National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: ENERGY LOSS AT THE BIFURCATIONS OF THE RIVER MAHANADI
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Venue	: CE Department Seminar Hall
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Abstract	: This study investigates the influence of Energy loss on the geomorphic evolution of the river reach of the Mahanadi River junction at Naraj, Cuttack, a deltaic system with unmanaged distributary channels characterized by frequent overbank spillage and crevasse formation. Field data have been collected from the channel networks at the junction of the river Mahanadi system, measuring channel geometry, water surface elevation, and discharge. These data are being used to validate a 1-D hydraulic model of unsteady flow, which simulates the influence of flow loss on channel hydraulics. The hydraulic model is coupled with a sediment transport model to analyze the impacts of energy loss on flow distribution, sediment transport capacity along the reach. The result is expected to evaluate the effect of energy loss substantially modulates velocity and sediment transport trends along the diverted Mahanadi Rivers reach and the river Kathjodi. From the recent observations, it is seen that the shallower channels are found to be particularly sensitive to flow loss, with greater reductions in velocity and sediment transport capacity observed in these areas compared to deeper channels. Furthermore, the study highlights that energy loss plays a critical role in shaping channel morphology and the distribution of sediment within deltaic environments in the Mahanadi River at its bifurcated junction. It is also observed that due to the bifurcations, there is a challanges in prediction of flow at the tributaries of the river Mahanadi, huge siltation occuring at the junction not only obstructs the flow into the river Kathjodi but also inundates the banks during monsoon. The study suggest the effects of channel diversion angle, roughness, slope, Reynoldrs number, on flow distributions in the distributaries, sediment deposition and scour formation to the main and distributary channels. With the help of field data, numerical modelling, mathematical modelling and the proposed proto type laboratory experiment, a modified mathematical modelling shall be developed to evaluate the accurate discharge at the distributary channels of the River Mahanadi at Naraj, Cuttack and then other bifurcations of the Mahanadi river for which Water Resources Dept can easily utilise the precious water for the beneficiation to the people of Odisha, India.

Key words: River Mahanadi, Kathajodi, Bifurcation, energy loss, flow distributions, sedimentations