CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENT

DEPARTMENT OF CIVIL ENGINEERING

PARALAKHEMUNDI CAMPUS

Report on

Dam Break Modelling Using HEC-RAS In association with Astronauts Services Pvt. Ltd (3rd to 5th August 2021)

Prepared by
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Agenda

Day-1: 10 am to 1pmIntroduction about the workshop.

Dam Break Modeling & Its importance.

Various websites for data collection.

Day-1: 2 pm to 5pm

 Different approaches & Ideas for UG Projects.

 Introduction to Shapefile, DEM & its set up in Arc-Gis.

 How to download DEM?

Day-2: 10 am to 1pm

 Input file Preparation for HEC-RAS

 Hydrograph

 DEM mosaic , Mask & Extraction

Day-2: 2 to 5pm

 Demo HEC-RAS Model Run (2D), Unsteady by resource persons.

 Project and Assignments

Day-3: Day-1: 10 am to 1pm and 2 pm to 5pm

 HEC-RAS Model Run (2D)

 Student Project

 Project and Assignments reviews

Recourse Team Details

Dr. Prafulla Kumar Panda (CUTM), Dr. Kamal Kumar Barik (CUTM), Rosysmita Bikram Singh (NIT Rourkela), M. Uma Maheswar Rao (NIT Rourkela), Satya Narayana Bhuyan (NIT Rourkela)

N.B: One hour lunch break (1 to 2pm)

Dam Break simulation in CHANDAN DAM.

***Software used**:*

HEC-RAS and ArcMap 10.8

***Introduction**:*

Dam break simulation is a situation under which any dam under any river basin breaks and we are going to find the main consequences of the area and the location it is going to affect and the exact calculated time. How it will affect the vegetation and what will be the velocity of the water. Considering these situations we can say which regions should be vacant before flood situations. We will also consider calculation.

HEC-RAS is a computer program that models the hydraulics of water flow through natural rivers and other channels. Before the 2016 update to Version 5.0, the program was one-dimensional, meaning that there is no direct modeling of the hydraulic effect of cross-section shape changes, bends, and other two- and three-dimensional aspects of flow. The release of Version 5.0 introduced two-dimensional modeling of flow as well as sediment transfer modeling capabilities. The program was developed by the United States Army Corps of Engineers to manage the rivers, harbors, and other public works under their jurisdiction; it has found wide acceptance by many others since its public release in 1995.

The Hydrologic Engineering Center (HEC) in Davis, California, developed the River Analysis System (RAS) to aid hydraulic engineers in channel flow analysis and floodplain determination. It includes numerous data entry capabilities, hydraulic analysis components, data storage, and management capabilities, and graphing and reporting capabilities.

***Procedure**:*

- *Open ArcMap and load all the data and then we will start the mosaic process.*

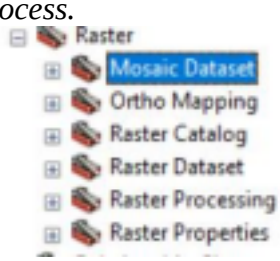

Fig no-5.3

- *To do that go to the toolbar go to the data management tool then raster and then mosaic.*
-
- *Select the tiles and do the mosaic process.*
- *Then after selecting your study area and save the layer.*
- *Open HEC-RAS opens a new project.*
- *Open Ras mapper right-click on Terrans.*

• *Then create a new Terrans.*

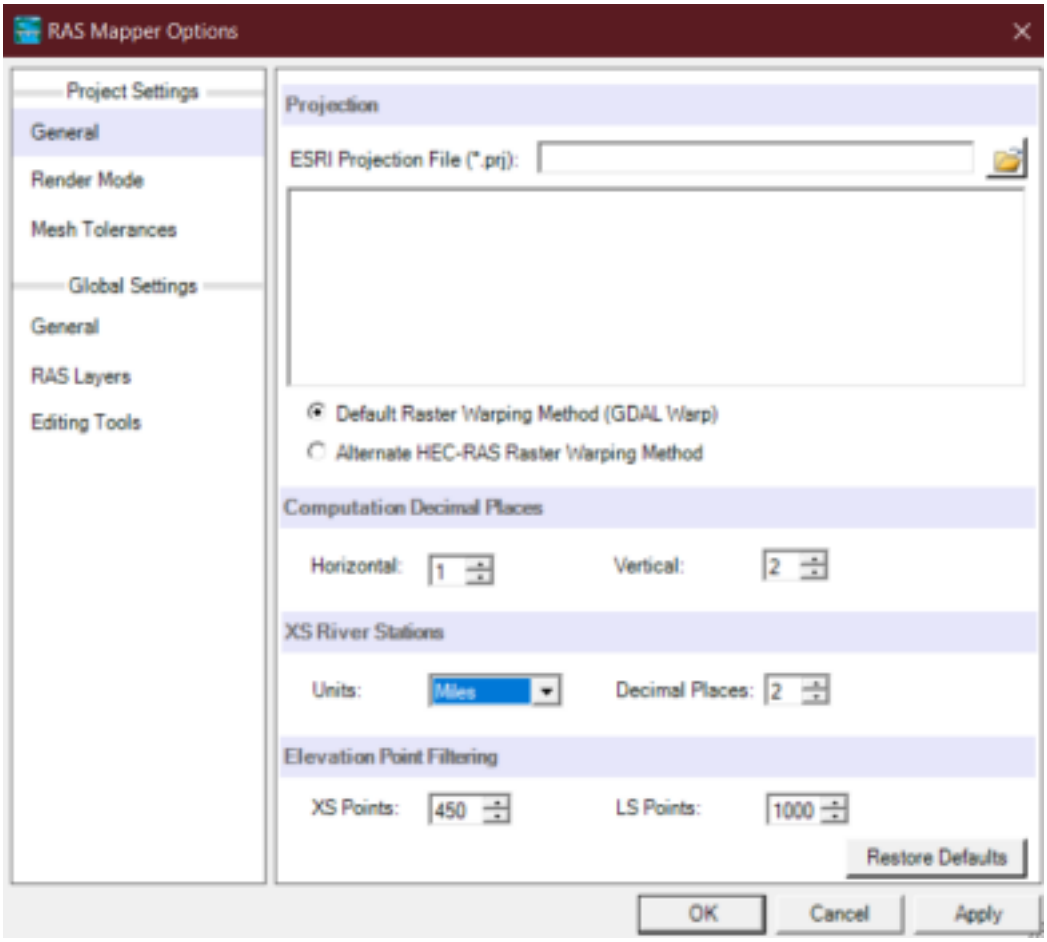

Fig no-5.4

• *Then add the study area that we have made using ArcMap.*
• *Then add a new map layer and set the transparency level 30%.*
• *Then go to geometry and select the storage area and flow area.*

Fig no-5.5

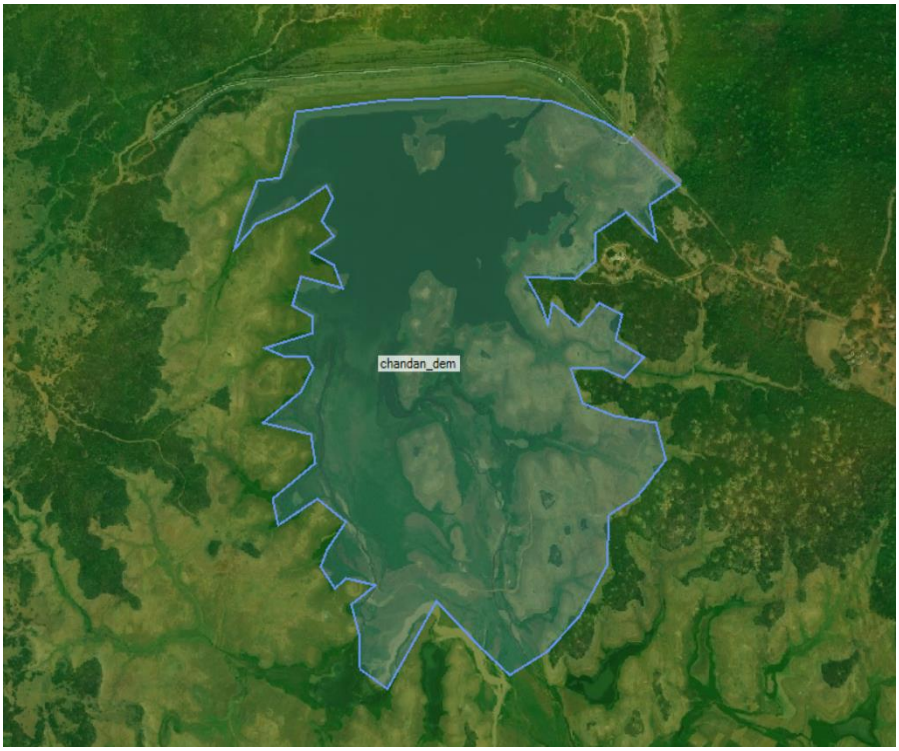

Fig no-5.6

Specify the boundary area. Then all the digital drawing work is done, we need to compute the data now.

Then open geometric data and define the bridge from left to right. Then open the 2D flow area and go to the geometric point and add 400 points in DX and DY, and hit ok.

Open construction data editor and open storage area data. In station 1 add zero and in the elevation the maximum data shown in the graph, for me it's 185.

Then set the dam specification and run it for computation. • Then run the model.

Then in the results panel calculate all other values like inundation boundary and depth. We also calculate all other values.

Then export the results and open them in ArcMap.

• From that in a map format, with all the specifications.

Output:

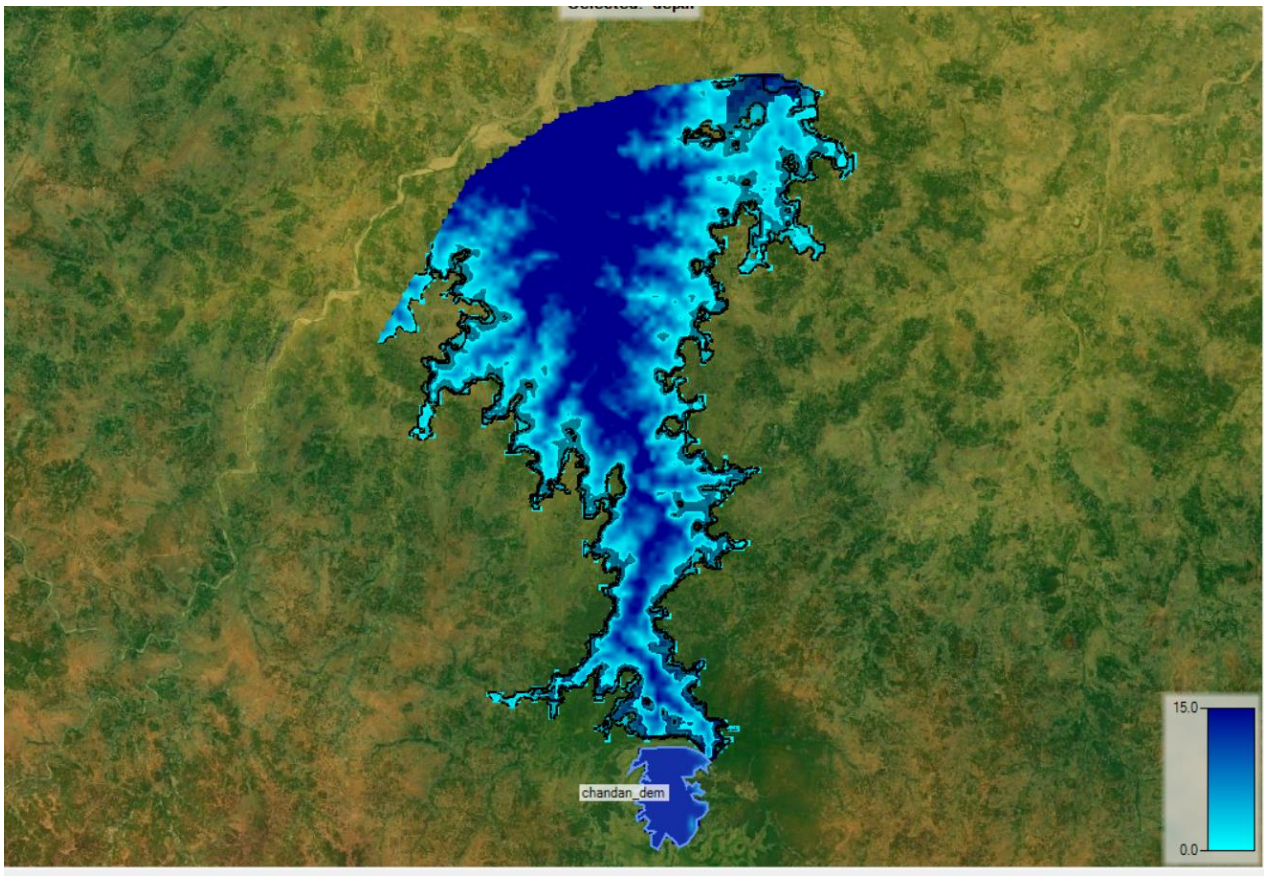

Fig no-5.7[HEC-RAS output]

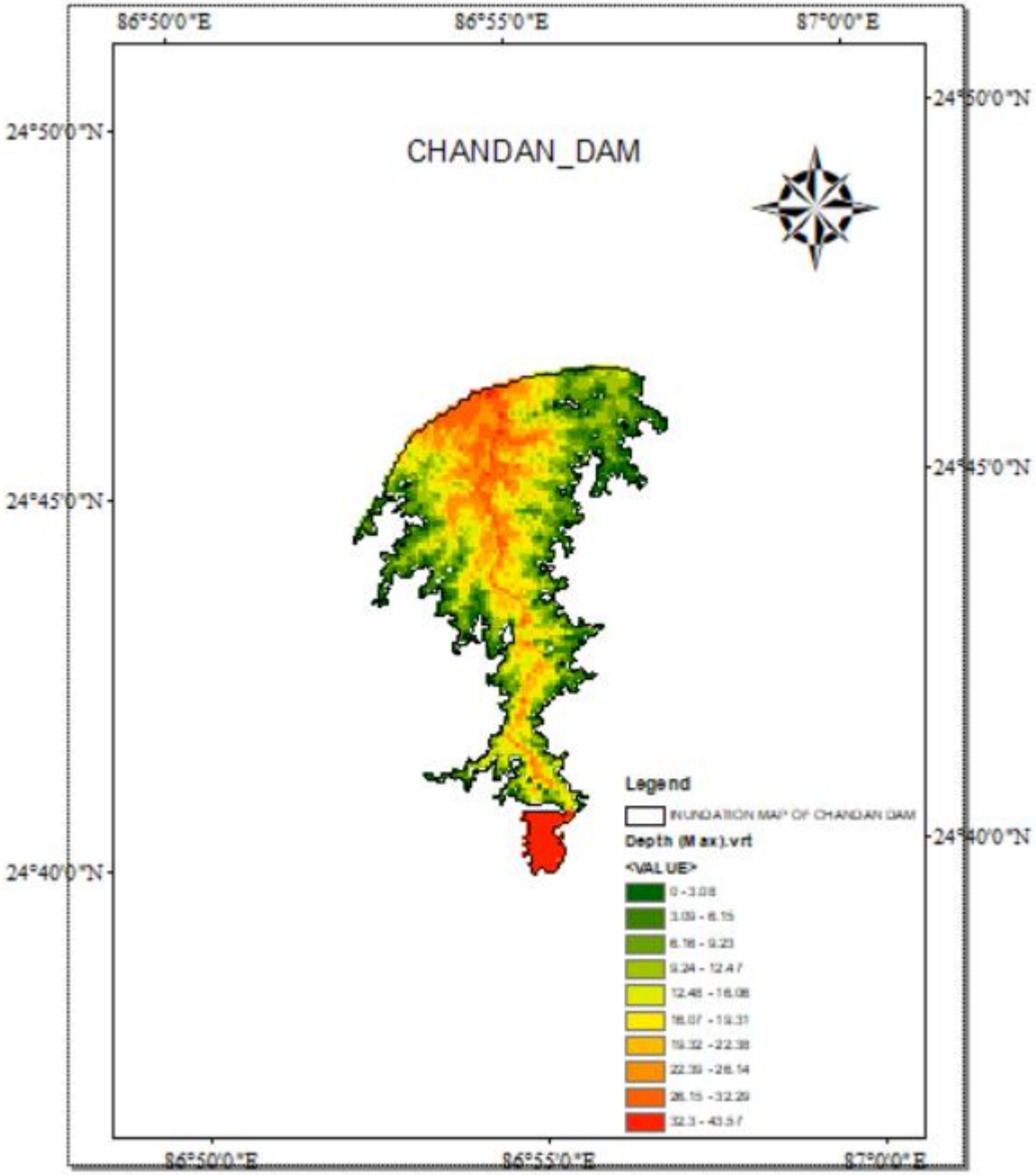

Fig no-5.8[ArcMap output]

Photographs