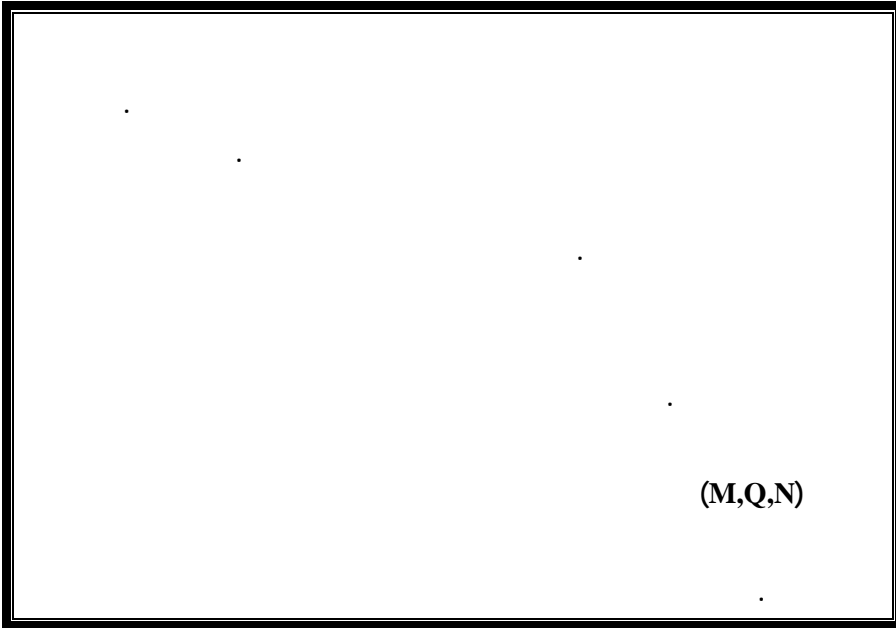


1



1



:

.

... ..

.

()

.

(...)

.

.

.

:

:

.

-1

-2

-3

...

:

-1

-2

-3

-4

-5

()

: (1)

$$C = C_A + C_B \quad (1)$$

$$R_a \quad F_a$$

$$R_{a1} \quad F_{a1} \quad (\quad)$$

:

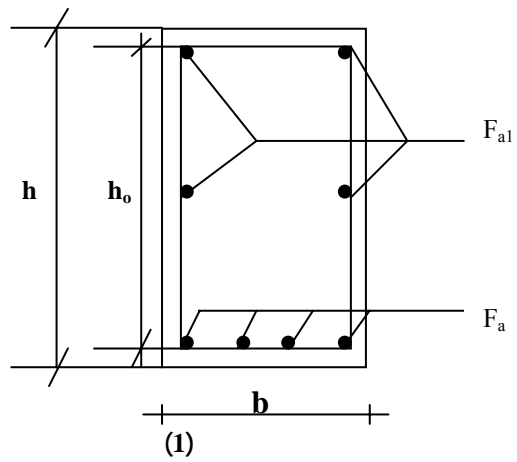
$$C_A = C_a \cdot F_a + C_{a1} \cdot F_{a1} = C_a \cdot F_a \left(1 + \frac{C_{a1} \cdot F_{a1}}{C_a \cdot F_a} \right) \quad (2)$$

:

$$^3 \quad -C_{a1} \quad C_a$$

$$C_a = 7.85 C_{at}$$

-C_{at} :



:

(2)

$$C_A = C_a \cdot F_a \cdot \varphi_a \quad (3)$$

φ_a

:

$$\varphi_a = 1 + \frac{C_{a1} \cdot F_{a1}}{C_a \cdot F_a}$$

$$C_B = C_b \cdot b \cdot h = C_b \cdot b \cdot h_o \cdot \varphi_b \quad (4)$$

$$\varphi_b = \frac{h}{h_o} - C_b$$

$$C = C_A + C_B = C_a \cdot F_a \cdot \varphi_a + C_b \cdot b \cdot h_o \cdot \varphi_b \quad (5)$$

$$C = C_b \cdot b \cdot h_o \cdot \varphi_b \left[1 + \frac{C_a \cdot F_a \cdot \varphi_a}{C_b \cdot b \cdot h_o \cdot \varphi_b} \right] \quad (6)$$

$$\zeta = \frac{X}{h_o} = \frac{R_a \cdot F_a}{R_b \cdot b \cdot h_o} \quad (7)$$

X

$$X \cdot b \cdot R_b = R_a \cdot F_a \rightarrow X = \frac{R_a \cdot F_a}{b \cdot R_b} \quad (7)$$

$$F_a = \frac{\zeta \cdot R_b \cdot b \cdot h_o}{R_a} \quad (8)$$

$$(6) \quad (8) \quad F_a$$

$$C = C_b \cdot b \cdot h_o \cdot \varphi_b \cdot \left(1 + \frac{C_a \cdot \varphi_a \cdot R_b}{C_b \cdot \varphi_b \cdot R_a} \zeta\right) \quad (9)$$

$$W = \frac{C_a \cdot \varphi_a \cdot R_b}{C_b \cdot \varphi_b \cdot R_a} \quad (10)$$

$$C = C_b \cdot b \cdot h_o \cdot \varphi_b \cdot (1 + W \cdot \zeta) \quad (11)$$

$$W \quad 10$$

C

:

$$CX = \frac{C_{ax} \cdot F_x \cdot (h_x + b_x) \cdot n_x}{U_x} \quad (12)$$

:

$$C_{ax} = 7.85 C_{at} \quad 3 \text{ كلفة} - C_{ax}$$

- Fx

- h_x b_x- n_x- U_x

C_A

12

(3)

Q,N,M

:
:

$$M_p + M_g \cdot b \cdot h = R_b \cdot b \cdot h_0 \cdot \zeta \cdot (1 - 0,5 \zeta) \quad (13)$$

b=h=1

:
-M_p
-M_g
-ζ = X/h₀

$$M_g \cdot b \cdot h = 1,5 b \cdot \varphi_b \cdot h_0 \cdot \gamma \cdot l^2 \cdot \alpha \quad (14)$$

()
γ = 2,5 T/m³
-1,5
-γ
-L
-α

$$\alpha = \frac{1}{8} = 0,125$$

$$\zeta = 1 - \sqrt{1 - \frac{2A}{R_b}} \quad (15)$$

$$A = \frac{M_p}{b \cdot h_o^2} + \frac{M_g}{h_o} \quad (16)$$

11

$$C = C_b \cdot b \cdot h_o \cdot \varphi_b + \frac{C_a}{R_a} \cdot \varphi_b \cdot R_b \cdot b \cdot h_o \cdot \zeta \quad (17)$$

$$R_b \quad C_b$$

$$C_b = S R_b + d \quad (18)$$

$$(15) \quad R_b \quad \zeta \quad (18) \quad C_b \quad \overline{C_a} = \frac{C_a}{R_a}$$

$$C = (S R_b + d) \cdot \varphi_b \cdot b \cdot h_o + \overline{C_a} \cdot \varphi_a \cdot b \cdot h_o \cdot (R_b - \sqrt{R_b^2 - 2 R_b \cdot A}) \quad (19)$$

$\overline{C_a}$, b , h_o , R_b , R_a , ζ :

$$C \quad (19)$$

$$\frac{dC}{dC_a} > 0$$

$$\varphi_a \cdot \bar{C}_a$$

$$R_a$$

$$C_a$$

$$\varphi_a$$

$$R_b$$

$$(19)$$

$$\frac{dc}{dR_b} = \varphi_b \cdot S + \varphi_a \cdot \bar{C}_a - \varphi_a \cdot \bar{C}_a \frac{R_b - A}{\sqrt{R_b^2 - 2AR_b}}$$

$$(20)$$

$$R_b$$

$$(20)$$

:

$$R_b = K \cdot A$$

$$(21)$$

$$K = 1 + \frac{\varphi_b \cdot S + \varphi_a \cdot \bar{C}_a}{\sqrt{\varphi_b \cdot S(\varphi_b \cdot S + 2\varphi_a \cdot \bar{C}_a)}}$$

:

$$\zeta$$

$$(15)$$

$$(21)$$

$$\zeta = 1 - \sqrt{1 - \frac{2}{K}}$$

$$(22)$$

h,b

ζ

$$\zeta_R$$

ζ

$$\zeta \leq \zeta_R$$

:

K

$$K \geq \frac{2}{1 - (1 - \zeta_R)^2}$$

$$(23)$$

)

ζ_R

.(

$$\frac{dC}{db} > 0 \quad (19)$$

I T

b

$$\frac{dC}{dh_o} = \frac{K \cdot M_p}{b \cdot h_o} (\varphi_b \cdot S + \varphi_a \cdot \overline{C_a} \cdot \zeta) + \varphi_b \cdot d \quad (19)$$

$$h_o = \sqrt{\frac{K(\varphi_b \cdot S + \varphi_a \cdot \overline{C_a} \cdot \zeta)}{d}} \cdot \sqrt{\frac{M_p}{b}} \quad (24)$$

$$h_o = r \cdot \sqrt{\frac{M_p}{b}} \quad (25)$$

$$: \quad (21) \quad (25)$$

$$R_b = \frac{K}{r^2} \cdot (1 + r \cdot \zeta_m) \quad (26)$$

$$\zeta_m = \frac{M_g}{\sqrt{\frac{M_p}{b}}} \quad (27)$$

$$: \quad (24) \quad r$$

$$R_b = \frac{d}{\varphi_b \cdot S + \varphi_a \cdot \overline{C_a} \cdot \zeta} \left[1 + \sqrt{\frac{K(\varphi_b \cdot S + \overline{C_a} \cdot \zeta)}{\zeta_b \cdot d}} \cdot \zeta_m \right] \quad (28)$$

(28)

R_b

b

R_a

ζ h_o

: ζ h_o

$$h_o = r_b \sqrt{\frac{M_p}{R_b \cdot b}} \quad (29)$$

$$r_b = \zeta_m + \frac{W + 1}{\sqrt{W + 0,5}} \quad (30)$$

$$\zeta_m = \frac{M_g}{\sqrt{\frac{M_p \cdot R_b}{b}}} \quad (31)$$

(10) W

$$\zeta = \frac{\zeta_m \cdot \sqrt{W + 0,5} + 1}{\zeta_m \cdot \sqrt{W + 0,5} + W + 1} \leq \zeta_R \quad (32)$$

$$C = C_b \cdot \varphi \left[\zeta_m \cdot (W + 1) + 2\sqrt{W + 0,5} \right] \sqrt{\frac{M_p \cdot b}{R_b}} \quad (33)$$

$$C = C_b \cdot \varphi \cdot \rho \cdot \sqrt{\frac{M_p \cdot b}{R_b}} \quad (34)$$

$$\rho = \zeta_m \cdot (W + 1) + 2\sqrt{W + 0,5} \quad (35)$$

$$F_a = \frac{1}{R_a} \left(\zeta_m + \frac{1}{\sqrt{W + 0,5}} \right) \cdot \sqrt{M_p \cdot R_b \cdot b} \quad (36)$$

$$F_b = r_b \cdot \varphi_b \cdot \sqrt{\frac{M_p \cdot b}{R_b}} \quad (37)$$

$$\mu = \frac{R_b}{\varphi \cdot R_a} \cdot \frac{\zeta_m \cdot \sqrt{W + 0,5} + 1}{\zeta_m \cdot \sqrt{W + 0,5} + 1 + W} \quad (38)$$

	:		
(10)	W	(31)	-1
b	(14)	M _g	-2
		(30)	-3
	(29)	h _o	-4
(36)			-5
	(33)		-6

$$W \leq 1$$

$$Q \leq \sqrt{8 \cdot R_{bt} \cdot b \cdot h_o^2 \cdot q_x} \quad (39)$$

- R_{bt} :

$$Q \leq R_{bt} \cdot b \cdot h_o \sqrt{8 \cdot \alpha_x} \quad (40)$$

- α_x :

$$\alpha_x = \frac{q_x}{R_{bt} \cdot b} = \frac{n_x \cdot F_x \cdot F_{ax}}{R_{bt} \cdot b \cdot U_x} \quad (41)$$

- n_x

- F_{ax}

- R_{ax}

- U_x

$$C = C_b \cdot \varphi_b \cdot h_o \cdot b \cdot (1 + W_x \cdot \alpha_x) \quad (42)$$

$$W_x = \frac{C_a \cdot R_{bt} \cdot \varphi_a}{C_b \cdot \varphi_b \cdot R_{ax}} \quad (43)$$

$$\varphi_b = \frac{h}{h_o} \quad \varphi_a = 1 + \frac{C_a \cdot F_a}{C_{ax} \cdot F_{ax}}$$

$$\frac{dC}{d\alpha_x} = \frac{dh_o}{d\alpha_x} (1 + W_x \cdot \alpha_x) + W_x \cdot h_o = 0 \quad (44)$$

$$\frac{dh_o}{d\alpha_x} = \frac{h_o}{2\alpha_x} \quad (45)$$

$$\alpha_x = \frac{1}{W_x} \quad (46)$$

$$Q \leq R_{bt} \cdot b \cdot h_o \cdot \sqrt{\frac{8}{W_x}} \quad (47)$$

$$h_o = 0,35 \frac{Q}{R_{bt} \cdot b} \sqrt{W_x} \quad (48)$$

$$(42) \quad (48) \quad (46)$$

$$C = 0,7 \cdot C_b \cdot \varphi_b \cdot \frac{Q}{R_{bt}} \cdot \sqrt{W_x} \quad (49)$$

$$Q \leq 0,35 \cdot R_b \cdot b \cdot h_o \quad (50)$$

$$: \quad W_x \geq 66 \left(\frac{R_{bt}}{R_b} \right)^2 \quad (48)$$

$$h_o \quad (48)$$

$$. (50)$$

$$: \quad (43) \quad W_x \quad -1$$

$$. (48) \quad -2$$

$$. (49) \quad -3$$

$$: \quad -3$$

:

$$. L_o \leq 20h \quad -1$$

-2

$\leq 20h$

$L_o > 20h$

: L_o

$$N \leq m \cdot \varphi \cdot (R_b \cdot F_b + R_{ac} \cdot F_a) \quad (52)$$

:

$$\alpha = \frac{F_a \cdot R_{ac}}{F_b \cdot R_b} \quad (53)$$

:

$$N \leq m \cdot \varphi \cdot F_b \cdot R_b \cdot (1 + \alpha) \quad (54)$$

:

$$C = C_b \cdot F_b (1 + W \cdot \alpha) \quad (55)$$

$$W = \frac{C_a.R_b}{C_b.R_a} \quad (56)$$

: (55) (54) F_b

$$C = \frac{C_b.N}{m.\varphi.R_b} \cdot \frac{1+W.\alpha}{1+\alpha} \quad (57)$$

(54)

$$C = \frac{C_a.N}{R_{ac}} \quad \alpha$$

W

W = 1

W < 1

C

W > 1

$L_o > 20h$

)

(

$$M_p = 15 \cdot T \cdot m \quad (5) \quad -1$$

$$R_b = 200 \quad / \quad 30 \quad 000 / \quad (R_a = 3000 \text{ Kg/cm}^2) \quad (\text{Kg/cm}^2)$$

$$C_a = \text{Cat. } 7,85 = 30 \quad 000 \times 7,85 = 235 \quad 500 \text{ L.S/m}^3$$

$$C_b = 3000 \text{ L.S/m}^3$$

$$W \quad (10)$$

$$W = \frac{235500 \times 1,25 \times 200}{3000 \times 1,05 \times 3000} = 6,23$$

$$\varphi_b = \frac{h}{h_o} = 1,05, \quad \varphi_a = 1,25$$

$$(14) \quad M_g \quad \zeta_m \quad (31)$$

$$b = 20 \text{ cm}$$

$$\zeta_m = \frac{1,5 \times 1,05 \times 2,5 \times 10^{-3} \times 5^{-2} \times 10^4 \times 0,125}{\sqrt{\frac{15 \times 10^5 \times 200}{20}}} = 0,032$$

$$:r_b \quad (30)$$

$$r_b = 0,032 \frac{6,23+1}{\sqrt{6,23+0,5}} = 2,82$$

:h_o (29)

$$h_o = 2,82 \sqrt{\frac{15 \times 10^5}{200 \times 20}} = 55 \text{ cm}$$

$$h_o = 57$$

$$h = 60 \text{ cm}$$

$$\varphi_b = \frac{60}{57} = 1,05$$

(36)

F_a

$$F_a = \frac{1}{3000} \left(0,032 + \frac{1}{\sqrt{6,23 + 0,5}} \right) \sqrt{15 \times 10^5 \times 200 \times 20} = 10,8 \text{ cm}^2$$

$$F_{a1} = 2,26 \text{ cm}^2$$

2T12

4T18

$$\varphi_a = 1 + \frac{2,26}{10,8} = 1,21 \approx 1,25$$

: ϕ_aϕ_b, ϕ_a

.

:

$$\mu = \frac{F_a}{F_b} = \frac{10,8}{20 \times 60} \times 100 = 0,9\%$$

:(2)

:

$$C_b = 2000 \text{ L.S/m}^3, C_a = 40\,000 \times 7,85 = 314\,000 \text{ L.S/m}^3$$

:

$$W = \frac{314000 \times 1,25 \times 200}{2000 \times 1,25 \times 3000} = 12,5$$

$$r_b = 0,032 + \frac{12,5 + 1}{\sqrt{12,5 + 0,5}} = 3,78$$

$$h_0 = 3,78 \sqrt{\frac{15 \times 10^5}{200 \times 20}} = 73,2 \rightarrow h = 75 \text{ cm}$$

$$\varphi_b = \frac{75}{72} = 1,05$$

$$F_a = \frac{1}{3000} \left(0,032 + \frac{1}{\sqrt{12,5 + 0,5}} \right) \sqrt{15 \times 10^5 \times 200 \times 200} = 8 \text{ cm}^2$$

2T12

4T16

:

φ_a

$F_{a1} = 2,26$

$$\varphi_a = 1 + \frac{2,26}{8} = 1,28 \approx 1,25$$

φ_b, φ_a

:

$$\mu = \frac{8}{20 \times 75} \times 100 = 0,5\%$$

$b = 20 \text{ cm}$

$$h = \frac{L}{10} = \frac{500}{10} = 50 \text{ cm}$$

$$Mg = \frac{1,5 \times 0,2 \times 0,5 \times 2,5 \times 5^2}{8} = 1,17 \text{ T.m}$$

$$M = 15 + 1,17 = 16,17 \text{ T.m}$$

$$B_0 = \frac{M}{R_b \cdot b \cdot h_0^2} = \frac{16,17 \times 10^5}{200 \times 20 \times 47^2} = 0,18 \frac{\text{من الجداول}}{\text{من الجداول}} \rightarrow \alpha = 0,9$$

$$F_a = \frac{M}{R_s \cdot \alpha \cdot h_0} = \frac{16,17 * 10^5}{3000 * 0,9 * 47} = 12,8 \text{ C m}^2$$

$$\mu = \frac{12,8}{20 \times 50} \times 100 = 1,28\%$$

$$C1 = 0,75 \times 0,2 \times 2000 + 8 \times 10^{-4} \times 314\ 000 = 551 \text{ L.S}$$

$$C2 = 0,5 \times 0,2 \times 2000 + 12,8 \times 10^{-4} \times 314\ 000 = 602 \text{ L.S}$$

$$\frac{602 - 551}{551} = 10\%$$

()



: _____

-1

.2004

-2

. 2004 28-29

.1995 - : - - -3

.2006/5/9