

Hydrodynamic simulation of urban stormwater drain using iRIC Model

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Flooding in urban areas takes place mainly due to increased urbanization, decrease in infiltration rate and poor infrastructure for stormwater drainage network. Nays2DFlood is a recently developed solver by iRIC for the simulation of river flow regime. The number of input data requirement is few which makes this solver superior to other models but has been rarely applied to urban catchments. In this paper, a hydrodynamic model was developed to assess the model's feasibility to simulate urban stormwater drainage system of Delhi, the capital city of India for mapping inundation extents using Nays2DFlood solver. The data used in this model is a DEM (5 × 5 m resolution) and daily discharge data of the drains. The simulated drainage is analyzed keeping in mind the constraints which were observed during the collection of field data; the storm-water drains are choked, the drains have improper flow gradient or damaged flow gradients. Based on the simulated results, the water depth and velocity profiles were analyzed for the drain. The model identified four critical locations where the problem like zig-zag bed slope of the drain, undersized cross-section of the drain and last but not the least the backflow problem which was in close agreement with the observed field data. The flood propagation exactly predicting the inundated area. Thus, Nays2DFlood solver model can also be applied to urban catchments for identifying the flood inundation extent.

Keywords: iRIC, Nays2DFlood, 2 Dimensional modelling, Hydrodynamic Modelling, urban flood

