

# Sedimentation Tank Controls

March 5, 2014

Location: area in B60 next to fume hood/ B60a

Skills: fabrication

Number of students: 2

Improved sedimentation tank inlet control valves for high flow rates (depends on conversations with Drew Hart as to whether or not manifolds larger than 8" are practical and whether the 8" pipes can be blocked using the pipe stub system). Improved controls or new design for 4 channel system. It is difficult for the operator to reach across 4 channels to cap the launder outlet. Could we design a tool for placing the launder caps or add an extension handle to the cap to make it easier to place? Or should we design a movable lightweight bridge that can be placed across the 4 channels to provide easier access? Consider developing tools to make it easier to remove caps from the launder pipes and pipe stubs from the sed tank inlets and drain channels. Either use leverage or impact to make removal easier. A lever could use the channel wall as a leverage point. An impact tool could have a free weight that slides on a shaft with a solid stop at the end of the shaft. The operator could rapidly slide the weight toward the solid stop to develop a strong impact force for pipe stub removal. A tent anchor stake removal tool is an example of the type of tool that could be created. The tool for placing and removing the pipe caps for the launder could potentially be as simple as a very strong handle attached to the pipe cap that would give the operator leverage to wiggle the cap for placement and removal. The impact mass might also be helpful for removal.



Figure 1: Tent Stake Removal Device

## Floc probe

The goal is to develop an easy method for operators to monitor the floc blanket depth and the depth of sludge in the floc hopper. Currently the operators in Atima, Honduras use an LED flashlight that they shine down between the plate settlers. They are able to see the floc blanket if it is up to the level of the floc hopper weir. They probably can't see the floc blanket if it is still growing. The potential technologies range from simple to complex and include:

- eye as detector
1. sludge judge (a transparent tube with a valve at the bottom that can be used to grab a column of water from the sedimentation tank)
  2. submersible LED light (see prior AguaClara research on low cost turbidimeter)

Viewed from above and the point of extinction is used to measure the height of the flocs or viewed through a tube filled with air that has a glass bottom and an LED light separated a short distance below the glass bottom. The gap between the LED light and the glass viewing port can be varied depending on the turbidity of the floc blanket that will be viewed. The previous AguaClara research on the relationship between turbidity and optical extinction will be useful. in setting the appropriate gap

- sensors

1. ultrasound

2. optical

The best solution will use the simplest technology possible that allows the operators to monitor the position of the water - floc interface.