FACING REAL WORLD ENGINEERING CHALLENGES... IN THE LAB

The environment is increasingly being seen as one of the world’s most significant – and real - engineering challenges. But while climate change dominates the headlines, there are countless other ecological challenges being tackled by environmental engineers at regional, national and global levels.

One such engineer is Professor Ted Endreny of the SUNY ESF Department of Environmental Resources and Forest Engineering, who is currently carrying out research into the hydraulics of stream restoration.

Professor Endreny is well equipped to conduct this research; the university’s newly commissioned James M Hassett Laboratory for the study of hydrology and hydraulics features state-of-the-art teaching and research equipment, including an Armfield S6MkII 7.5 meter sediment circulating flume. The laboratory was named for Dr Hassett, recipient of numerous awards for excellence in teaching and research and, until recently, Chair of the SUNY ESF Department of Environmental Resources and Forest Engineering. The new laboratory will ensure that Dr Hassett’s legacy of promoting interest and advancement in the field of environmental and ecological engineering continues well into the future.

Having received funding from the National Science Foundation and US Environmental Protection Agency, the laboratory is now being used as part of the extensive research project led by Professor Endreny, which focuses on the analysis of in-channel stream restoration structures such as cross-vanes. The research is complemented by instrumented field studies, computational fluid dynamics modeling studies, and a range of practical flume experiments.

The research questions concerning in-channel structures were generated by river managers, who are investing millions of dollars in river restoration. The research aims to identify the parameters for a cross-vane design capable of reducing bank erosion, maintaining pool depths, and withstanding channel bed scour forces. Using the Armfield flume, the in-channel structure research is examining scour around cross-vanes, and how the scour location and rate changes according to the vane location in the pool-riffle sequence and the vane footer placement in a vertical or compounded streamwise direction.

Students in a PhD research program have been centrally involved in the research, and the outreach has targeted high-school science and math teachers interested in bringing university experimental data, on issues relevant to their students, into their classrooms.

The flume is already scheduled for a new set of experiments in mid-April, when colleagues in the Environmental and Forest Biology program begin analysis of how fish eggs move in different substrate types and flow depths. These questions were motivated by river managers in New York State who are interested in identifying optimal gravel types for restoration of degraded reaches of river with excessive scour and bedrock controls.

Professor Endreny concludes that these research projects are “wonderful examples of how the hydraulic tools designed by Armfield have assisted SUNY ESF examine real world ecological engineering challenges.”

For further information visit www.esf.edu/erfeg, where you can also make an online donation to support the development of the James M Hassett Laboratory.
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