



Urban Drainage Simulation Model Sensitivity Analysis On Runoff Control Elements

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ABSTRACT

In current design practice, regardless if classic or sustainable drainage concept approach is applied in modeling of rainfall-runoff process, various drainage elements are used (gullies, catch basins, grates or slotted inlets with various types of outlets). These elements are drainage controls and their characteristics have significant impact on capacity and system performance. The study of hydraulic characteristics of these elements is mostly performed in simplified laboratory conditions while obtained performance data are used in the modeling process of the real and complex drainage systems.

Unfortunately, in most cases, these laboratory tests do not consider the use of these elements in terms of contemporary sustainable drainage, where it is allowed to retain part of the water on the streets and where „dual drainage“ concept is used, which allows two-way flow through those control elements during the pressurized flows in the collectors. Also, modeling the system using an alternative concept includes drainage water infiltration at the source, which requires the application of new drainage elements in modeling (e.g. semi-permeable pavements and asphalt), and only some of those elements are built-in the commercial software packages for the storm water runoff modeling.

This paper examines the sensitivity of the commercial urban drainage model StormNET regarding the characteristics of the drainage elements used for surface drainage. The paper analyzes the results of the model and the uncertainty of the obtained results (flow, velocity), for different flow conditions (with free surface or pressurized flow, with or without ponding) in urban catchments of different sizes, as a function of the degree of ignorance (or error) of the individual drainage control elements' parameters.

KEYWORDS

drainage control elements, StormNET ACO-Hydro