

II555

Lucinda's Individual Contribution Page

Spring 2016 Contributions

As a member of the StaRS filtration theory subteam, I collaborated with my subteam to design and conduct experiments to test the StaRS filter performance under various doses of coagulant. Our experiments resulted in a plethora of data on head loss, effluent turbidity, and pC^* at varying doses of coagulant. Through extensive data analysis, we were able to predict important relationships between head loss and time, head loss and failure time, PACI dosage and failure time, etc. Ultimately, we will use this data to create a mathematical model of the filter's performance in relation to coagulant dosage.

Fall 2016 Contributions

This semester, I worked with the StaRS filter theory subteam to analyze the data collected during the Spring 2016 semester and identify relationships between various variables affecting filter performance. Using such relationships, we formulated a hypothesis illustrating filter performance as small regions of particle removal during the filtration apparatus that travel along the filter as the previous section gets clogged. We created a capillary model on mathcad and determined that it was invalid because the calculated floc density was not reasonable. Moving forward, we identified a new model, the washer model that we believe better depicts particle filtration in the StaRS filters. Our speculations will allow us to create a model of the filter that can predict failure time given the coagulant input.

Spring 2017 Contributions

This semester, I hope to finalize a draft for the paper on particle removal in stacked rapid sand filters. I will also be working with two new members of the subteam to run experiments, finish the mathCAD model for the washer model, and do any necessary data analysis to complete the paper. As of now, the team was able to calculate dimensions for the washer geometry we suspect the mass of flocs has at each filter constriction. There has also been significant progress made to the paper.