

Flocculator Efficiency

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1. The Flocculator Efficiency team was started in Fall 2015, and aims to effectively utilize available space in the flocculator.

Fall 2015

AguaClara plants make use of vertical flocculators, where water flows up and over lower baffles, and under a set of upper baffles. A problem that has been observed with this design is that the upward velocity of the water decreases as it rises over the lower baffles, causing the fluid to flow immediately over the lower baffle and leaving an unutilized dead zone of low shear circulating fluid right above it. Collision potential for floc formation in this zone is low. The main goals of the Flocculator Efficiency subteam are to minimize this dead zone by increasing the upward velocity of the water as it flows over the lower baffles, and by increasing turbulence in the region above the lower baffles by creating an additional contraction and expansion. This is done with the addition of obstacles to restrict the flow at significant places.

The current set-up includes obstacles along the sides of the baffles to reduce cross-sectional area of the flow, thereby increasing velocity, and leading to the creation of another contraction and expansion, which increases turbulence. These two effects allow fluid to flow over the lower baffles at a higher trajectory, making better use of the available space, and cause an increase in collision potential by eliminating the low shear zone of circulating fluid.

The team this year studied the effects of a single obstacle at the top of each lower baffle, in the form of a slit piece of flexible tubing. The size of the restriction created by this tubing could be manipulated by compressing it to different extent. The team observed successful elimination of dead zones with restrictions of 78% channel width and upward, while restrictions of 60% channel width reduced the effects of dead zones but did not eliminate them.

Members

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Documents

	Challenges	Tasks	Symposium	Final Presentation	Final Report
Fall '15	Challenges	Flocculator Efficiency Detailed Task List.pdf	Flocculator Efficiency Symposium	Flocculator Efficiency Presentation	ReportFlocculatorEfficiencyFall2015 (1).pdf