

PIV and its Application to Hydraulic Engineering Research

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Friday, April 18th
12:15* - 1:15 pm, 202 Hammond Building

Particle Image Velocimetry (PIV) is a non-intrusive method for velocity field acquisition in either two, or three-dimensions. Through the use of an illuminating light source (usually a laser), high speed camera, and reflective particles, images are captured of the particles which are then correlated to show the speed and direction of the particle movement. Once the velocity field has been established, integration of the velocity vectors can be performed to obtain streamlines. Additionally, hydraulic parameters such as vorticity and shear stress can be calculated.

The Federal Highway Administrations' Hydraulic Research Laboratory in Mclean, Virginia has been using this technology to assist in their efforts to find solutions to various hydraulic problems. Specifically, experiments have been performed using PIV to ascertain: the vena-contracta height for flow entering a culvert in order to determine an entrance loss; the effects of cross-vanes on local scour depths at the abutments when placed upstream of a culvert entrance; the shear stress produced at the outlet of culverts and its relation to downstream scour depths; the oscillatory nature of the vortex system that forms at the upstream base of piers; and the vortex shedding frequency of the wake vortex downstream of vertical obstructions (bridge piers).

* Note that this is a 'brown bag' seminar series. 202 Hammond will be open at 12:00pm and you are encouraged to bring a lunch, show up early, and socialize with your colleagues.