Full Scale Floc Breakup

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We have two indications that small flocs are needed to aggregate with colloids. The flocculation model based on the physics of the aggregation process only fits the data if we assume that large flocs are no longer reactive. A preliminary experiment using the tube flocculator and FReTA shows a significant reduction in settled water turbidity when the flocculator had 6 floc breakup flow constrictions. Although all of our experimental work is based on laminar flow tube flocculators, the results are quite similar to full scale hydraulic flocculator performance and the flocculation model explains the need for the 1000 second retention time. Thus we should begin to explore the implications of our new understanding of the flocculation process on full scale hydraulic flocculators.

The flocculation model predicts that flocculator performance would be substantially improved if the large flocs were routinely broken so that they could collide and attach to colloids. The goal of Full Scale Floc Breakup is to design a device that can be added to a hydraulic flocculator in Honduras to test the hypothesis that floc break up improves the performance of full scale hydraulic flocculators.

The floc breakup device must have the following characteristics:

Head loss through the device must be minimal. Head loss is directly related to the fraction of the flow area that is blocked by the device. Thus the device will need to have a large fraction of open area.
The device will need to create a high energy dissipation rate. One possible rational basis for this energy dissipation rate is that the flocs leaving the floc break up device should have a terminal velocity that can be captured by the plate settlers.
Minimize head loss and yet create a high energy dissipation rate can be accomplished by creating very tiny jets. Thus the floc break up device will likely be made using a wire mesh. If the mesh size is too fine it will clog easily. The challenge here is to design a mesh size that doesn't clog and that minimizes head loss.
The goal is to design a device, invent fabrication methods for installing the floc breakup device in a plant in Honduras, and work with the team at APP to test the performance of the device. Drew Hart will be testing floc blanket performance at Atima in the coming months and thus this test could be added to his research program.

Members
Documents

	Challenges	Tasks	Teach-In	Presentation	Final Report
Spring '13		? Unknown Attachment	? Unknown Attachment	? Unknown Attachment	? Unknown At ? Unknown At