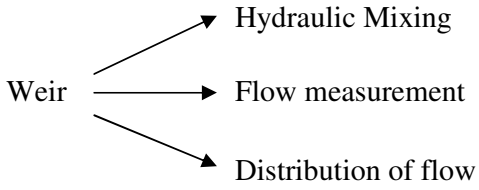
LECTURE 13: Flow measurement in open channels



Sharp Crested Weir

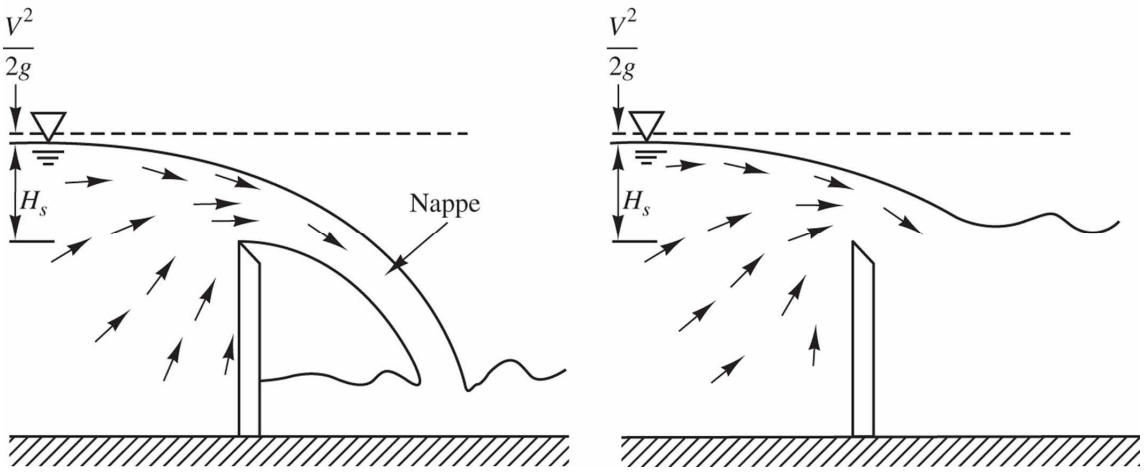


Figure 8.8 **Flow over sharp-crested weir (free-falling nappe and submerged flow)**

Water depth above weir => width of the weir

=> unit discharge (width of weir $= \frac{Q}{6} = q$)

Width of the weir

Sharp Crested Weir

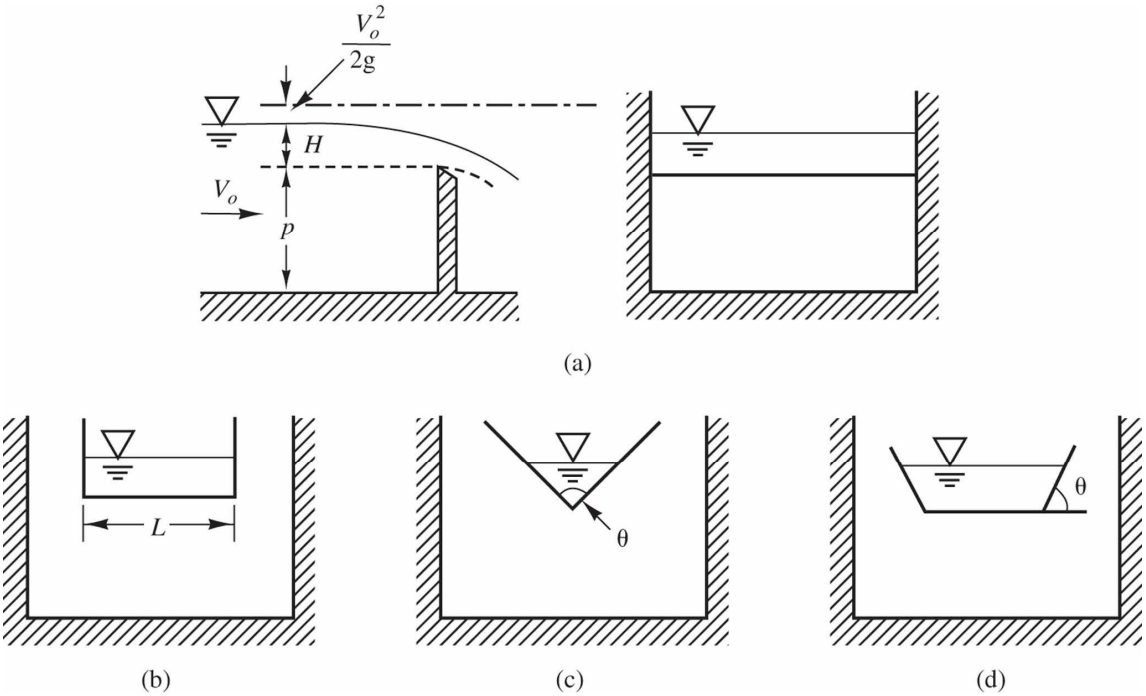


Figure 9.10 **Common sharp-crested weirs: (a) uncontracted horizontal weir, (b) contracted horizontal weir, (c) V-notched weir, and (d) trapezoidal weir**

Basic discharge equation for standard, uncontracted horizontal weir

$$Q = C.L.H^{3/2}$$

C: Discharge coefficient; L: Length of water; H: Water above weir (crest)

$$C = 3.22 + 0.40(H/p)$$ British Units (ft)

$$C = 1.78 + 0.22(H/p)$$ SI Units (m)

Contracted horizontal weir

$$Q = C.(L - n.H/10).H^{3/2}$$

C: Discharge coefficient; L: Weir length; n: Number of contractions for 2

$$Q = C.(L - 2H/10).H^{3/2}$$

Contractions from both sides

For standard contracted horizontal weir

$$\underbrace{Q = 3.33(L - 0.2H).H^{3/2}}_{\text{British Units (ft)}} \qquad \underbrace{Q = 1.84(L - 0.2H).H^{3/2}}_{\text{SI Units (m)}}$$

V-Notched weir

$$Q = C.(\tan\theta/2).H^{5/2}$$