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Rachel Philipson's Individual Contribution Page

Summer 2009 Contributions

During summer 2009 I am working on the Plate Settler Spacing team. I am currently running experiments to test the robust-ness of the plate settler geometry. An ideal geometry is being subjected to non ideal conditions by changing the alum dose. I am also graphically analyzing the data collected from these experiments to attempt to develop a relationship with influent conditions and effluent turbidity. I have also worked on the velocity gradient calculations in mathCAD. We are attempting to figure out what the critical velocity and diameter of a particle would be to cause it roll up the plate settler and into the effluent. This critical velocity is also being determined experimentally using a ramp function (slowly increasing the flow rate over time) which allows us to see exactly where the critical velocity is. I have also been working to design a filter foam experiment which will even out the flow between the settlers in plants in Honduras. Preliminary experiments are currently being performed.

Fall 2009 Contributions

During Fall 2009 I am working with the Plate Settler Spacing team. I am currently running ramp state experiments to experimentally determine the critical velocity at which particles in the effluent will begin to roll up the tube settler. I am graphically analyzing these results to determine this critical velocity. I have also been working on the velocity gradient mathCAD file to analytically determine the relationship between this critical velocity, the tube diameter, and the particle size. The results from these calculations are being compared to the data from the ramp state experiments to see how the theory holds up in reality. I have also assisted in running experiments with the Floating Floc team to run saturated water through the plate settler spacing apparatus, and have been continuing to work with the filter foam experiment that was started over the summer.

Fall 2010 Contributions

This semester, I am working on the foam filtration team. We are currently preparing our experimental apparatus to run an experiment to determine the head loss across the foam column both with clean water running through it and when the foam fails and collapses due to particle buildup on the top layer. Results were collected for both of these experiments, and will be used to help design the point of use filter unit. Additionally, we have begun experimentation with layering foam porosities in order to find the optimal layering that will increase filter performance. Additionally, the foam filtration team is working on designing a point of use foam filtration unit that will be constructed in future semesters. Several different situations in which the filter could be used were analyzed, and different designs were considered for each situation. I have also worked on the EPA P3 phase 1 application for the foam filtration team, which included a written proposal and other forms.

Spring 2011 Contributions

During Spring 2011, I am again the subteam leader of the Foam filtration team. This semester the team is divided into two parts: design and research. The design team has been focusing on designing and constructing the prototype for the POU foam filtration unit. The majority of the work thus far has been to determine the best way to dose the influent water with alum. Experimental trials this semester have been focused on the trials with varying influent turbidities to determine the optimal range under which the filter can operate. Additionally, I have been working on a paper about the optimization and characterization of foam filtration and have been running individual experiments to fill in gaps in the paper.

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