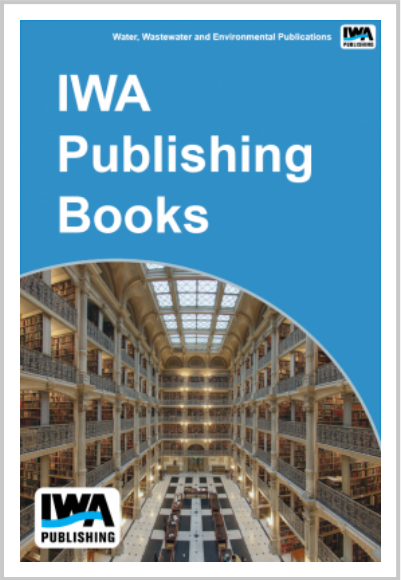
A New Tool for Measuring Biosolids Floc Strength



The ability to measure sludge network strength is important in sludge dewatering applications because it can be used to determine optimum polymer dose for conditioning to achieve good dewaterability. This was demonstrated in laboratory and in full-scale dewatering and thickening.

The network strength increased as the polymer dose was increased, however, at the optimum dose a "drop" in the network strength occurred. Further research is needed to verify this concept at full scale and to provide a robust technology to the water and wastewater treatment industry. A second phase is sought through WERF funding.

Rheometry was used for determining the sludge network strength. This report also formulated and demonstrated a standard protocol for measuring network strength in terms of energy dissipated in a certain volume of sludge. Two protocols for measuring network strengths by either torque or concentric cylinder rheometers are described in this report.

A mathematical derivation has shown that area under rheograms, namely the curves which were developed by plotting shear rate (1/sec) versus shear stress (Pa) and time (sec) versus torque (mNm), indicated the rate of energy dissipation within the sludge system and the total dissipated energy was related to the network strength.

The research did not intend to measure the "absolute" network strength, rather a comparative strength of different aggregates using the same instrument and under the same measuring conditions.

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