FLUIDS LABORATORY

College of Engineering

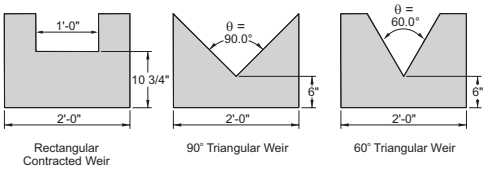
Weir Calibration

Purpose

To experimentally determine the discharge coefficients for various weir geometry and to compare experimental results with theoretical estimates.

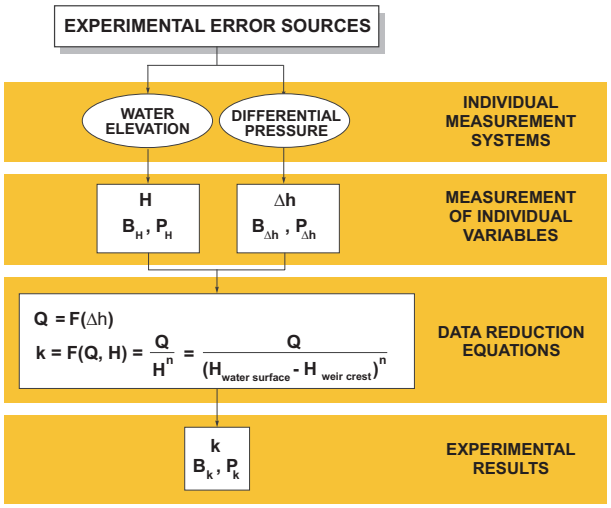
Test Design

Three sharp-edged weirs (below) are subjected to measurements in this experiment. Slots in the sidewalls are located in the middle section of a 2-ft tilting flume (left), between which the weir plates can be inserted. The slope of the flume is set such that no submergence of the weir occurs. A side-contraction meter is used to measure the discharge in the flume.



Geometry of the weirs

Measurement System

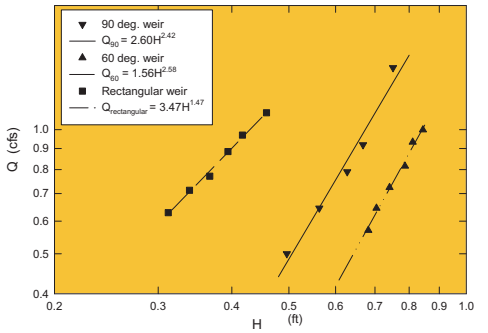


Block diagram of the discharge coefficient

Data Analysis

- Determine the discharge Q in the flume (using the side-contraction) and the head *H* on the weirs
- Using several measured Q-H pairs, plot Q versus *H*
- From the best-fit line to the experimental points determine the k_{exp} and n_{exp}
- Compare k_{exp} and n_{exp} with values indicated in the literature
- Determine uncertainty in the results

Results



Experimental results for weir head-discharge relationships

Comparison of experimental results for discharge equation, $Q = kH^n$, with reference data (Gray, 2000)

Weir shape	Discharge coefficient, k		Exponent, *n*	
	Reference	Experimental	Reference	Experimental
90°	2.49	2.58	2.5	2.42
60°	1.46	1.56	2.5	2.58
Rectangular	3.07	3.47	1.5	1.47