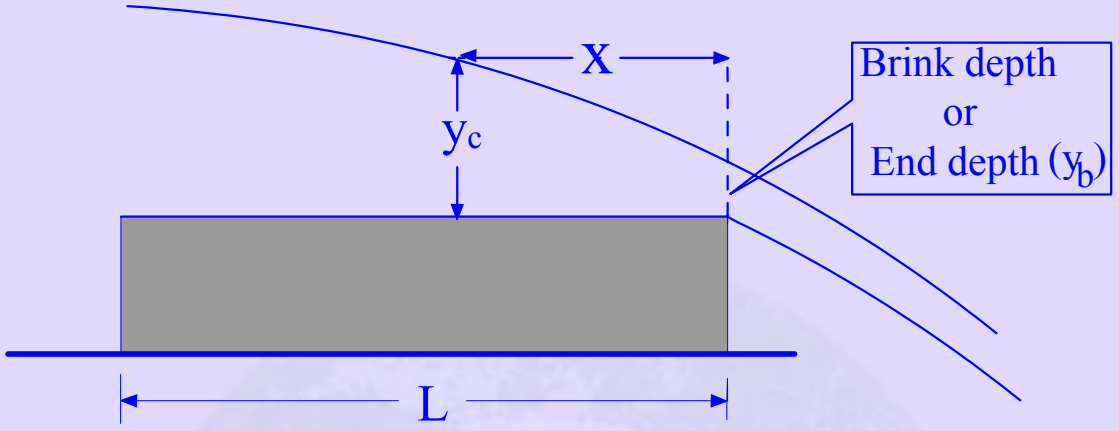
BRINK DEPTH

When the canal drops suddenly, a free over fall is formed, since flow changes to supercritical flow can be used as a measuring device.



$$\frac{y_c}{y_b} \approx 1.4 \text{ , } x = 3 \text{ to } 4\ y_c$$

Brink depth

The drop distance should be more than $0.6y_c$. Brink depth will be different at the centre and sides of the canal (which is higher). The roughness of the canal affects the brink depth and hence the bed and sides should be finished smooth.

$$H_o = y + \alpha \frac{q^2}{2gy^2}$$

Differentiating w.r.t 'y' assuming Q to be constant.

$$\frac{dH_o}{dy} = 1 - \alpha \frac{q^2}{gy^3}$$

$n = \frac{y_1}{w}$ if the flow is critical, hence $y_c = \sqrt[3]{\frac{\alpha q^2}{g}}$

If α=1, then $Q = b\sqrt{g}\ y_b$

Rouse showed $y_b = 0.715y$

Thus $Q = b\sqrt{g}\left[\frac{y_b}{0.715}\right]$

This derivation is assumed for a free fall with an unconfined nappe. This value is modified as 0.705 when the flow is two dimensional. This results in a error of 2 to 3 % respectively for the above two cases.

The width of the canal should not be less than 3 y_c. This is applicable to canals with slopes upto 0.0025.