(4) محاضرة تصميم اعمال الري (٢)
الاثنين (١٦/١١/٢٠٠٩)

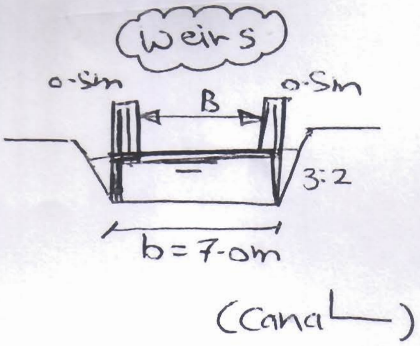
Example:

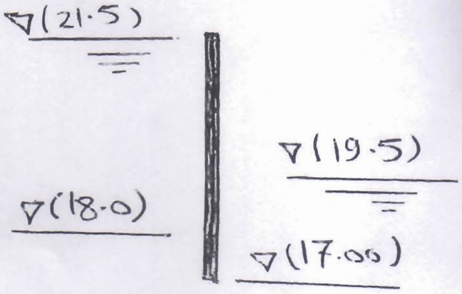
$C_B = 15.$

$Q = 21\ m^3/sec.$

Req.:

- Design of weir.
- Find the floor dimensions, Levels.
- Check of floor thickness against upleft.
- Design of wing wall (side walls).





Sol.

Drop in water Level $= 21.5 - 19.5 = 2.00\,m < 3.0m$ (Fayyoum type weir)

$Q = 2/3 \cdot C_d \cdot B\sqrt{2g} \cdot H^{3/2}$

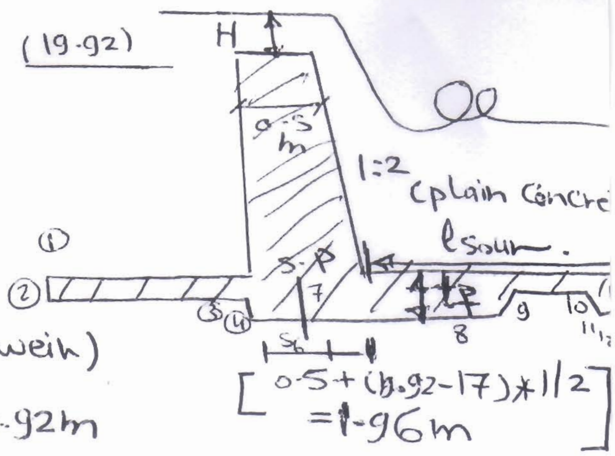
C_d → (0.6)

B → width of water passing the weir) = $(7 - 2(0.5) = 6m)$)

$21 = (2/3 * 0.6) * 0.6 * 6 * \sqrt{2g} \cdot H^{3/2}$

→ Get $H = 1.58m <$ drop.

(check as type of weir)



Crest level $= u.s.w.L - H = 21.5 - 1.58 = 19.92m$

$L_{scour} = 0.6\ C_B\sqrt{H_{max}}.$

H_{max}. (max. of) $= 21.5 - 19.5 = 2.0m$

or $= 19.92 - 17 = 2.92m$

$L_{scour} = 0.6 * 15\sqrt{2.92} = 15.4\,m \simeq 20m$

$t_f = \sqrt{H_{max}} = \sqrt{2.92} = 1.8m$

$L_{Bligh} = C_B \cdot H_{max} = 15 * 2.92$

$L_{Horizontal} = 50 + 1.96 + 20 = 96$
26. m

$L_{vertical} = 2t_f$ → هبوط (صعود و اطلاع) $+ 2d$ (sheet pile)

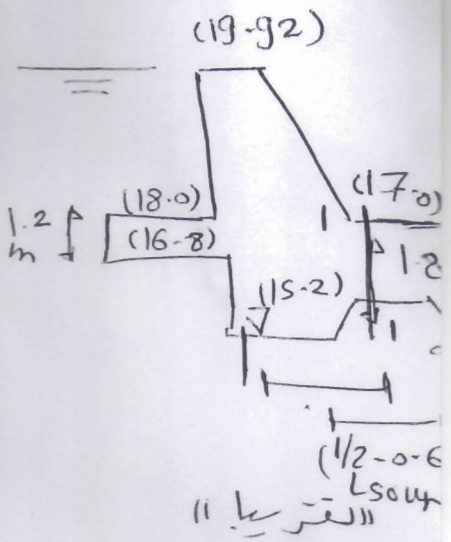
For Bligh:

$L_{Horizontal} = L_{vertical}$ ———→ $d_{sh.} = 6.62m \simeq 7m$

(use 2 sheet piles
$d_1 = 4m - d_2 = 3m$)

Making Table of points:

point	L_H	$L_{vertical}$	ΔH	$\sum \Delta H$
1	0	1.20		
2				
3	5.0	–		
4	–	1.6		
5	0.25	–		
6	–	4		
⋮	⋮	⋮		
16				
	$\sum$ = 26.75 m	$\sum$ = 20.3 m		$\sum$ = Hmax.



$L_{actual.} = C_{B(actual)} * H_{max.}$

$C_{B(actual)} = L_{(actual)} / H_{max} = \frac{26.75 + 20.3}{2.92} = 16.1$

$h' = 2.92 - 1.0 - (1.71/16.1) = 1.61m$

↳ (uplift pressure at sec 1–1)

↳ $t_f > h'$) (safe)