Foam Filtration Pore Size

Foam Filtration Pore Size

The overall goal of the Foam Filtration Pore Size Team is to determine the most effective distribution of foam in the Foam Filter, in terms of depth and pore size. This will be done by researching the effect of the foam pore size on the filtration efficiency. Experiments with various foam heights combined with varying foam pore sizes will be conducted. From the analyzed data we hope to be able to find the optimum combination which results in the most efficient filtration. This will all be done considering several important filtration and water parameters. These include: the coagulant dose, the concentration of dissolved organics, the influent turbidity, the headloss, upflow velocity, etc.

Spring 2015

Our primary goal of the semester is to observe the efficiencies of the different pore sizes with respect to dissolved organics in the influent water. This was one of the primary ambiguities the Foam Filtration Team observed when experimenting with the foam filter in El Carpintero, Honduras, this past winter. The team noticed that the discrepancies with the influent used to test the filter in the lab at Cornell were significant compared to the raw influent on site in Honduras. The coagulant doses needed to treat the water in Honduras were much larger than what was needed in the laboratory at Cornell. In addition the backwash efficiencies of the filter were staggeringly different. It is with this in mind that we plan to observe the efficiencies of the different pore-sized foam with an effluent that includes dissolved organics in addition to a set turbidity. We will use humic acid to imitate the organics in the actual raw water. We will experiment with the various foam pore sizes (10 ppi, 30 ppi, 60 ppi, 90 ppi, etc.), as well as with varying coagulant doses and influent turbidities. This will allow us to observe the range of efficiencies that each type of foam presents according to the predetermined parameters. Once each individual foam pore size is tested, using the small 4 inch-diameter Foam Filtration experimental apparatus, we will test combinations of foam (layering two foam pore sizes and subsequently three different foam pore sizes). This will give us ample data to observe how each distribution of foam pore sizes behaves according to the dissolved organics. This research will be done in conjunction with past research the Foam Filtration team did on dissolved organics, however study will focus more on the foam pore size rather than the variation in dissolved organics.

While doing this experimentation, we plan on modifying the current experimental apparatus in order to facilitate the exchange of foam in the filter. Because our research depends heavily on varying the foam pore size, using various samples of foam, we will need to make it easier to remove the foam in the set up and replace it with the foam that needs to be tested. This will require some design and fabrication work.

Throughout our work, we hope to work closely with the Foam Filtration Team as well as with the AguaClara engineers currently in Honduras in order to act under a comprehensive understanding of the foam filter both in the laboratory setting as well as in the field.

Members

Caroline Caglioni

Lotta van Leeuwen

Tianchen Yu

Documents

	Challenges	Tasks	Symposium	Final Presentation	Final Report
Spring '15					