Development of effective methods for robust and resilient depth filtration



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Introduction

Rapid gravity filters are the final physical barrier in many water treatment systems preventing pathogens and particulate contaminants from reaching the distribution system and customer. These long life assets are typically monitored using on-line turbidity, flow and head loss instrumentation. New methods for monitoring modelling and optimising particle systems as well as software for converting big online datasets into useful insights to evidence operational decisions are being developed to allow existing physical assets to deliver improving levels of water

Applying new online particle measurement

Physical separation processes are complex and dynamic. Combining improved technologies for the online monitoring of key particle Online floc characteristics with machine learning "quality" methods will allow improved monitoring understanding of how to operate and optimise existing treatment assets. By 00000 modelling the impact of particle and aggregate characteristics on process performance we can better understand what floc characteristics Objective are ideal for particle separation. functions for Effective quantification of key particle particle characteristics between treatment characteristics stages reduces the size of process modelling and Model impact optimisation problems. on filter -00 performance SCADA data New online particle Shape Zeta potential measurements Chord length distribution

quality compliance.

Improving interpretation of turbidity data

Turbidity in treated water is affected by the size and optical properties of particles and cannot be consistently related to microbiological water quality and risk. Pilot scale tests will aid the interpretation of filtrate turbidity at different stages of the filter cycle and under different challenge conditions. Comparison of filter ripening profiles indicates that ripening for cell removal is faster than for smaller turbidity particles and that turbidity may not capture all cell count spikes.







analysis tools and data driven modelling can facilitate efficient management of the performance of individual assets allowing interventions before critical or compound failures occur.



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