Modelling the impact of retention–detention units on sewer surcharge and peak and annual runoff reduction - DTU Orbit (09/03/2019)

Modelling the impact of retention–detention units on sewer surcharge and peak and annual runoff reduction

Stormwater management using water sensitive urban design is expected to be part of future drainage systems. This paper aims to model the combination of local retention units, such as soakaways, with subsurface detention units. Soakaways are employed to reduce (by storage and infiltration) peak and volume stormwater runoff; however, large retention volumes are required for a significant peak reduction. Peak runoff can therefore be handled by combining detention units with soakaways. This paper models the impact of retrofitting retention-detention units for an existing urbanized catchment in Denmark. The impact of retrofitting a retention-detention unit of 3.3 m(3)/100 m(2) (volume/impervious area) was simulated for a small catchment in Copenhagen using MIKE URBAN. The retention-detention unit was shown to prevent flooding from the sewer for a 10-year rainfall event. Statistical analysis of continuous simulations covering 22 years showed that annual stormwater runoff was reduced by 68-87%, and that the retention volume was on average 53% full at the beginning of rain events. The effect of different retention-detention volume combinations was simulated, and results showed that allocating 20-40% of a soakaway volume to detention would significantly increase peak runoff reduction with a small reduction in the annual runoff.

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