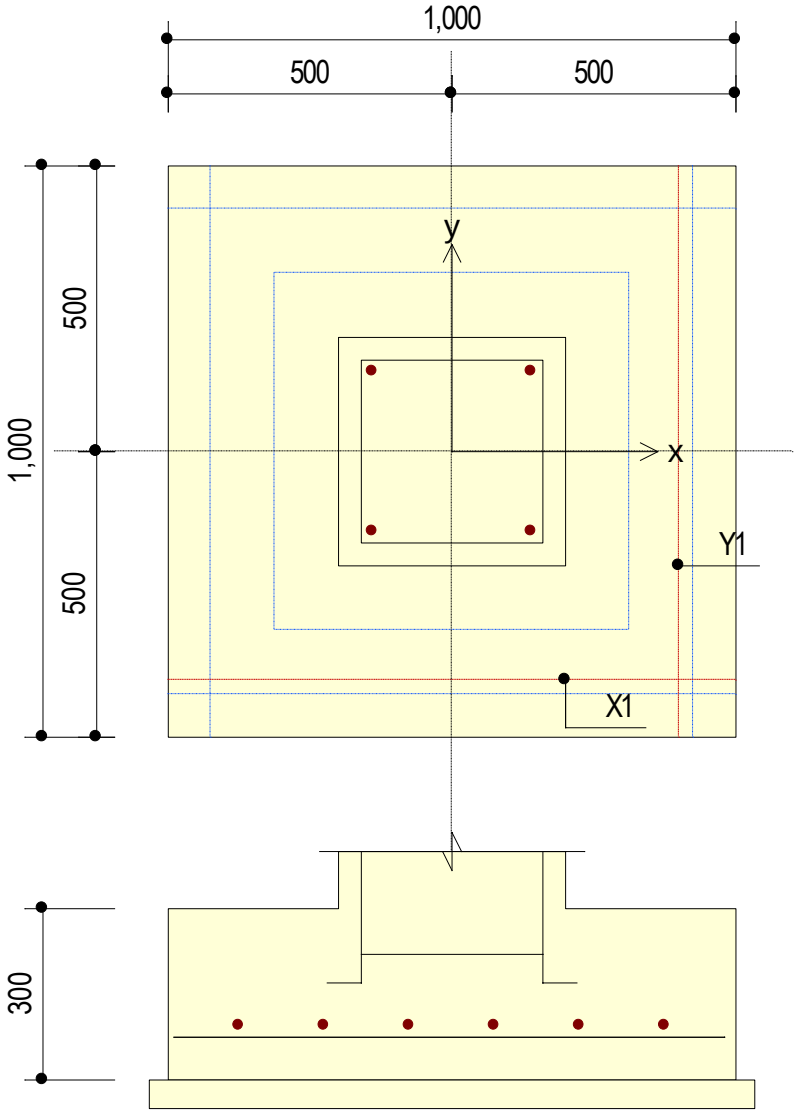
■ MEMBER NAME : F01

1. General Information

(1) Design Code : ACI318M-14
(2) Unit System : N, mm

2. Material

(1) F'_c : 18.00MPa
(2) F_y : 413MPa



3. Section

(1) Section Size

- Depth : 300mm
- Cover : 75.00mm

(2) Column Section

- Shape of Column : Rectangle
- Section : 400x400mm

4. Rebar

(1) Direction Y

- Layer 1 : #4@150 (A_s = 860mm²)

(2) Direction X

- Layer 1 : #4@150 (A_s = 860mm²)

5. Foundation

(1) Foundation Size

- L_x : 1.000m
- L_y : 1.000m
- f_e : 110KPa

6. Design Load

(1) Service Load

- P_s : 82.00kN
- M_{sx} : 2.000kN·m
- M_{sy} : 2.000kN·m

(2) Factored Load

- P_u : 116kN
- M_{ux} : 3.000kN·m
- M_{uy} : 3.000kN·m

(3) Surcharge Load is not considered.

(4) Self weight is considered.

7. Check Soil Capacity

(1) Calculate actual soil stress (KPa)

- $q_{s.top\text{-}left}$ = 88.83 $q_{s.top\text{-}right}$ = 109
- $q_{s.bot\text{-}left}$ = 64.83 $q_{s.bot\text{-}right}$ = 88.83
- $q_{s.max}$ = 109
- $q_{s.max} / f_e$ = 0.98 → OK

(2) Calculate factored soil stress (KPa)

- $q_{u.top\text{-}left}$ = 124 $q_{u.top\text{-}right}$ = 160
- $q_{u.bot\text{-}left}$ = 88.20 $q_{u.bot\text{-}right}$ = 124
- $q_{u.max}$ = 160 $q_{u.min}$ = 88.20

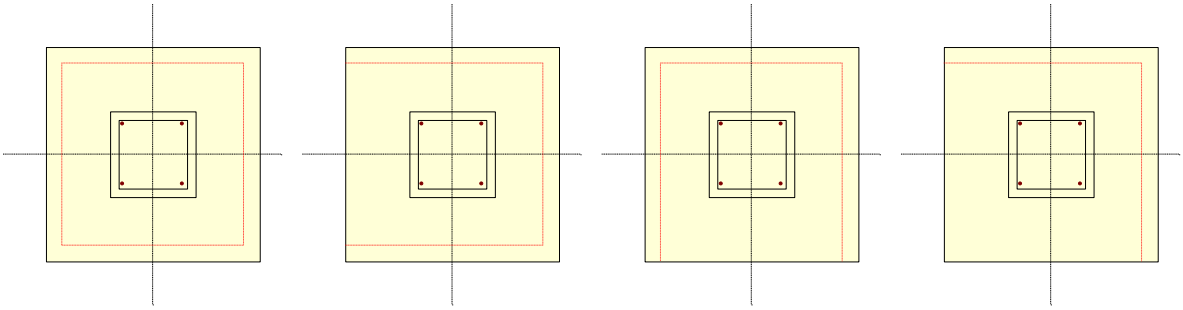
8. Check Shear

(1) Calculate one-way shear

- ø = 0.750
- V_{ux} = 8.989kN $øV_{cx}$ = 118kN
- V_{ux} / $øV_{cx}$ = 0.0760 → O.K
- V_{uy} = 10.75kN $øV_{cy}$ = 111kN
- V_{uy} / $øV_{cy}$ = 0.0965 → O.K

(2) Calculate two-way shear

-	b_0 (mm)	V_{c1} (kN)	V_{c2} (kN)	V_{c3} (kN)	V_c (kN)	V_u (kN)	$øV_c$ (kN)	Ratio
Interior	2,475	1,171	1,054	758	758	71.60	568	0.126
Edge(X)	2,237	1,058	850	685	685	56.95	514	0.111
Edge(Y)	2,237	1,058	850	685	685	56.95	514	0.111
Corner	1,619	766	586	496	496	37.79	372	0.102



- ø = 0.750
- d = 219mm
- $V_{c1} = 0.17\left(1 + \frac{2}{\beta}\right)\sqrt{f'_c}\ b_0\ d$
- $V_{c2} = 0.083\left(\frac{a_s\ d}{b_0} + 2\right)\sqrt{f'_c}\ b_0\ d$
- $V_{c3} = 0.33\sqrt{f'_c}\ b_0\ d$
- V_c = min(V_{c1} , V_{c2} , V_{c3})
- V_u = 71.60kN
- V_u / $øV_c$ = 0.126 → O.K

9. Check Moment Capacity

(1) Calculate moment capacity (Direction X)

- ø = 0.900
- M_{uy} = 5.868kN·m $øM_{ny}$ = 66.20kN·m
- M_{uy} / $øM_{ny}$ = 0.0886 → O.K

(2) Calculate moment capacity (Direction Y)

- ø = 0.900
- M_{ux} = 5.868kN·m $øM_{nx}$ = 62.14kN·m
- M_{ux} / $øM_{nx}$ = 0.0944 → O.K

10. Check Rebar

(1) Calculate minimum rebar area required

- $A_{s.min}$ = 0.00180D = 540mm²

(2) Calculate minimum rebar space required (Direction Y)

- A_s = 129mm² (#4@150)
- $s_{req.}$ = 239mm
- s_x = 150mm < $s_{req.}$ = 239mm → O.K

(3) Calculate minimum rebar space required (Direction X)

- A_s = 129mm² (#4@150)
- $s_{req.}$ = 239mm
- s_y = 150mm < $s_{req.}$ = 239mm → O.K
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