

## **Field trials of suction dredging and dewatering**

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### **Background**

Sediment and sludge is defined as an aqueous raw material contaminated with solid, liquid and dissolved inorganic and organic substances. Sediments are particles that has settled in water.

We forecast that the dredging and dewatering techniques of sediment and sludge in the future will be a key competence in Ragn-Sells and necessary to meet competition in the market.

We consider assignments in the following two main options:

- Collection, purification and treatment on site with mobile technology
- Collection and transport to the plant for purification and treatment.

### **Collection of sediment**

WEDA YT-800 is an electrically powered remote underwater vehicle - robot - for cleaning large areas under water. For example, bottom of the sedimentation pond, or top layer of a sand filter. The relatively powerful pump, with a capacity of 50-70 m<sup>3</sup> per hour and the wide suction nozzle makes it possible to clean large areas of sediment in a relatively short time.

The sediment is pumped through a hose to a selected point where the sludge phase is received. Normally, sludge is dewatered on site, so that the proportion of dry matter (DM) is increased to > 20%.

### **Dewatering of sediment**

Geotube® - is a registered trade name of TenCate.

- Geotube® is constructed of high strength woven filter fabric
- High flow rate allows liquid to dewater, while containing solids.
- Geotube® is custom fabricated with seaming techniques that resist pressures during pumping operations.

### **Trials with WEDA-robot och Geotube®**

Over two days in mid-November 2009 was conducted the experiment in Ragn-Sells PV-pond on Högbytorp with WEDA-robot, as a sediment collector, and Geotube, as a dewatering equipment.



Fig 1: WEDA robot equipped with electric cable, for operation of the pump, and 75 mm hose, for the transportation of sludge to Geotube.



Fig 2: Geotube after about eight hours filling of sediment, sludge about 1-6% DM, pumped with WEDA-robot. DM content in Geotube increased to > 20%.  
NOTE: The addition of flocculating chemicals about 5 meters before the entrance to Geotube.



Fig 3: The robot in operation in the PV pond. In the foreground, on the pond's edge, are seen the electric cable and the hose fitted with buoys to assist the remote control of the robot.

## Results

The WEDA-robot technology has been investigated in a field trial that has been carried out in the PV pond in Högbytorp. We can see that equipment fulfilled our expectations and the results from the trial is consider as an very interesting technological and economical way too clean a pond when it still is used in production. The pond at Högbytorp was contaminated with at least 40 – 50 cm sludge with a dry content of about 15%, the Weda robot had no problems with that, the pump worked well and robot had no problems to move.

In our work with development of collection methods for sludge our conclusion is that the WEDA robot competes with, and under certain cases is even better than, today existing sludge dredging methods at the company. Primarily we are considering sedimentation ponds with sensitive bottoms and slow sand filters.

A very interesting result that we have achieved is the interconnection of the WEDA robot, chemical water treatment, flocculation with polymer and collection of the particles in a Geotube.