

# Maximizing of hydropower generation of Hwacheon Reservoir using HEC-ResPRM model

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## Abstract

Hwacheon Reservoir is one of the reservoirs, which are located on the North Han River in South Korea. Construction of this reservoir was started in 1939 and completed in 1944. At the upstream of this reservoir there are Peace Reservoir, which is located in South Korea and Innam Reservoir, which is located in North Korea. After construction of Innam Reservoir, inflow regularity of Hwacheon Reservoir was changed and inflow of Hwacheon Reservoir also, was decreased. Peace Reservoir is used to decrease flood and damage at downstream due to unexpected release from Innam Reservoir. This reservoir also, has a special role to regulate inflow of Hwacheon Reservoir. Hwacheon Reservoir has an important role for hydropower generation and flood control. Capacity and maximum discharge capacity of Hwacheon Reservoir are 1018 million m<sup>3</sup> and 9500m<sup>3</sup>/s, respectively. This reservoir has four generators to produce power and it is one of the important reservoirs for hydropower generation in South Korea. Due to the important role of this reservoir in generating power, maximization of hydropower generation of this reservoir is important and necessary. For this purpose, HEC-ResPRM model was applied in this study. HEC-ResPRM is a useful and applicable model to operate reservoirs and it gives optimal value for release to maximize power by minimizing penalty functions. In this study, after running the model, amount of release was optimized and hydropower generation was maximized by allocating more water for hydropower release instead of spillway release. Also, the model increased release in dry period from October to June to prevent high amount of release in flood season from July to September.

**Keywords:** Han River, Hwacheon Reservoir, inflow, release, maximizing hydropower, Hec-ResPRM, penalty functions.

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