Floc Blanket MS Thesis

Evaluation of Parameters Affecting Steady-State Floc Blanket Performance

Matt Hurst's M.S. Thesis can be found in this link. Some of the pages can also be found on the wiki in the links below.

Abstract

A laboratory-scale reactor was used to simulate a water treatment process sequence of rapid mix, hydraulic flocculation, upflow clarification with a floc blanket, and lamellar sedimentation to accomplish removal of colloidal particles. This process sequence, followed by chlorination, has been employed to create affordable designs for water treatment in the Global South. This study focused on variables affecting performance of the floc blanket including: condition of hydraulic flocculation, raw water turbidity, coagulant dose, upflow velocity through the floc blanket, floc blanket height, and bulk density and solids concentration of the floc blanket. An upflow clarifier velocity between 90-110 m/day produced the best floc blanket performance for most influent turbidities studied. The results show that particle removal efficiency in lamellar sedimentation improved linearly with respect to floc blanket heights up to 45 cm. Improved performance is also correlated with increased hydraulic flocculator residence time and energy dissipation rate. At floc blanket heights above 45 cm, there is still improvement in performance for most cases, but improved performance and blanket height no longer follow a linear relationship. Lamellar sedimentation with a capture velocity of 10 m/day is a key component in improving clarifier performance when utilizing a floc blanket. Future studies are needed to determine mechanisms of particle removal in a floc blanket.

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