

KİLYOS SU TERAZİLİ SU SİSTEMİ  
1997 NİSAN AYINDA GERÇEKLEŞEN  
CURA AQUARUM IN JORDAN  
KONFERANSINDA POSTER OLARAK SUNULDU

# KILYOS WATER SUPPLY SYSTEM WITH SU TERAZIS

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## SUTERAZIS

*Suterazi* means water balance in Turkish. There is similarity between inverted siphons and the *suterazis*. The most impressive inverted siphons in ancient water supply systems can be seen at *Pergamon* with the lead pipes and at *Aspendos* with the stone pipes. The pipes were under pressure in inverted siphons.

“According to Alan Edmonds from London; *Suterazis* were constructed over a period of many centuries by the Ottomans on their water distribution systems, particularly around Istanbul/Constantinople. Remains of *suterazis* exist elsewhere in the former Ottoman Empire.

There are two types of *suterazis*, the first and more easily comprehensive; the distribution tower with the function of distribution water under pressure to several points such as fountains. These are functionally the same as the modern water towers except that their tanks never contain more than about a cubic meter of water.

The second type *suterazis* were found in rows along long inverted siphons.

Their function may be summarized as follows:

- They were supposed to allow air to escape,
- They functioned as pressure reducing devices,
- They reduced the damaging effect of water hammer on the pipes,
- They were placed at points along the pipeline at which the line underwent a change of direction. (Ref. 4)

Some of them in ruins over fifty *suterazis* exist in Istanbul. But the only existing continuous row of *suterazis* can be seen at *Kilyos*. In this paper this system will be discussed.

## KILYOS AQUEDUCT WITH SUTERAZIS THE LOCATION

*Kilyos* is a holiday resort on the Black Sea shore, 11 km from *Sarıyer* (town center) and 32 km from *Taksim* (Istanbul) by high way. A special boat is also available for those who want to reach from the sea.

*Kilyos*, Greek word *kilia* that means “sand”, is also known with its Turkish name *Kumluk* (same meaning).

Greek inhabitants of *Kilyos* migrated to Greece before Turkish republic was founded. Turkish origins from elsewhere moved in as part of population exchange.

On the way to *Kilyos* cemeteries of the different faiths such as Bahai, Jehova’s Witnesses can be seen side by side.

## THE HISTORY OF KILYOS

The main historical monuments in *Kilyos* are a fortress, two stone harbors and three *suterazis*. Fortress is very important in the history of *Kilyos*. It was probably constructed by Byzantine emperors in the 4<sup>th</sup> or 5<sup>th</sup> centuries. It had been used or reconstructed by Genoese in the 12<sup>th</sup> and 13<sup>th</sup> centuries. At that time walled Galata in Istanbul was the city of Genoese and they have had some others fortress at the Bosphorus and Black Sea shores. Galata was ruled by Genoese between the years of 1303-1453. (Ref.1)

In Ottoman times the Fortress was attacked by Don Cossacks in the 17<sup>th</sup> -18<sup>th</sup> centuries. Russian army settled in Bosphorus after the agreement with Ottoman Sultan in 19<sup>th</sup> century for a period. The Fortress was restored by the order of Sultan Mahmut II in 1826 according to the inscription on the entrance door of it. In the Crimean war in 1854 it was used as hospital for injured soldiers. There are baths, cisterns and caves inside the fortress. But today it is a military zone and off limit to visitors.

## THE AQUEDUCT OF KILYOS

Water was conveyed to the Fortress by means of 5 *suterazis* (Ref.2). Three of them can be seen today. Water was conveyed by lead pipes under the ground and reached up by its own pressure and fell down to under ground and reached the second *suterazi* by pressure and went on...

Existing heights of *suterazis*; Nr. 1 are about 14-15 m, Nr 2, 8-10 m, Nr 3, 9-10 m. The pipes of the system were lead pipes (Ref.3). The system has been ruined for 100-150 years. The distances between *suterazis* are about 200 m, so the system can be better repaired. It has a function of a valve.

## THE DATE OF THE SYSTEM

There are two speculations:

-*Suterazis* were constructed to get water to the Fortress by Genoese before Ottoman Empire in 14<sup>th</sup> century.

-*Suterazis* were constructed by Ottomans 18<sup>th</sup> century.

According to my opinion due to masonry technique, the first *suterazi* near to the Fortress was probably built by Ottomans. But the others may have been built by Genoese.

If this theory is right, the technique of *suterazi* was inherited by Ottomans from Romans who got it from Genoese. Otherwise *suterazis* were constructed before Ottomans in Turkey by Genoese.

## THE REFERENCES

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General view of Kilyos  
The Fortress and the 3 su terazis





su terazi (1)



suterazi 1



Suterazi 2



suterazi 3



Suterazis 1,2,3,

