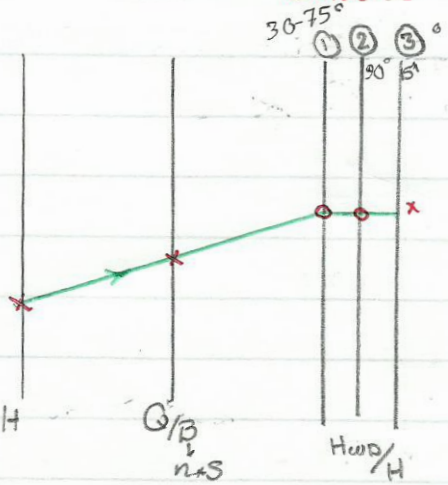
Culverts



Internal height of box Culvert | Discharge Per (m) | Angle of wall ① Divergent wall ② Box

* Calculate $H_{wD} = d + h_{wp}$
* Calculate $Q/B \rightarrow (n * S)$
* Define wall type $b_{str} < b_c$ ①

  $n*S+(n-1)t_1$ ← $b_{str} = b_c$ ②
* From chart get "$\frac{H_{wb}}{H}$" → H_{wb} = ✓
* $H_{wD} < H^*_{wD}$ → Outlet Control

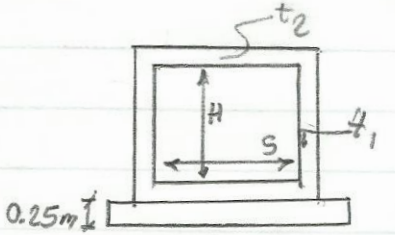
  $H_w \geq H^*_{wD}$ → Inlet Control

* Emperical Design:
  * RC Box Culvert:

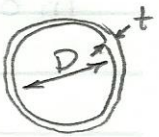
$t_1 = \frac{H}{5-7}$

$t_2 = \frac{S}{5-7}$

t_1 & t_2 ≯ 20 cm



* Steel pipe culvert:



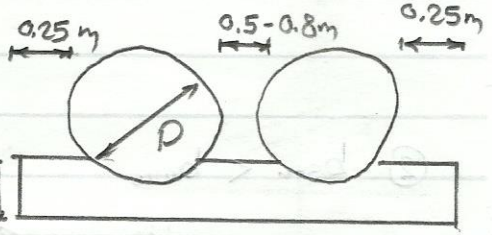
Thickness of pipe $t_{(m)} = 0.35(D_{(m)}+1)$

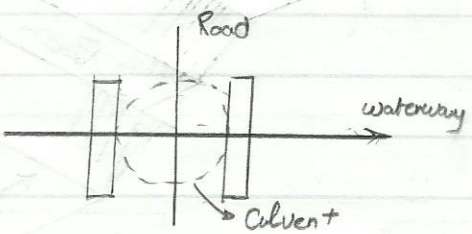
Increase t by 1 mm for rusting inc

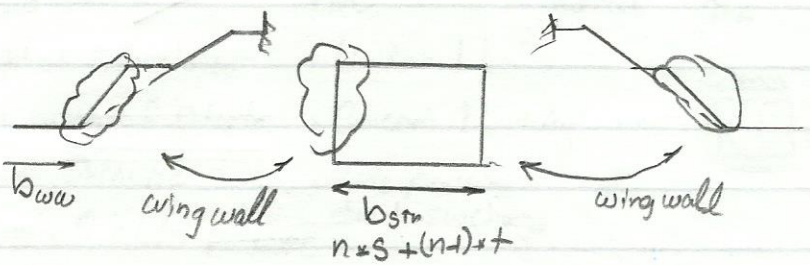
$t \leq 10\,mm$

or $\leq 15\,mm$

$t_{f(m)} = 0.2\,D_{(m)}+0.3$



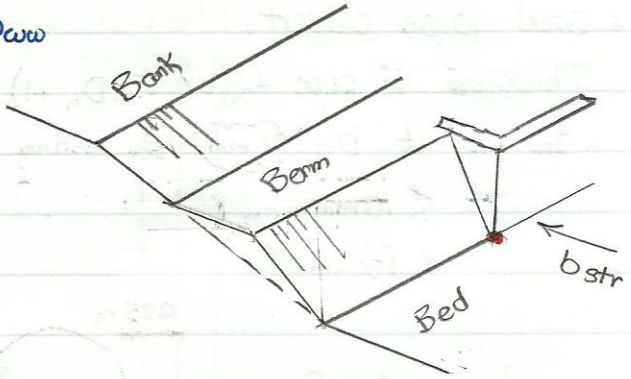




① $b_{str} = b_{ww}$

② $b_{str} < b_{ww}$

① $b_{str} = b_{ww}$



② $b_{str} < b_{ww}$