ABSTRACT

Semarang is the one of the biggest cities in the Central Java, Indonesia where has been suffered from flooding since 1973 thanks to urbanization, industrialization and global climate change. As the result, almost all districts including the Sringin are was inundated. The root causes of flooding in that area are torrential rainfall, and high tide (rob flooding). What is more, the flat topography and the ineffectiveness of drainage system have influenced the floods in the city. That current condition left too many homes and businesses vulnerable to flooding, so that this issue compels the government to do feasibility study with the aim of implementing flood disaster mitigation, non-structural and structural countermeasures for dealing with urban flood problem.

The main objective of this study is to progress hydrology and hydraulic model based on the hydraulic structure design concept to deal with flood inundation in Sringin area. To achieve above objective, daily rainfall intensity values of historic recorded rainfall data over a period of 21 years (1991-2011) have been considered for identifying the design rainfall and uniform lateral inflow hydrograph to input in hydraulic model. Moreover, the simulation has been used with the geometries data as the input in order to analyze unsteady flow. There are two scenarios to analyze above simulation, the first scenario is to simulate the existing condition by using the existing geometry and the second scenario is to analyze the design condition by computing the normalization geometry.

The result shows that the design rainfall of 25 years return period measures 173mm in vertical length and data collected from the office of Public Work Semarang City can be used to implement the design scenario with normalization of drainage system and the increase of levee with the free board up to 0.75m is proved to be the solution to the flood inundation in that flood-prone area while the existing scenario causes excessive discharge at downstream up to 9h05min to 9h25min.

Keywords: Hydrology and hydraulic model, rob flooding, hydraulic structure, levee, flood-prone area