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Depth-Averaged Velocity Distribution in Braided Channel Using Calibrating Coefficients

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Abstract : Rivers are the backbone of human civilization as well as one of the most important components of nature. In this paper, a method for predicting lateral depth-averaged velocity distribution in a two-flow braided compound channel is proposed. Experiments were conducted to study the boundary shear stress in the tip of the two flow path. The cross-section of the channel is divided into several panels to study the flow phenomenon on both the main channel and the flood plain. It can be inferred from the study that the flow coefficients get affected by boundary shear stress. In this study, the analytical solution of Shiono and knight (SKM) for lateral distributions of depth-averaged velocity and bed shear stress has been taken into account. The SKM is based on hydraulic parameters, which signify the bed friction factor (f), lateral eddy viscosity, and depth-averaged flow. While applying the SKM to different panels, the equations are solved considering the boundary conditions between panels. The boundary shear stress data, which are obtained from experimentation, are compared with CES software, which is based on quasi-one-dimensional Reynold's Averaged Navier-Stokes (RANS) approach.

Keywords : boundary shear stress, lateral depth-averaged velocity, two-flow braided compound channel, velocity distribution
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