



# Reconstruction of Riga canal

## ***Introduction***

Built over 800 years ago, Riga, the capital city of Latvia has developed an exquisite beauty and charm of its own. The Old Town is embraced by the historic semicircular City canal which acquired its current appearance after 1857 when the earth ramparts were demolished and in their place an area of official buildings, boulevards and green spaces was established. The City Canal is 3.2 km long and about 2 meters deep. Sixteen bridges of different widths cross it.

However, the city canal had not been regularly cleaned and renovated since the 1930s -it had grown shallow, the old oak planks had become timeworn and erosion of the banks was endangering the hundred-year-old trees growing on its banks.

Therefore Riga Municipality accepted a plan to renovate the city canal and financed the execution of the project. The reconstruction project included various types of work -deepening the canal bed, waste removal, strengthening the banks by steel sheet piles and wooden poles, renewing and leveling slopes.

## ***Main problems***

First, the difficult working conditions and the variety of operations involved. Technical solutions had to be found for dredging work in confined shallow areas, including work under bridges and discharging soil at a distance of 1.5km. The other problem was the location of the city canal itself. The city center and historic park around the canal made it

### *Watermaster piledriving metal sheet piles*



impossible to carry out any kind of work from the land, including piling work and transportation. Riga municipality and environmental organizations forbade keeping any vehicles in the park area to avoid damaging the park greenery.

## ***Technical solutions and contractors involved***

The reconstruction works were done by two Latvian local contractors, using different approaches to project execution. Besides us, (**BGS co.,ltd**), there was another company which started the project one year earlier. They used a traditional dredger produced in the 1970s. The massive steel pipe mounted on floating pontoons took up practically all the water surface. It was not possible to use the full capacity of the equipment and therefore it was not efficient. Other features, such as big dimensions, low mobility, high fuel consumption, for instance, made work execution difficult and unprofitable. Besides, to carry out piling and excavation work it was necessary to use other building equipment. In such a situation, the successful and punctual completing of the project



*Watermaster pile-driving wooden piles*

was jeopardized and the employer decided to invite our company to continue the project. Analyzing the work and organization of the other contractor, it was clear that for the successful completing of the project we needed multifunctional and mobile equipment - the best solution in our opinion was **Watermaster classic** produced by the Finnish company **Aquamec oy**.

Our part of the job included dredging and transporting more than 10 000 m<sup>3</sup> of soil, piling of about 500 meters of existing retaining wall and the same amount - wooden piles, leveling the slopes, removing the waste from the canal bottom, etc. Deadline - 6 months from the commencement of work. This work was done by 2 Watermaster units. One performed deepening of the canal bed, the other one provided all other functions; pile driving both wooden and steel sheet piles, excavation and leveling of slopes. All work was organized from water as stipulated. For this purpose a new technology the Movax vibrodriver which is designed for standard excavators was specially adapted to the Watermaster

### ***Competitiveness, environmental aspects***

The reconstruction of Riga canal provided a good comparison of the efficiency of different types of dredging equipment - Finnish Watermaster and the traditional dredger used.

### **Cost efficiency**

The traditional dredger's fuel consumption was at least 3 times more than Watermasters. Personnel - 10-12 people

crew in each shift, Watermaster requires a 3 man crew - 1 operator and 1-2 assistants. Mobility and ability to perform all required works - Watermaster, unlike the traditional dredger, moves by using its propulsion unit, easily performing work even in confined areas such as - under bridges and/or in shallow water.

### **Dredging performance**

Although Watermasters dredging capacity is less than the traditional dredger used, the discharge length is up to 1km which is enough to transport mud into the barge in one step. The traditional dredger has higher dredging capacity but lower pumping distance - mud had to be pumped in two steps. Watermaster with its variety of accessory tools performed all the work by using one equipment. Replacing tools was fast and easy. The traditional dredger carries out dredging work only, other work - piling, excavating - were done

by using other equipment, which by the way, contrary to restrictions in some places had been done from the land.

### **Visual-esthetic aspect**

Watermaster, with its design and form, quite well fit in the surroundings, most people did not even notice Watermaster in operation (especially dredging) while the traditional dredger and pipeline occupied a huge water area and was noisy.

### **Time saving**

Even putting financial aspects aside the reconstruction of Riga city canal clearly showed the advantages of Watermaster working technology against traditional technology. The same amount of work with Watermaster was done by our company in 4 months while the other company needed 18 months to complete their part of the work.

*Inga Cirvele, BGS co., Latvia*

### ***Final results***

