If $C_d = 0.6$ and $\theta = 90^o \Rightarrow Q = 1.417\ H^{5/2}$

Example -7.16-

During an experiment in a laboratory, 50 liters of water flowing over a right-angled notch was collected in one minute. If the head of still is 50mm. Calculate the coefficient of discharge of the notch.

Solution:

$$Q = \frac{8}{15} C_d \tan(\theta/2)\sqrt{2g}H^{5/2} = 50 \text{ lit/min } (m^3/1000lit)(min/60s) = 8.334 \times 10^{-4}\ m^3/s$$

$\Rightarrow C_d = (8.334 \times 10^{-4})/[(8/15)(2x9.81)^{0.5} \tan(\theta/2)(0.05)^{5/2}] = 0.63$

Example -7.17-

A rectangular channel 1.5 m wide is used to carry 0.2 m^3/s water. The rate of flow is measured by placing a 90º V-notch weir. If the maximum depth of water is not to exceed 1.2 m, find the position of the apex of the notch from the bed of channel. C_d = 0.6.

Solution:

$Q = 1.417\ H^{5/2} \Rightarrow H^{5/2} = (0.2\ m^3/s)/1.417 \Rightarrow H = 0.46$ m

The maximum depth of water in channel = 1.2 m

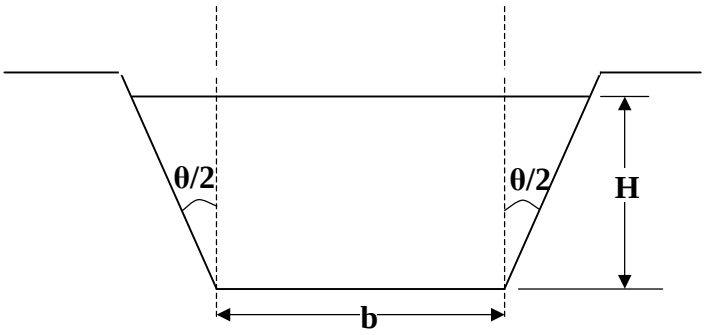
H is the height of water above the apex of notch.

Apex of triangular notch is to be kept at distance = 1.2 –0.46

= 0.74 m from the bed of channel.

7.2.4.3 Trapezoidal Notch

A trapezoidal notch is a combination of a rectangular notch and triangular notch as shown in Figure;



Discharge over the trapezoidal notch,

Q=[Discharge over the rectangular notch + Discharge over the triangular notch]

$$Q = \frac{2}{3} C_{d1} b\sqrt{2g}H^{3/2} + \frac{8}{15} C_{d2} \tan(\theta/2)\sqrt{2g}H^{5/2}$$

Example -7.18-

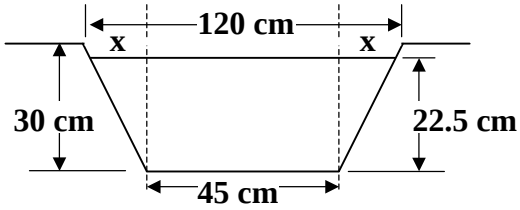
A trapezoidal notch 120 cm wide at top and 45 cm at the bottom has 30 cm height. Find the discharge through the notch, if the head of water is 22.5 cm. $C_{d1} = C_{d2} = 0.6$.

Solution:

x = (120+45)/2 = 37.5 cm

tan(θ/2) = x/30 = 37.5/30 = 1.25

$$Q = \frac{2}{3} C_{d1} b\sqrt{2g}H^{3/2} + \frac{8}{15} C_{d2} \tan(\theta/2)\sqrt{2g}H^{5/2}$$



$Q = 2/3(0.6)(0.45)(2 \times 9.81)^{0.5}\ (0.225)^{3/2} + 8/15(0.6)\ (2 \times 9.81)^{0.5}\ (1.25)(0.225)^{5/2}$

$= 0.1276\ m^3/s$