Swimming pool water treatment

Influence of bather load and treatment on particles and dissolved substances concentrations

Graduate

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Introduction: In a swimming pool, bathers release organic and inorganic substances, particles, and other substances into the pool water. There are various process combinations for the treatment of swimming pool water, whereby a treatment including coagulation, filtration and chlorination for disinfection is most common. By coagulation, particles should be trapped in flocs and removed in subsequent deep bed rapid filtration with sand or other inert granular media. Often, sand and activated carbon filters are combined for this purpose. Both the deep bed and activated carbon filters need to be backwashed regularly to maintain their effectiveness.

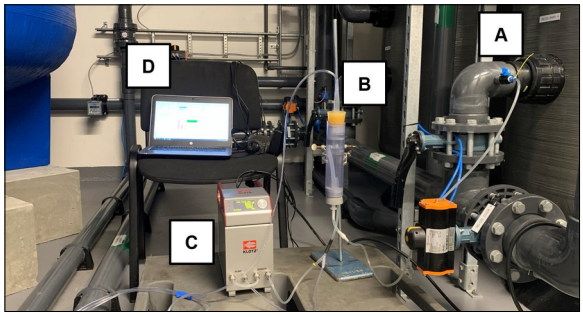
Objective: The primary objective of this thesis is to gain an understanding of the effect of bather load and the water treatment system on the particle concentrations and dissolved contaminants in the pool. For this purpose, discontinuous and continuous measurements shall be executed. The data of the bather load is obtained from a drowning detection system. The secondary objective is to gain experience with continuous measurements under conditions typical for pool water treatment, with the handling and the adequate evaluation of respective data obtained.

Result: From the results of the continuous measurements, it is concluded that the number of bathers impacts the particle concentrations in the pool water considerably. Concentrations are clearly correlated to the number of bathers in the pool. These fluctuations are seen in the treated water, as the treatment system did not remove the particles sufficiently. The measurements also demonstrated that the operation of the water treatment system impacts the concentration of particles in the pool.

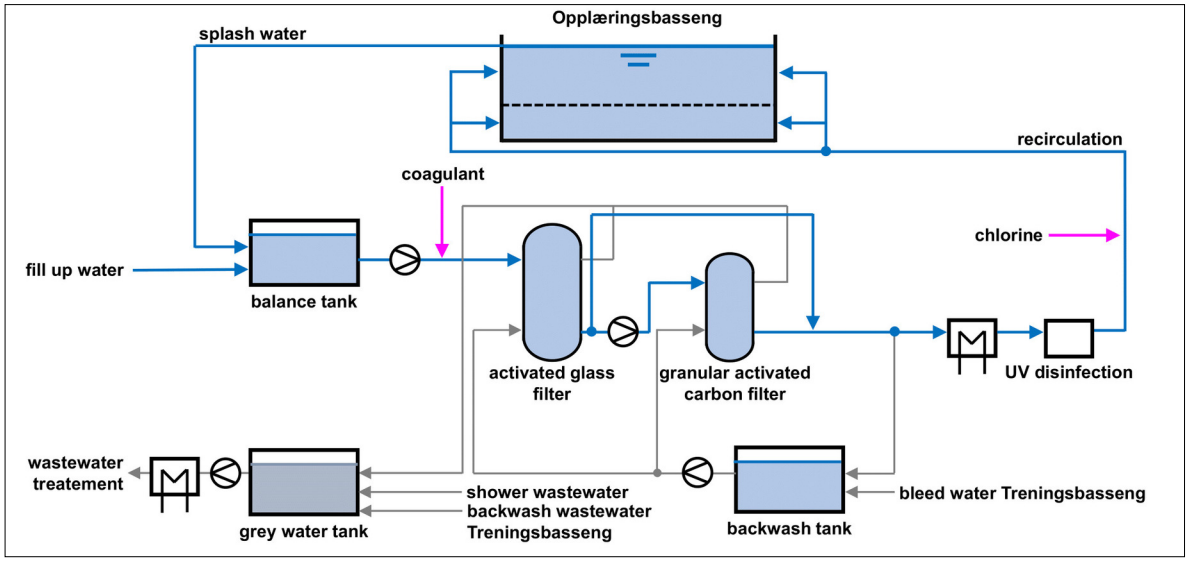
Backwashing of the filters increased the particle concentration in the pool water. This is obviously due to insufficient filter-to-waste time after backwashing. Organic matter is solely removed in the granular activated carbon filters. At the site investigated, coagulation did not achieve the desired effect.

The pool being studied: Opplæringsbasseng of Bærum idrettspark svømmehall in Norway
Own presentment

Particle concentration measurement with A: sampling point, B: bubble trap, C: particle counter, D: data monitoring
Own presentment



Process scheme of the treatment system with the treatment (blue) and the backwash mode flow direction (grey)
Own presentment



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