

Numerical Investigation of Wastewater Rheological Characteristics on Flow Field Inside a Sewage Network

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Abstract : The wastewater flow field inside a sewage network including pipe and manhole was investigated using a Computational Fluid Dynamics (CFD) model. The numerical model is developed by incorporating a rheological model to calculate the viscosity of wastewater fluid by means of open source toolbox OpenFOAM. The rheological properties of prepared wastewater fluid suspensions are first measured using a BrookField LVDVII Pro+ viscometer with an enhanced UL adapter and then correlated the suitable rheological viscosity model values from the measured rheological properties. The results show the significant effects of rheological characteristics of wastewater fluid on the flow domain of sewer system. Results were compared and discussed with the commonly used Newtonian model to evaluate the differences for velocity profile, pressure and shear stress.

Keywords : Non-Newtonian flows, Wastewater, Numerical simulation, Rheology, Sewage Network

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