

## **Application of Hydrologic Engineering Centers and River Analysis System Model for Hydrodynamic Analysis of Arial Khan River**

**Authors :** Najeeb Hassan, Mahmudur Rahman

**Abstract :** Arial Khan River is one of the main south-eastward outlets of the River Padma. This river maintains a meander channel through its course and is erosional in nature. The specific objective of the research is to study and evaluate the hydrological characteristics in the form of assessing changes of cross-sections, discharge, water level and velocity profile in different stations and to create a hydrodynamic model of the Arial Khan River. Necessary data have been collected from Bangladesh Water Development Board (BWDB) and Center for Environment and Geographic Information Services (CEGIS). Satellite images have been observed from Google earth. In this study, hydrodynamic model of Arial Khan River has been developed using well known steady open channel flow code Hydrologic Engineering Centers and River Analysis System (HEC-RAS) using field surveyed geometric data. Cross-section properties at 22 locations of River Arial Khan for the years 2011, 2013 and 2015 were also analysed. 1-D HEC-RAS model has been developed using the cross sectional data of 2015 and appropriate boundary condition is being used to run the model. This Arial Khan River model is calibrated using the pick discharge of 2015. The applicable value of Mannings roughness coefficient (n) is adjusted through the process of calibration. The value of water level which ties with the observed data to an acceptable accuracy is taken as calibrated model. The 1-D HEC-RAS model then validated by using the pick discharges from 2009-2018. Variation in observed water level in the model and collected water level data is being compared to validate the model. It is observed that due to seasonal variation, discharge of the river changes rapidly and Mannings roughness coefficient (n) also changes due to the vegetation growth along the river banks. This river model may act as a tool to measure flood area in future. By considering the past pick flow discharge, it is strongly recommended to improve the carrying capacity of Arial Khan River to protect the surrounding areas from flash flood.

**Keywords :** BWDB, CEGIS, HEC-RAS

**Conference Title :** ICWRHEE 2020 : International Conference on Water Resources, Hydrology, Ecology and Environment

**Conference Location :** Toronto, Canada

**Conference Dates :** June 18-19, 2020