

Abstract

Title: Decision Support System (DSS) for the analysis and design of the collecting system for the urban runoff

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One of the major challenges in Urban Hydrology is to delimit the maximum flow in the urban environment due to a specific rainfall. The purpose, in fact, is being able to drain the superficial runoff water and to introduce it inside the subterranean collectors in a reliable way. The specific element for this aim is the inlet.

The present work doesn't contain any experimental analysis, in fact, the hydraulic information about inlet characteristics is already supported. The innovative subject is a calculation basis which allows us to decide the optimum distance between inlets since the rainfall, the street geometry, the inlet type as well as the threshold flow values are also well-known.

These limit values are:

1. Maximum water depth (y_{\max})
2. Maximum water velocity (v_{\max})
3. Overturn stability (mathematically expressed as: $[v \cdot y]_{\max}$)
4. Slide stability (mathematically expressed as: $[v^2 \cdot y]_{\max}$)

In the present discussion it won't be considered as possible picking up the complete water runoff caused by the rainfall episode because of the economic cost and consequently it will be only captured the exceeding water volume which goes over the limit of the lowest risk criterion.

The calculation basis mentioned before- also expert system- uses the simplified St. Venant equations- Kinematic Wave Routing/Runoff- and has been solved numerically with the finite difference method in an Excel spreadsheet considering several stages, that is:

1. Standard rainfall (IDF curve with a return period of 10 years corresponding to Barcelona)

2. Different street typologies (supposing a standard section but changing the longitudinal slope).
3. Different inlet types as well as dissimilar conservation conditions.

Besides it will be simulated the action of the most standard risk criterions in the cities with legislation on this respect and how these criterions affect the street typologies studied.

The accuracy of the results accordingly to this procedure has been compared satisfactorily with other prestigious software like HEC-HMS from US Army Corps of Engineers.