OBSERVATIONS AND CALCULATIONS

Table 1. Results of flow through Triangular/Rectangular notch

S.NO	Hook gauge reading (mm) at sill level during zero discharge in channel, h_o (m)	Hook gauge reading (mm) at free Surface, h_1 (m)	Head over the notch ($h=h_1-h_o$) m	Time for H cm rise, T sec	Discharge (Q) m^3/s		Coefficient of discharge (C_d)
					Q_{th}	Q_{act}	

Vertex angle of the triangular notch, θ =

Dimensions of collecting tank =

Experiment No: Roll No:

Date :

3. DETERMINE THE DISCHARGE PASSING THROUGH A PALAR RIVER (using TRIANGULAR / RECTANGULAR NOTCH)

AIM

To study the flow over a triangular notch and to calibrate it for the discharge measurement for a free surface flow.

BASIC CONCEPT

A weir is an obstruction placed across a free surface flow such that the flow takes place over it. The weir with a sharp edge is commonly referred to as a notch. Generally, notches are opening cut in metallic plates and installed in flumes to measure the discharge. The free surface flow taking place over it acquires steady state condition such that the discharge is uniquely related to the head over the crest of the notch and its geometry. In actual practice, the discharge over a notch is considerably less than the theoretical discharge. This is due to real – flow effects like viscosity, end-contraction, nappe suppression, ventilation of notches, etc. The actual discharge is obtained by multiplying the theoretical discharge by a factor called Coefficient of Discharge, C_d

The following formula is employed.

Theoretical discharge (Q_{th}) = $\frac{8}{15}\sqrt{2g}\tan\frac{\theta}{2}h^{5/2}$ (Triangular Notch)

h=head over the sill of the notch

θ = Vertex angle of the notch

g= acceleration due to gravity

Theoretical discharge (Q_{th}) = $\frac{2}{3}\sqrt{2g}Lh^{3/2}$ (Rectangular Notch)

L = length of the crest

h=head over the sill of the notch

g= acceleration due to gravity

Actual Discharge (Q_a) = AH/t

A= Internal plan area of the collecting tank

H= Time required for a rise of “H” cm in the collecting tank

t= time required for rise of ‘H’ cm in the collecting tank.

Coefficient of discharge for a triangular notch (C_d) = Q_a/Q_{th}

MODEL CALCULATIONS

APPARATUS

1. Flume with a Triangular / Rectangular notch
2. Hook gauge
3. Collecting tank.
4. Stop watch
5. Piezometer
6. Scale.

PROCEDURE

1. The internal plan dimensions of the collecting and the vertex angle of the notch are measured.
2. The supply valve is opened and the water is allowed to rise up to sill of the notch and then the supply valve is closed.
3. The tip of the pointer of the hook gauge is adjusted such that the tip coincides with free water surfaces.
4. The sill level of the notch (h_o) is noted in the hook gauge.
5. The supply valve is opened and the water is allowed to flow through. The tip of the pointer is adjusted to coincide with the water surface.
6. The reading of the hook gauge (h_1) is noted down.
7. The outlet valve of the collecting tank is closed and the time taken for a rise of "H" in the collecting tank is noted down.
8. The above procedure is repeated for different heads of flow.

GRAPHS

The following graphs is drawn with Q_a on y- axis and $(h)^{5/2}$ on x – axis, $Q_a$vs $(h)^{5/}$

RESULT

The coefficient of discharge of the Triangular / Rectangular notch, (C_d)=

(from experiment)

The coefficient of discharge of the Triangular / Rectangular notch, (C_d)=

(from Q_a vs $(h)^{5/2}$ (or) $(h)^{3/2}$graph)

INFERENCE