

River Analysis System Model for Proposed Weirs at Downstream of Large Dam, Thailand

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Abstract : This research was conducted in the Lower Ping River Basin downstream of the Bhumibol Dam and the Lower Wang River Basin in Tak Province, Thailand. Most of the tributary streams of the Ping can be considered as ungauged catchments. There are 10- pumping station installation at both river banks of the Ping in Tak Province. Recently, most of them could not fully operate due to the water amount in the river below the level that would be pumping, even though included water from the natural river and released flow from the Bhumibol Dam. The aim of this research was to increase the performance of those pumping stations using weir projects in the Ping. Therefore, the river analysis system model (HEC-RAS) was applied to study the hydraulic behavior of water surface profiles in the Ping River with both cases of existing conditions and proposed weirs during the violent flood in 2011 and severe drought in 2013. Moreover, the hydrologic modeling system (HMS) was applied to simulate lateral streamflow hydrograph from ungauged catchments of the Ping. The results of HEC-RAS model calibration with existing conditions in 2011 showed best trial roughness coefficient for the main channel of 0.026. The simulated water surface levels fitted to observation data with R2 of 0.8175. The model was applied to 3 proposed cascade weirs with 2.35 m in height and found surcharge water level only 0.27 m higher than the existing condition in 2011. Moreover, those weirs could maintain river water levels and increase of those pumping performances during less river flow in 2013.

Keywords : HEC-RAS, HMS, pumping stations, cascade weirs

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