



LITERATURE STUDY OF FLOOD MODELLING USING ARC-GIS & HEC-RAS

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I. ABSTRACT

As there have been hazardous climatic environments due to climate variation and as a consequence, the intensity of rainfall has increased tremendously causing floods in India. Floods are the most critical among all the natural calamities in world causing vast damages to life and property. It is therefore essential to address these natural calamities by developing integrated approach for the flood modelling and flood mapping for future prevention of flood and to decrease the influence on societies and life and the surroundings. It is therefore essential to address these natural calamities by developing integrated approach for the flood modelling and flood mapping for future prevention of flood and to reduce the impact on people and life and the environment. For hydraulic modelling and floodplain mapping was integrated to perform flood routing for the computation of flow peak flood. The present work focus on carrying out a review of “Flood model using Arc-GIS and HEC-RAS”

Keywords: Flood, Inundation, Floodplain Mapping, HEC-RAS, ARC-GIS

II. INTRODUCTION

Now a days in many emerging countries, natural calamities, such as hurricanes, floods, earthquakes, drought, etc. are repeated events. All this natural calamities are inter-connected with environmental characteristics like precipitation and its intensity, temperature, pressure variation, wind velocities, etc. with catchment characteristics like slope, soil type, vegetation, etc. Thus, an imaginary cyclic structure in the form of Disaster Cycle appears in one's mind and disaster becomes calamity when it affects lives and properties. Flooding is the most common natural hazard that can happen any time in wide variety of locations due to high intensity rainfall events, hurricanes, tidal waves, melting ice or snow. The predictions of climate change trends indicate increase of the occurrence of the intense rainfall events, both in terms of their intensity as well as frequency. Such high intensity rainfall events along with the changes in the land use patterns are expected to have inferences on the intensity of river flooding and local flash flooding in a flood plain region and can substantially alter the spatial extent of future flood. The geographic and demographical development of urban regions can potentially alter the degree of vulnerability in terms of exposure to inundation depths and spatial extent of flood water.

III. WORK DONE

Eric C Tate (2002) expresses the use of a geographic information system (GIS) method accessible for the growth of a topography model based on tributary channel depiction of the HEC-RAS model. The researcher has an idea for developing an automated terrain modelling approach in which a technique combine a topography model from HEC-RAS cross section data and DEM. The conclusion was that the resulting topography DTM precisely describes both channel morphology and floodplain mapping.

Asgar Shahbazi Hossienkhanlo (2013), This paper determines the case study of urban Hir watershed for determining flooding sites in the given study area. The mathematical software used in this paper was HEC-RAS which has high potentiality in simulating river hydraulic regime, assessing steady and unsteady flood proceedings; water level sketches calculations and outcomes in relation with GIS and extension HEC-GeoRAS. . By usage of these models prove to be effective in precision in providing inputs and detecting outputs. First step is to do flood mapping and flood plain zoning by surveying. Then HEC-RAS model was used and by using this model we can evaluate water

level sketch for different return periods and cross section parameters which were used as input data and then it was entered into the GIS to provide flood zoning maps and the maps were prepared.

Ahmad ShahiriParsa (2013), This paper describes the case study using 1-D HEC – RAS model which was used to pretend the flood zoning in the Kota Tinggi District in Johor state. In this paper they have consider return period of 2, 25, 50 and 100 years with different unevenness co-efficient. Zoning of flood generated by the HEC-RAS model can be created for other flood actions and transported to ArcView software package and located on the TIN of the ground and resolute the flood region, and also recognize the places which were essential of structural processes along the river.

Sunil Kute (2014), The context express in this paper presents a case study of Godavari river flood modelling using HEC-RAS software. With the introduction of modern techniques, the use of sophisticated software in flood modelling helps in getting an indication of extent of flood at its submergence and causes the calamity in cities or towns settled on banks of rivers. The flood released from Gangapur dam, which is built on upstream of Nashik city at 14 km distance for the modelling. The flood release is based on the worst discharge of 1969 flood. By the use of HEC-RAS model it will show the flood sketch for the worst flood strength and by use of this sketch we can enable to design appropriate flood calamity mitigation events.

Usman Khalil (2015),In this paper researcher had done research on the Indus river reach Chashma-Taunsa for flood modelling and flood mapping for normal flood of 2006 and exceptionally high flood occurred in year 2010. To implement hydraulic modelling and flood plain mapping HEC-RAS, ARC-GIS and its extension Hec-GeoRAS were used for the working out the peak flow attenuation, assessment of lag time between inflow and outflow and to implement mapping for the estimation of flood zone depth and flooded area of reach.

IV.Methodology

Auther	Methodology
Eric C Tate (2002)	The work provides a method to synthesize a terrain model from HEC-RAS cross-section data and a coarse digital elevation model. As inputs, the approach requires a completed HEC-RAS model simulation, a DEM of the study area, and a GIS representation of the stream line. The output is a TIN model of the terrain that describes the terrain of the stream floodplain and contains additional detail with the stream channel.
Asgar Shahbazi Hossienkhanlo (2013)	In this paper ,using HECGeoRAS software and showing cross sections, border locations and other river and flood plain characteristics in HEC-RAS model, for different return period; water level profile was provided. The data taken from hydraulic model was entered to HEC-GeoRAS software.
Ahmad ShahiriParsa (2013)	According to the survey conducted in this research, topographic maps and metropolitan area with data layers flood zones, flood zoning maps for return periods of 2, 25, 50 and 100 years were obtained. Furthermore, changes in the depth, velocity and flow area, Froude number and shear stress and etc. were calculated for different return periods;
Sunil Kute (2014)	The flood profiles for different flood intensities with different return periods can be plotted at any given cross section of river. Also, such flood profile can be plotted for entire length of river reach. Flood modeling using HEC-RAS is effective tool for hydraulic study, handling of disaster management measures.
Usman Khalil (2015)	HEC-RAS model unsteady flow analysis has been carried out for flood routing between Chashma- Taunsa reach of Indus River for 2006 normal and 2010 super flood; The simulated and computed hydrographs upstream of Taunsa Barrage statistical comparison shows the satisfactory results i.e. coefficient of determination (R ²) and Nash and Sutcliffe Coefficient as 0.90 & 0.86 and 0.95 & 0.93 for 2006 and 2010 flood respectively, which show a good base for the generation of flood inundation in channels.

V.CONCLUSION

From the study of various literatures related floodplain mapping and application of HEC-RAS and Arc-GIS it was concluded that with the help of using this software the flood inundation and flood mapping of the low relief area effected by flood can be easily trace out in order it provides greater response to several return interval storm actions and has capability to transform the predicted data result into a strategy opinion magnitude of submerging. Application of HEC-RAS software is considered as an essential tool for urban and municipal growth purpose, emergency action strategies. This conclusion is based on application of Hec ras and various resercher's work done

VI.REFERENCES

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