

Weirs Calibration Experiment

Objective:

Study the flow over thin plate weirs and find their coefficient of discharge

Equipment:

Hydraulics bench, rectangular and triangular thin plate weirs, stop watch

Method:

Install a weir plate. Run pump and open valve to allow water to flow over the weir. Turn pump off and close valve to stop the flow. Allow water to settle to the level of the weir crest. This defines the datum level of heads over the weir. Record this level using the Vernier point gauge.

Obtain head over the weir for at least 5 different flow rates (adjusting the valve to change the flow rate). Flow rates are best measured by recording the time taken for a pre-set volume to be stored in the measuring chamber. Head should be measured at least $5h$ upstream from the weir, where h represent the maximum head to be measured.

Repeat for the other weir plate.

Analysis/result:

Plot graph of $(\text{head})^{2.5}$ against flow for the triangular weir, and $(\text{head})^{1.5}$ against flow for the rectangular weir. On the same graphs, plot theoretical ideal flow values. Hence obtain discharge coefficients for the two weirs. Consider sources and magnitude of likely errors. What effect do surface tension and viscosity have? Will the discharge coefficients be the same for the larger weirs and flows?

Data:

Triangular weir angle $\theta = 90$ degree

Rectangular weir width $B = 30$ mm