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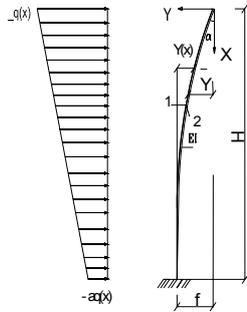
() :

X : (X, Y, Z)

:(Introduction) : -1

X = 0

(1) X = H



(1)

Introduction and :

-2

Background

-1

f -3 -2 -1

-q(x)

N_i(x)

M_i(x)

(1) f_i(x)

α(x)

$$Y''''(x) = \alpha''''(x) = \frac{-M''''(x)}{EI} = \frac{-Q'''(x)}{EI} = \frac{q(x)}{EI} \quad (1)$$

- Y''''(x)

Y(x)

N(x)

Q(x)

-α''''(x)

-M''''(x)

-Q'''(x)

-{-q(x)}

-EI

(2) (1)

$$EI Y(x) = \int_0^x \int_x^H \int_0^x \int_x^H q(x) dx' = \int_0^x \int_x^H M dx^2 = EI \int_0^x \alpha dx \quad (2)$$

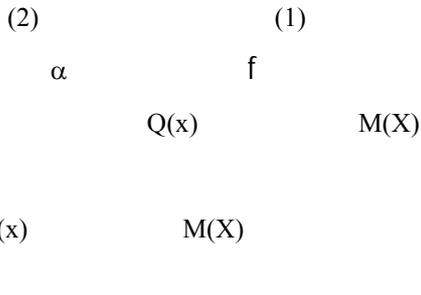
(1,2,3,4,6,7,8,9,10,11,12)

Y(X=H) = f

(2)

Y(X=0) = 0

|ȳ(x)| = f - Y(x)



(8)

(The shear walls of the hole

(shear walls)

cut)

(Join beams)

)

(2-a)

(The shear walls of the hole cut)

.(

(shear walls)

Join beams

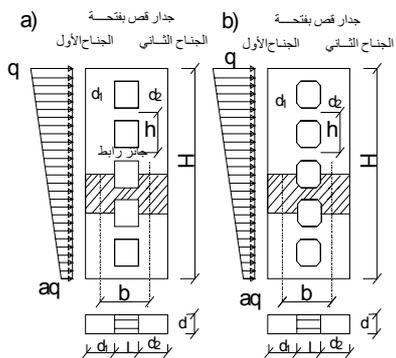
(Join beams)

(with crown)

(2-b)

(5)

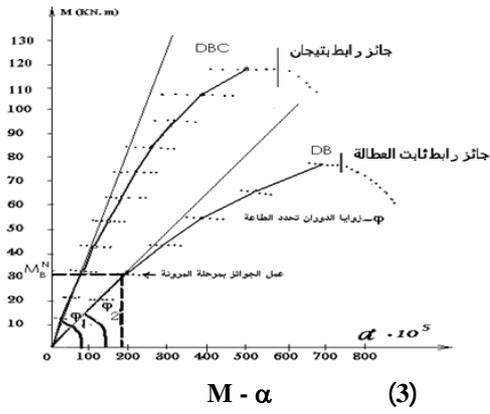
(1)



-2- a (2)

(7)

-2 - b



$0,3N_{cr}$

:(8)

$N \quad 0,3 \quad N$

-1

-2

-3



:(4)

(
(M- α) (M- ϵ)

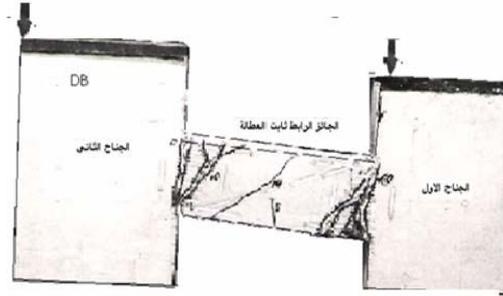
ϵ α
 ϵ
 f δ
(4)

M- α

$0,3 \quad N_{cr}$

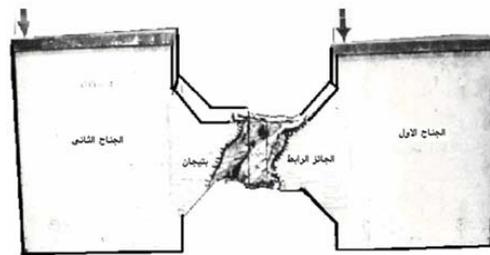
(8) N
:(3) (5)

(7) (



(5)

(2) (1)



(6)

(7)

(The shear walls of the hole cut)

(4)

.(8-a-b)

:(Shear walls)

-1

$q_h(x)$

$M_h(x)$

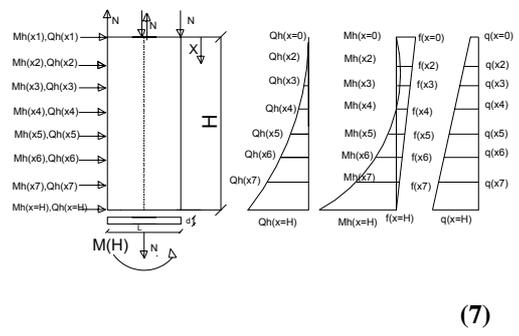
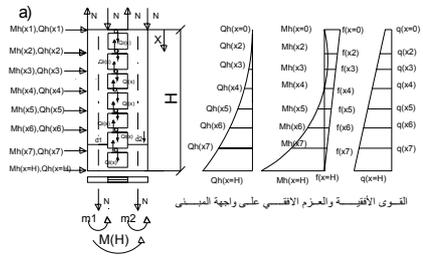
$Q_h(x)$

):

.(7)

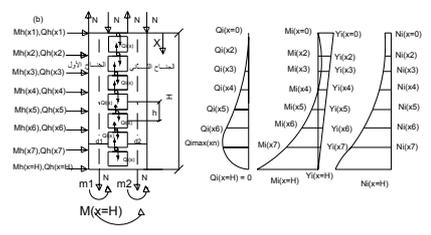
(Join beams)

(8-a-b-c) (3),(6)



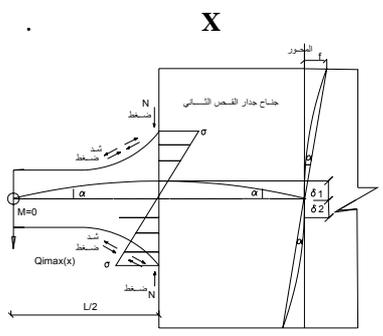
(Shear walls)

(The shear walls of the hole cut) -2



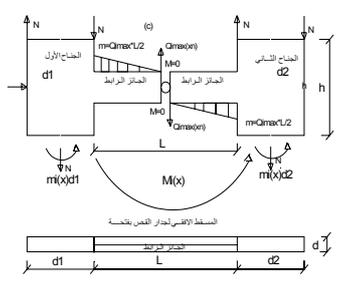
(8-a-b)

$Q_h(x)$
 $M_h(x)$
 $Q_h(x)$



$N_i(x)$ $M_i(x)$ -2
 $Y_i(x)$

$x = 0$ $x = H$



(8-c)

$N_i(x)$ $M_i(x)$
(8-b)

$Q_i(x)$ -2

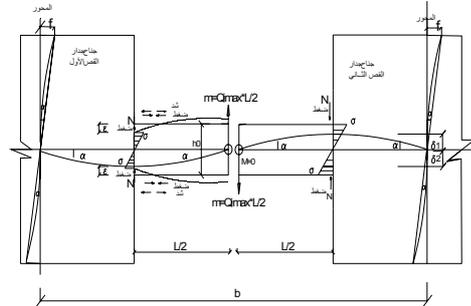
(9) (8-a-b-c)

$Q_i(x)$

$Q_i(x) =$)

(8-b)

$f \quad \delta \quad M \quad (\epsilon)$



$\sigma \quad M \quad Q_i(x) \quad (9)$
 $f \quad \delta \quad \epsilon \quad \alpha$

$h^3 \quad d$
 $EI = E / 12) E$

12

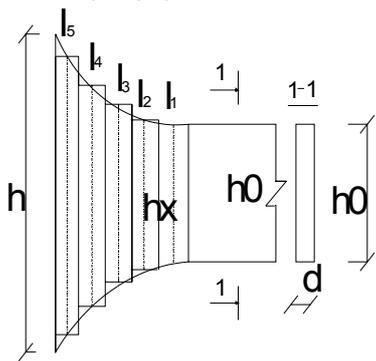
$(d * h^3$

N
 σ

ϵ

(9) (8-c)

$E I_x = EI_0 / 1 - (1-n) \xi^m$ (7)
 (3)



(10)

$(\quad) \quad -\xi = x/a$

.X

- a σ

(7)

$$EI_0/EI_h$$

- n

(9) (8-C)

- m

$$\alpha = S * Q_i(x) = S N', \alpha = (\delta_1 + \delta_2) / b, S = h * L^3 / 12 K_B * b \quad (7)$$

:

- α

- I_x

(9)

- S

- $Q_i(x)$

- N'

- b

- L

$$- K_B = EI_B$$

$$\xi^m = \frac{I_x - I_0}{(1-m) I_x}$$

$$m = \frac{\log \frac{I_x - I_0}{(1-m) I_x}}{\log \xi}$$

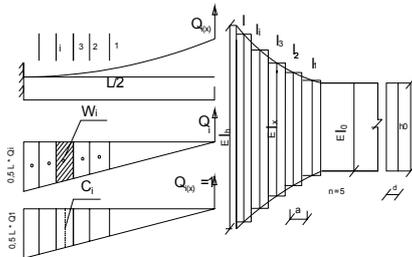
$$h = h_0 (1 + c \xi)$$

$$I = d \cdot h^3 / 12:$$

- h_0

- h_x

- d



(11)

1, 2, 3, i,

-1

$$\delta = \delta_1 + \delta_2$$

()

.X

δ_i

$$\delta_1 = \sum (W_i * C_i / E I_i)$$

- W_i

5

- C_i

1, 2, 3, I, 5

. 2, 3, i, 5

- $E I_i$

f α

S

4 3

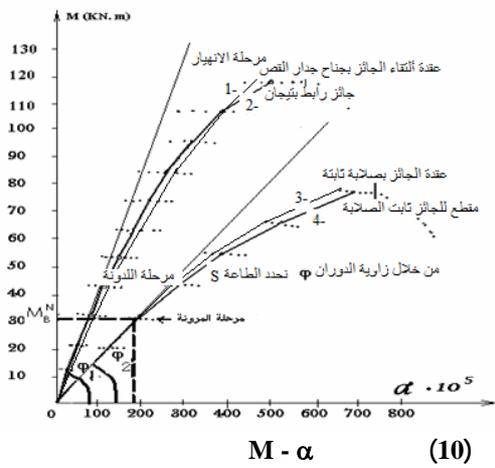
$$\delta = \delta_1 + \alpha \tag{9}$$

$$Q_1(x) \quad M_i(x) \quad Y_i(x) \quad \delta_2$$

$$N_i \quad \alpha$$

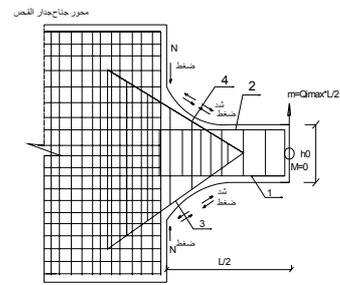
$$(9) \quad (8-a-b-c) \quad (x)$$

2 1



(5)

(12)



(12)

:

:

(7)

-1

1

2

(10)

(8)

4

3

M- α

M- ϵ

(Terminology)	
Beams;	
Shear walls;	
The shear walls of the hole cut;	
Join beams;	
Join beams with crown;	
Reinforced concrete;	
High buildings;	
The horizontal loads (earthquakes, winds).	()

2,3

(σ)

-2

2, 7

-3

-4

1,9

-5

1,5

-6

2,3

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