Abstract Submitted
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Study of Flow Over and Through the Porous Bed: Experimental and Numerical Study NARENDRA KUMAR PATEL, JUNKE GUO, DAVID ADMIRAAL, University of Nebraska Lincoln — Guo et al.(2016) suggested velocity profile in vegetated flows. Objectives of this research are to extend the velocity profile suggested by Guo et al.(2016) to generate velocity profile over and through the porous gravel bed, and suggest values for the fitting parameters in equations. Navier-Stokes-Forchheimer equation for flow within the bed and Navier-Stokes equation for flow above the bed are solved simultaneously to generate unified velocity profile. Experimentally, dye was injected in the gravel bed at different depths and its peak concentration was observed at multiple locations at downstream side. A fiber optics based sensor was developed and time for peak concentration at different locations was identified by LabVIEW to generate velocity profile in bed. An ADV is used to measure flow velocity above the bed. V-notch is used to measure total flow at the end of flume. Numerically, Fluent software is used to simulate combine flow field in and above the porous bed. Our preliminary experimental data well matched with numerical results and help us to find values of fitting parameters in theoretical equations. Reference: Junke, Guo; Jianmin Zhang (2016) Velocity distributions in laminar and turbulent vegetated flows. J. of hydraulic research, volume 54, issue 2, pp 117-130.

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