Making the bend: Demonstration of HEC-RAS 2D to support hydraulic design of turning vanes

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The River Analysis System developed by the Hydrologic Engineering Centre, otherwise known as HEC-RAS, is a commonly deployed tool in the field of water resources engineering, traditionally for the purposes of determining flood conditions and developing floodline mapping. Additional features of the model can be used to provide determination of parameters such as channel velocity, shear stress, stream power and other hydraulic values for stream channel design in quasi-2D. The recent developments in the 2D modelling capabilities of HEC-RAS however, have facilitated the use of the HEC-RAS tool for various other purposes, including to support the design of instream structures. This is demonstrated in a case study for the design of turning vanes in Mimico Creek, where a 2D model was used to evaluate the ability of the turning vanes to train flow. The model was also capable of illustrating potential design adjustments based on geometry and position modifications. The model outputs are presented in the form of graphics and animations, which greatly improve the user's ability to evaluate, respond to and present the results. The benefit and tradeoff from 1D analysis capabilities of HEC-RAS are also contrasted and discussed. The required information for the model, including development of the terrain from survey data and challenges in integrating a 2D surface into the model are presented. A comparison to other similar available 2D modelling softwares is also discussed.

Biography

Robert Chlumsky is an Engineering Intern and Junior Water Resources Engineer at Ecosystem Recovery Inc., where he works on a range of projects in the field of water resources, including natural channel design, hydraulic modelling, integration of GIS capabilities into data collection programs, and design of stormwater management facilities. Robert is a recent graduate of the Master of Applied Science program at the University of Waterloo, where his research focused on the rigorous validation of hydrologic models in support of decision-making.