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Spring 2013 Contributions

Last semester, the Tube Floc team found that once flocs reach a certain size they can no longer grow due to shear forces, and are thus no longer useful in decreasing turbidity. Therefore, adding floc breakup devices (clamps) to the apparatus should improve overall flocculator performance. This semester, I worked with Patience Li to optimize the floc breakup process. Before beginning floc breakup experiments, we installed a silicone tube flocculator to replace the tygon tube flocculator. It was hypothesized that the hydrophobic nature of the silicone tubing would result in less clay and coagulant attachment to tube walls. Experimental results show higher effluent residual turbidity from the silicone tube, validating the theory. Therefore, we used the silicone tube flocculator for the rest of our experiments.

We derived an equation that describes the relationship between energy dissipation rate and orifice size. We experimented with a variety of orifice sizes, PACl doses, and number of breakup devices in order to determine optimal floc breakup apparatus characteristics. Further research needs to be conducted to determine optimal positioning as well as optimal orifice sizes for different numbers of clamps.