Empirical Formulae for discharge over Rectangular Weir

1. Francis Formula

$$Q = \frac{2}{3} \times C_d \times \left[L - 0.2 \times H\right] \times \sqrt{2g}\ H^{3/2}$$

where $L = (L - 0.2H)$

↑ effective Length.

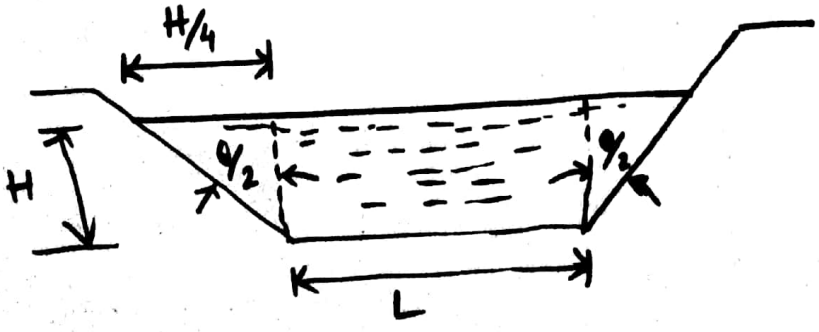
2. Bazin's Formula

$$Q = m \times L \times \sqrt{2g} \times H^{3/2}$$

$$m = \frac{2}{3} \times C_d = 0.405 + \frac{0.003}{H}$$

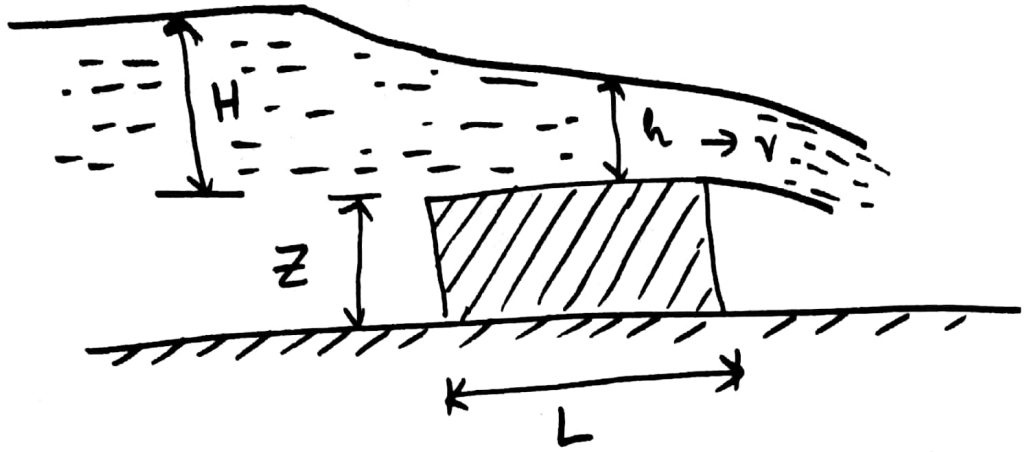
Cipolletti Weir or Notch

Cipolletti weir is a trapezoidal weir, which has side slopes of 1 horizontal to 4 vertical (1H : 4V)



$$Q = \frac{2}{3} \times C_d \times L \times \sqrt{2g}\ H^{3/2}$$

Discharge over a broad-crested weir



H = height of water above the crest

L = Length of crest

h = Head of water at the middle of weir which is constant.

→ A weir having a wide crest is known as broad-crested weir.

→ If $2L > H$, The weir is called broad-crested weir

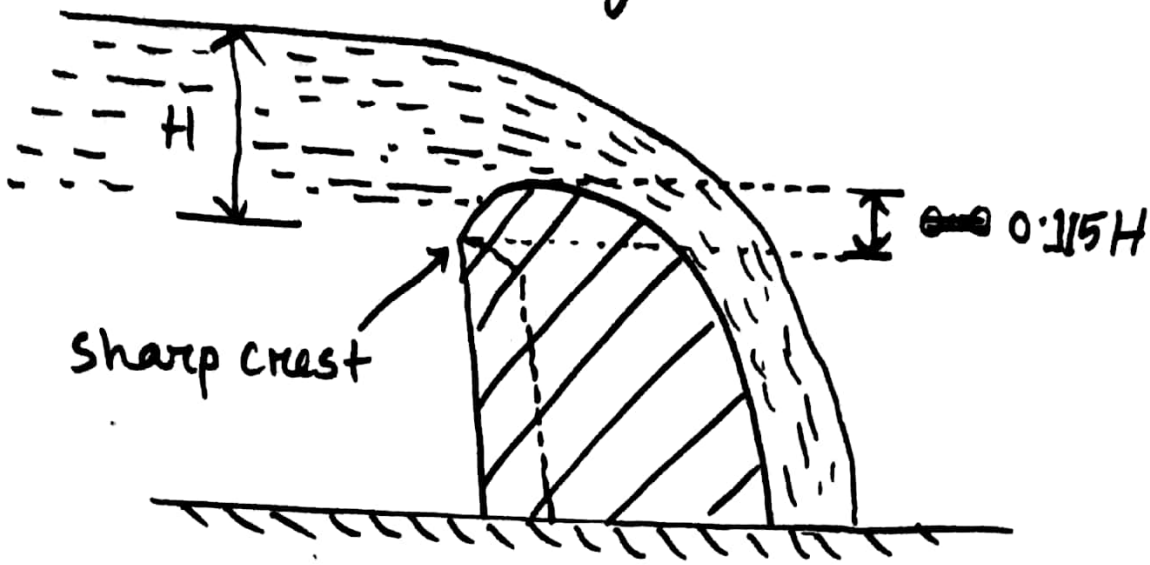
If $2L < H$, " " " Narrow-crested weir

$$Q = 1.705 \times C_d \times L \times H^{3/2}$$

Discharge over a Narrow Crested Weir :

$$Q = \frac{2}{3} \times C_d \times L \times \sqrt{2g} \times H^{3/2}$$

Discharge over an Ogee weir



Ogee weir is the weir in which crest of the weir rises upto a maximum height of $0.115\,H$ (where H is the height of water above inlet of the weir) and then falls.

$$Q = \frac{2}{3} \times C_d \times L \times \sqrt{2g} \times H^{3/2}$$