Modelling of percolation rate of stormwater from underground infiltration systems

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ABSTRACT

Underground or surface stormwater storage tank systems with infiltration of water into the ground constitute the basic elements used in Sustainable Urban Drainage Systems (SUDS). So far, the methods of designing such facilities have not taken into account the phenomenon of ground clogging during the infiltration of stormwater. Sealing of the top layer of the filter bed influences the infiltration rate of water into the ground.

This study presents an original, mathematical model describing the changes in the infiltration rate in the phases of filling and emptying of storage and infiltration tank systems, which enables to determine the degree of clogging of the top layer of the ground. The input data for modeling were obtained from studies conducted on experimental sites on objects constructed in semi-technological scale.

The tests have proved that the developed model is useful on the stage of designing stormwater infiltration facilities and that it helps to control the degree of clogging of absorptive surfaces during the exploitation of such facilities.

KEYWORDS

clogging; hydraulic resistance; modelling; storm water management; underground infiltration system