



The Estimation of Future Pump Capacity for the Urban Drainage System under Climate Change

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In the recent years, flash flood and local heavy rainfall have been frequently occurred in Korea and this may be due to the climate change. Korea Meteorological Administration(KMA) and IPCC AR5 reported new greenhouse gas scenario called RCPs(Representative concentration pathways) which are becoming an interesting subject in the field of water resources.

These days, the urban areas in the Korean Peninsula have been suffered from the floods, almost every year, by the localized heavy rainfall and this abnormal rainfall may be due to the climate change. Also, the runoff in the urban area has increased due to the rapid urbanization and so the current design rainfall could not be proper any more for accommodating the abnormal runoff capacity. When we determine the frequency of drainage facilities, the maximum flood discharge from the recorded rainfall intensity is used as the design capacity of the facilities. However, there is a need to examine the future rainfall tendency for the re-establishment of the design criteria of the facilities under the climate change, since the recorded rainfall intensity does not reflect the trend of the abnormal rainfall which can be occurred.

This study tries to analyze the variability and trend of future rainfall using RCP scenarios and estimate the future capacity at existing pumping station for the urban drainage system. The future projection periods are set to the next 90 years(2011-2100) and are divided into three cases; Target I : 2011~2040 yrs, Target II : 2041~2070 yrs, and Target III : 2071~2100 yrs. The study area is Incheon-city, Korea which has 9 pumping stations. According to the RCP 8.5 scenario which is the worst scenario of RCPs, the Target I design rainfall is increased by 20%, Target II increased by 33%, and Target III increased by 74% compared with the reference period(1970-2010).

When considering the impact of climate change, 3 of 9 pumping stations are expected to have no difficulty in the future rainfall. But, the capacities of 6 pumping stations will not be sufficient for the future rainfall and runoff. Therefore, it is expected to construct more pumping stations allowable 6 times of existing pump capacity especially for Target III(2071-2100).

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