

Olmsted Dam Major Equipment Aquadigger

Operational functions and particulars

The Aquadigger is a large hydraulic excavator (Komatsu PC 3000) ring mounted on a 50-foot wide by 180-foot long barge. It has a working depth up to 85 feet below river surface. The barge has three hydraulically controlled spuds: two stationary and one walking. It is also equipped with an on board 13 ton crane and four mooring winches which can be connected to anchors when spuds can't be used.

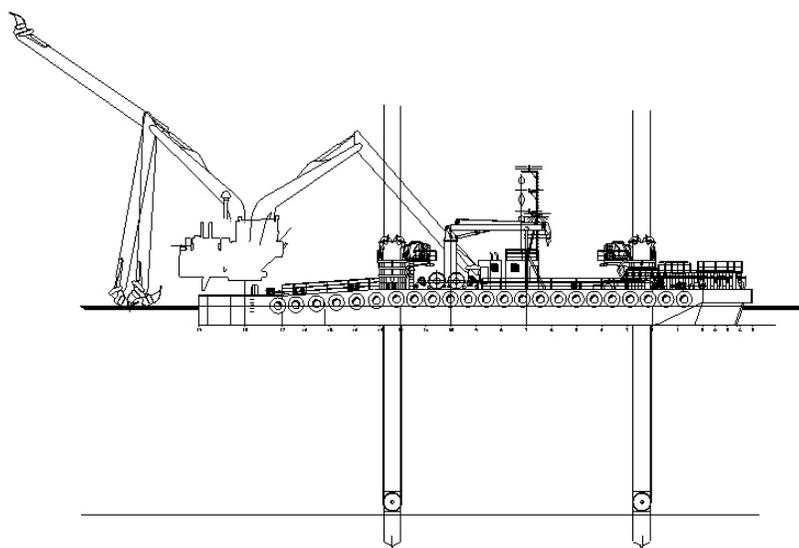
The Aquadigger is used to excavate river bottom alluvium to the design grade. The Aquadigger in conjunction with crane barges using clam buckets, installs the required select stone, drainage rock, bedding stone and scour stone materials to the required design grades of +0" and -6". The Aquadigger will be used to deploy jumbo sand bags (8-foot by 8-foot by 2.5-foot tall) used to provide erosion protection of the lock structure while foundation work is performed adjacent to the structure. The Aquadigger will also be outfitted with a rotary saw to cut foundation pile to the proper elevation if necessary, and it will be outfitted with pumps to remove sediment prior to shell set down.



Facts and Figures

Barge

- **Cost:** \$14 million
- **Barge Design / Vendor:** The barge was designed by The Glostien Associates, and built by Todd Shipyards of Seattle, WA
- **Barge Dimensions:** 180' long by 50' wide by 11' deep.
- **Spud Dimensions:** Spuds are 5'6" square, overall length is 109' and weigh 70 tons each. This vessel has a total of three spuds. Two of the spuds are used only for holding the vessel and travel in an up down movement only. The third is located on the bow, which is the primary spud allowing this vessel to walk up and down the river as needed. It can travel as much as 20' feet and as little as 1" at a time. All spuds are raised by hydraulic winches.



AQUADIGGER BARGE

Excavator:

- **Cost:** \$3,500,000
- **Vendor:** The Aquadigger PC 3000 was manufactured by Komatsu in Germany
- **Engine:** 1200 HP Turbo Charged Cummings Engine
- **Bucket Size:** The standard bucket is 5 cubic yards.
- **Cycle Time:** This is the time it takes for the operator to remove material from the river bottom, bring it to the surface, dump the load and then return to beginning location. It ranges between 35 to 45 seconds.
- **Assembly:** The excavator was shipped to Seattle and assembled on the barge at the Todd Shipyards in the fall of 2007. Only the spuds were installed at Olmsted because of bridge height restrictions. The excavator is fully integrated into the barge hydraulics such that the operator can control most hydraulic equipment from the cab.
- **Fuel Capacity:** Maximum storable fuel onboard is 30,000 gallons in the barge and 1000 gallons in the PC3000 with fuel consumption of approx. 40 gallons an hour.
- **Shipping:** The final assembled barge was shipped to Olmsted via the Panama Canal in early 2008

Technology in Action

The Aquadigger is capable of screeding/leveling the foundation and fill materials to a tolerance of +/- 2 inches at depth. In addition it can set objects attached to the boom to the same tolerance. To achieve this precision, the Aquadigger is equipped with an electronic positioning system that includes RTK-GPS, angle and rotation sensors on the excavator, computers, and marine positioning software.

Once the Aquadigger is on position, the spuds are lowered to the river bottom and then the barge is raised up two or three feet on the spuds to provide the barge with excellent stability. The electronic positioning system enables real-time monitoring of aquadigger progress by the operator and engineers during operations.

The operator controls digging depth and location by referring to the computer Operators Console which provides a virtual display of the exact location of the bucket. The computer screen also displays a reference line showing the design grade, showing exactly how much material is being removed and preventing the chances of over-digging. As the material is removed colors will appear representing different depths prior to reaching design depth.



Computer Screen View of Aquadigger from Side



Computer Screen view of Aquadigger from Top

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