamaike, vie la plus ancienne Terre-remplissent barrage au Japon

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ABSTRACT

Sayamaike Pond is the existing oldest pond in Japan. The excavations at this site carried out prior to the latest improvement project proved that the pond had been built about 1.400 years ago. The section of its embankment consists of the earth layers, which clearly showed the history of the improvement and the civil engineering technologies of ancient times. In view of the historical importance, Osaka Prefectural Government decided to preserve the entire section. Here I introduce you how the preservation work had been completed.

1 INTRODUCTION

Sayamaike Pond is located in the southeastern part of Osaka Prefecture. It was constructed by shutting a river with an earth-fill dam. It has been used as an irrigation reservoir since it had been built.

During the latest improvement project carried out by Civil Engineering Section of Osaka Prefecture from 1997-2001, some excavations were carried out prior to the construction works.

The surveys brought us remarkable remains such as the wooden water pipes for drainage of about 72m long, which dendrochronological survey proved to be cut in 616A.D. Above all, the most interesting was the section of the embankment which would be discussed below.

2 INFORMATIONS FROM THE SECTION OF THE EMBANKMENT

The section was about 62m wide at the bottom and 15m high, consisted of the earth layers, which clearly showed that at least twelve times improvement works had been carried out at that site.

The layers also showed us ancient civil engineering technologies. At the construction of this pond, they built the embankment in such order as follows::

- 1) Put sandbags at the bottom of the bed of the former river to 80cm high.
- 2) Put sandbags in line at right angles to the bottom of the bank in every 3m
- 3) Put soil between the lines to make a layer of 30cm high
- 4) Spread twigs with leaves along with the direction of the bottom of the bank
- 5) Repeat the process from 2) to 4) again and again

We also found out that from the birth of this pond to 762A.D., that is, for about 150 years, they kept adopting the use of spreading twigs with leaves.

It is a unique building method, and our experiments suggested that the layer of the twigs was effective for draining the spare water filtering into the soil, just like the modern filter draining method. to stabilize the foundation. It also might help the workers to maintain trafficability.

3 THE PRESERVATION WORK OF THE SECTION

In view of its historical importance of its embankment, Osaka Prefectural Government decided to preserve the entire section for the future generation.

The work was undertaken in such order as follows::

- 1) Cut the section in 101 blocks of each 3m wide and 1.5m high and 0.5m thick, with a steel frame to keep its shape.
- 2) Put these framed blocks in the pool filled with 38% PEG solution.
- 3) Analyzing the record of relative conduction degree of electricity got from the electrodes inserting the blocks, determine when the blocks to be finished being permeated with the solution.
- 4) Dry the blocks in a storehouse shut out of sunlight till they lost spare water.
- 5) Clear and smooth the surface of each block to regain the nuance as if they were just unearthed. Put these blocks on the steel stand.

It took two years for replacing the water in the blocks with the PEG solution , and another two years to dry them.

4 CONCLUSIONS

This reservation work was the unprecedented effort, and our challenge was succeeded.

The preservation work required us so much expence and so long time. We could have chosen other easier preservation methods such as lacquer film method, which is often adopted in Japanese archaeological surveys.

Nevertheless, we believe that keeping the real sample of the embankment will give our future generations the chance to reexamine it. Moreover, the exhibition of the real section in our museum is always giving great impression to the visitors that they are touching the real history of the pond.