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COMPUTATIONAL FLUID DYNAMICS DISCRETE PHASE MODELLING IN STORM SEWERS

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Abstract

A Computational Fluid Dynamics (ANSYS Fluent CFD) software was applied for the examination of a critical combined sewer section of Budapest (Hungary) sewer network. The critical part of the main branch is located at a combined sewer overflow (CSO) which is implying environmental risk for the receiving water body. The CFD simulations proved the anticipated disadvantageous hydrodynamic effects of the lateral inflow. A discrete phase model (DPM) was also applied to analyse the sediment transport and settling conditions around a junction structure in the main branch. Various parameters set in the model were recommended. The DPM simulations confirmed the anticipated negative effects of the lateral flow to the sedimentation in the main branch. The effects of the possible change of the particle size distribution were also examined. The smaller were the diameters the less was the sedimentation in the critical section of the main branch. Recommendation for the improvements of the main branch regarding the sedimentation processes were stated including local and wider range solutions.

Key words: CFD, combined sewer, discrete phase, sediment transport

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