

Development of a Multiscenario approach for Urban Drainage System Planning

Soon Ho Kwon¹⁾ and *Donghwi Jung²⁾

¹⁾ *Future and Fusion Lab of Architectural, Civil and Environmental Engineering, Korea University, Anamdong, Seongbukgu, Seoul 02841, Korea*

²⁾ *School of Civil, Environmental and Architectural Engineering, Korea University, Anamdong, Seongbukgu, Seoul 02841, Korea (sunnyjung625@korea.ac.kr)*

ABSTRACT

Traditional urban drainage system (UDS) planning approaches generally consider the most probable future rainfall scenario. However, such single-scenario-based planning approach is subject to be failed under recent climate conditions with a great level of uncertainties. To overcome the limitation, an alternative could be to consider multiple scenarios simultaneously. This study proposes a two-phase multiscenario-based UDS planning approach: the scenario-best solution is identified in the first-phase as the tradition planning approach, whereas the common elements across the scenarios are identified and used to decrease the solution space for the second-phase optimization from which a compromise solution is sought. Storm Water Management Model (SWMM) is dynamically linked to Harmony Search Algorithm (HSA) for each phase optimization. The proposed approach is demonstrated to the planning of two hypothetical networks of grid type. The results obtained with the proposed method are compared to those with the traditional approach with respect to cost-effectiveness and UDS performance under scenarios that have not considered in the planning phases.

Acknowledgement

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. NRF-2021R1A5A1032433).

¹⁾ Research Professor

²⁾ Assistant Professor