

## **2D HYDRAULIC MODELING FOR BARBS DESIGN TO PROTECT RIVER BANKS, CASE STUDY: SETI RIVER ALONG THE POKHARA-BAGLUNG HIGHWAY, NEPAL**

**Abstract**— Hydraulics of any river is better understood using numerical modelling. This study is concerned to design barbs for protection of Seti river banks along Pokhara-Baglun highway using two-dimensional (2D) hydraulic modeling in ANSYS Fluent. Desk study was conducted by collecting river flow data for seven years from 2009 A.D. to 2015 A.D. The geometry of the river reach near the weir section was drawn manually in geometry design modeler in Workbench. Face meshing with element size of 0.5m was performed in meshing module of Workbench. The model inputs used were: the stream geometry, roughness coefficient of 0.5 in each case, flow velocity of 3 m/s. Simulations were performed to obtain the velocity magnitude contours and velocity streamlines for all cases along with an additional base case without any barbs structure. The average length to width ratio (L/B) and average Spacing to length ratio (S/L) of the structures used in this study are 0.25 and 1.5 respectively. The length of barbs was taken as 20m in each case and spacing in-between barbs was taken as 30m in cases with double barbs. The simulation results showed that, among all the cases considered, the one with double barbs at an angle of 90° to the upstream increases the flow velocity and confines the flow towards the centre of the river and thereby induces bank stability effectively.

*Keywords*—numerical modeling, barbs, face meshing, bank erosion, Simulations