
 S1 SLAB

a) . MATERIAL:

$$\begin{aligned} f'_c &= 210 \text{ kgf/cm}^2 \\ f_y &= 2800 \text{ kgf/cm}^2 \end{aligned}$$

b) SIZE : 540 x 1100 (S x L in CM)
 DEPTH: 20 CM
 d' : 2.5 CM
 d = 17.5
 BEAM WIDE= 30 CM
 DL = 630 KG/M²
 LL = 200 KG/M²
 S/L = 540 / 1100 = 0.49
 Wu = 1.4 D.L. + 1.7 L.L. = 1222 KG/M²
 BOUNDARY : E TYPE

c) . SHEAR TRANSFER FRICTION REBAR:

$$\begin{aligned} \text{SHORT DIRECTION (Avs):} & 0 \text{ cm}^2/\text{M} \\ \text{LONG DIRECTION (Avl):} & 0 \text{ cm}^2/\text{M} \end{aligned}$$

c) SHORT DIRECTION :

FIND C COFFECTION FROM TABLE C = 0.063
 $-\mu = C * Wu * S^2 = 2501.28 \text{ KG-M/M}$
 $m = f_y / (0.85 * f'_c) = 15.69$
 $Rn = \mu / (Fi * B * d^2) = 9.07 \text{ KG/CM}^2/\text{M}$
 $p = [1 - (1 - 2 * m * Rn / f_y)^{0.5}] / m = 0.0033 > Pmin = 0.002$
 USE P= 0.0033 As = p * B * d = 5.82 cm²/M
 As+Avs/2= 5.82 cm²/M
 use # 4 @ 10.0 CM (AS= 12.70 cm²)
 --- (OK) ---

FIND C COFFECTION FROM TABLE C = 0.125
 $+\mu = C * Wu * S^2 = 4962.85 \text{ KG-M/M}$
 $m = f_y / (0.85 * f'_c) = 15.69$
 $Rn = \mu / (Fi * B * d^2) = 18.01 \text{ KG/CM}^2/\text{M}$
 $p = [1 - (1 - 2 * m * Rn / f_y)^{0.5}] / m = 0.0068 > Pmin = 0.002$
 USE P= 0.0068 As = p * B * d = 11.89 cm²/M
 As+Avs/2= 11.89 cm²/M
 use # 4 @ 10.0 CM (AS= 12.70 cm²)
 --- (OK) ---

d) LONG DIRECTION :

FIND C COFFECTION FROM TABLE C = 0.033
 $-\mu = C * Wu * S^2 = 1310.19 \text{ KG-M/M}$
 $m = f_y / (0.85 * f'_c) = 15.69$
 $Rn = \mu / (Fi * B * d^2) = 4.75 \text{ KG/CM}^2/\text{M}$
 $p = [1 - (1 - 2 * m * Rn / f_y)^{0.5}] / m = 0.0017 < Pmin = 0.002$
 USE P= 0.0020 As = p * B * d = 3.50 cm²/M
 As+Avl/2= 3.50 cm²/M
 use # 4 @ 27.5 CM (AS= 4.62 cm²)
 --- (OK) ---

FIND C COFFECTION FROM TABLE C = 0.050

$+\mu = C * Wu * S^2 = 1985.14 \text{ KG-M/M}$
 $m = f_y / (0.85 * f'_c) = 15.69$
 $Rn = \mu / (Fi * B * d^2) = 7.20 \text{ KG/CM}^2/\text{M}$
 $p = [1 - (1 - 2 * m * Rn / f_y)^{0.5}] / m = 0.0026 > Pmin = 0.002$
 USE P= 0.0026 As = p * B * d = 4.60 cm²/M
 As+Avl/2= 4.60 cm²/M
 use # 4 @ 27.5 CM (AS= 4.62 cm²)
 --- (OK) ---

e) SHORT DIRECTION SHEAR :

FIND C COFFECTION FROM TABLE C = 0.942

$$\begin{aligned} V_u &= C \cdot W_u \cdot (S - 2d) / 2 = & 2908 \text{ KG/M} \\ v_c &= f_i \cdot .53 \cdot F_c' \cdot .5 \cdot b \cdot d = & 11425 \text{ KG/M} \\ & & \text{-- (OK) --} \end{aligned}$$

S2 SLAB

a) . MATERIAL:

$$\begin{aligned} f'_c &= 210 \text{ kgf/cm}^2 \\ f_y &= 2800 \text{ kgf/cm}^2 \end{aligned}$$

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b) SIZE :          660      x          1350      ( S x L in CM )
  DEPTH:          25      CM
    d'   :          2.5      CM
    d    =         22.5
  BEAM WIDE=          30 CM
  DL     =          750 KG/M2
  LL     =          200 KG/M2
    S/L  =          660      /          1350      =          0.49
  Wu     = 1.4 D.L. + 1.7 L.L. =          1390 KG/M2
  BOUNDARY :          E          TYPE

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c) . SHEAR TRANSFER FRICTION REBAR:

SHORT DIRECTION (Avs): 0 cm²/M
LONG DIRECTION (Avl): 0 cm²/M

c) SHORT DIRECTION :

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FIND C COFFECTION FROM TABLE C = 0.063
-Mu = C * Wu * S^2 = 4169.21 KG-M/M
m = fy/(0.85*f'c) = 15.69
Rn = Mu/(Fi*B*d^2) = 9.15 KG/CM^2/M
p = [1-(1-2*m*Rn/fy)^0.5]/m = 0.0034 > Pmin = 0.002
USE P= 0.0034 As = p*B*d = 7.55 cm^2/M
As+Avs/2= 7.55 cm^2/M
use # 5 @ 12.5 CM ( AS= 15.92 cm^2 )
--- (OK) ---

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FIND C COFFECTION FROM TABLE C = 0.125
+Mu = C * Wu * S^2 = 8272.24 KG-M/M
m = fy/(0.85*f'c) = 15.69
Rn = Mu/(Fi*B*d^2) = 18.16 KG/CM^2/M
p = [1-(1-2*m*Rn/fy)^0.5]/m = 0.0069 > Pmin = 0.002
USE P= 0.0069 As = p*B*d = 15.42 cm^2/M
As+Avs/2= 15.42 cm^2/M
use # 5 @ 12.5 CM ( AS= 15.92 cm^2 )
--- (OK) ---

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d) LONG DIRECTION :

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FIND C COFFECTION FROM TABLE C = 0.033
-Mu = C * Wu * S^2 = 2183.87 KG-M/M
m = fy/(0.85*f'c) = 15.69
Rn = Mu/(Fi*B*d^2) = 4.79 KG/CM^2/M
p = [1-(1-2*m*Rn/fy)^0.5]/m = 0.0017 < Pmin 0.002
USE P= 0.0020 As = p*B*d = 4.50 cm^2/M
As+Avl/2= 4.50 cm^2/M
use # 5 @ 32.5 CM ( AS= 6.12 cm^2 )
--- (OK) ---

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FIND C COFFECTION FROM TABLE  C =          0.050

+Mu = C * Wu * S^2 =          3308.90 KG-M/M
m    = fy/(0.85*f'c)    =          15.69
Rn   = Mu/(Fi*B*d^2)    =          7.26 KG/CM^2/M
p    = [1-(1-2*m*Rn/fy)^0.5]/m =          0.0026  > Pmin =          0.002
USE P=          0.0026      As    = p*B*d    =          5.96  cm^2/M
                                As+Avl/2=          5.96  cm^2/M
                                use #      5      @          32.5  CM ( AS=          6.12  cm^2 )
                                --- (OK) ---

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e) SHORT DIRECTION SHEAR :

FIND C COFFECTION FROM TABLE C = 0.942

$$\begin{aligned} V_u &= C \cdot W_u \cdot (S - 2d) / 2 = & 4028 \text{ KG/M} \\ v_c &= f_i \cdot .53 \cdot F_c' \cdot .5 \cdot b \cdot d = & 14689 \text{ KG/M} \\ & & \text{-- (OK) --} \end{aligned}$$