

الاول 35/

1) $\frac{35}{47} = 0.745 < 1$ مقبول

05) $\tau_{cu} = \min \frac{5.5}{0.2 \times 22} = 4.4 \Rightarrow 4.4 = \frac{V_u}{0.75 \times 300 \times 470} \Rightarrow V_{u_{max}} = 465.5 \text{ kN}, N_{u_{min}} = 93.1 \text{ kN}$

2) $A_{vf} = \frac{320 \times 10^3}{0.75 \times 400 \times 1.4} = 761.9 \text{ mm}^2$

15) $N = 48 \times 0.2 \times 320 = 64 \Rightarrow A_f = \frac{(320 \times 350 + 64 \times 80) \times 10^3}{0.75 \times 400 \times 0.85 \times 470} = 977.22 \text{ mm}^2$

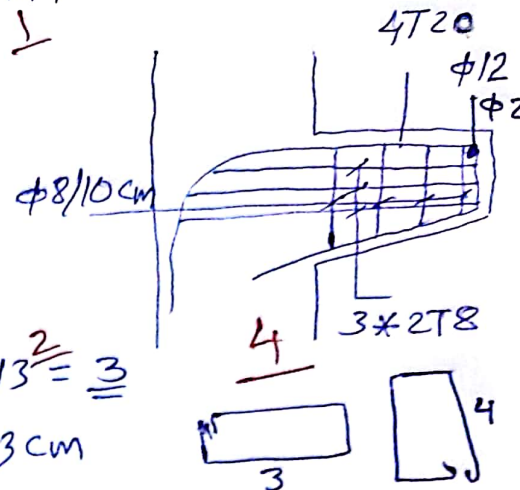
$A_n = \frac{64 \times 10^3}{0.75 \times 400} = 213.33$

$A_s = \max \left\{ \frac{2}{3} \times 761.9 + 213.33 = 721.26 \right.$

$977.22 + 213.33 = 1190.55 = 4T20$

$0.04 \times \frac{22}{400} \times 300 \times 470 = 310.2$

$A_h = 0.5 \times 977.22 = 488.61 = n \times 4 \times \frac{\pi \times 8^2}{4} \Rightarrow n = 2.43 = 3$
 $\frac{2}{3}d = 31.3 \text{ cm}$



$L = \min(420, 1.05 \times 380 = 399) = 400 \text{ cm}$ • $H = 480 \times 400$
 $H = 400$

09) $\frac{L}{H} = \frac{400}{400} = 1.0 < 2$

$229022 = 9T18 = 0.9 \times \frac{M_0}{0.55 \times 400 \times 4000} \left(1 + \frac{2}{3} \times 1\right) \Rightarrow M_0 = 1343.60 \text{ kN.m}$

$1343.6 = \frac{w \times 4^2}{8} \Rightarrow w = 671.8 \text{ kN/m}$

$S_w = 25 \times 0.3 \times 4.8 = 36$

$w = 635.8 \text{ kN/m}$

2) $A = \frac{635.8 \times 0.15 \times 10^3}{0.55 \times 400} = \frac{95.37 \times 10^3}{220} = 433.5 \text{ mm}^2/\text{m}$
 $= 86.7 \text{ mm}^2/20 \text{ cm}$

$A_s = 2T12 + 86.7 = 312.9 = 2T16/12$

$0.15L = 57 \text{ cm}$ أو $0.7L = 266 \text{ cm}$

	I_x	x_i	I_y	y_i
1	3.646	17.6		
2	10.009	6.4		
3			6.3	10.6
4			14.933	4.4

$$I_o = 1539.15 + 996.97 = 2536.12$$

$$e_y = 3.1 \text{ m}$$

$$V_3 = \frac{6.3}{21.233} V_x + \frac{6.3 \times 10.6}{2536.12} V_x (3.1 + 0.05 \times 15) = 0.398 V_x$$

$$V_3 = 0.398 \times 4410 = 1755.18 \text{ kN}$$

$$M_3 = 0.398 \times 33355 = 13275.29 \text{ kN.m}$$

$$A = 2.5 \times 9 = 22.5 \text{ m}^2$$

$$D = 25 \times 0.35 \times 6 \times 10.5 + 10 \times 22.5 \times 3 = 551.25 + 675 = 1226.25 \text{ kN}$$

$$L = 5 \times 22.5 \times 3 = 337.5 \text{ kN} \Rightarrow N = 1563.75 \text{ kN}$$

$$r_{\max} = 0.398 \times \frac{3}{6} = 0.199$$

$$\rho = 2 - \frac{6}{0.199 \sqrt{360}} = 0.410 < 1 \Rightarrow \rho = 1$$

$$\frac{h_w}{l_w} = \frac{18}{6} = 3 > 2 \Rightarrow \alpha_c = 0.17$$

$$\rho = \frac{2T12}{350 \times 120} = 0.005386 \Rightarrow 0.0025$$

$$\rho = 0.005 \Rightarrow 3524.7$$

$$\phi V_n = 0.6 \times 350 \times 6000 (0.17 \sqrt{22} + 0.0054 \times 400) = 3726.29 \text{ kN}$$

$$V_u = \phi V_n = 0.65 V_n$$

$$A_{vf} = 2 \times 24T22 + \frac{2T14}{10} \times 380 = 29945.66 \text{ mm}^2$$

$$V_n = 29945.66 \times 400 \times 1 = 11978.26 \text{ kN}$$

$$5.5 \times 6000 \times 350 = 11550$$

$$0.2 \times 22 \times 6000 \times 350 = 9240 \text{ kN}$$

$$V_u = 0.65 \times 9240 = 6006 \text{ kN}$$

$$A_{sh} = \max \left\{ \frac{0.3 \times 100 \times 300 \times 22}{240} \left(\frac{350 \times 100}{300 \times 1050} - 1 \right) = 183.33 \text{ (140.25)} \right.$$

$$\left. 0.09 \times \frac{100 \times 300 \times 22}{240} = 247.5 \text{ (148.5)} \right.$$

2T10/10cm

