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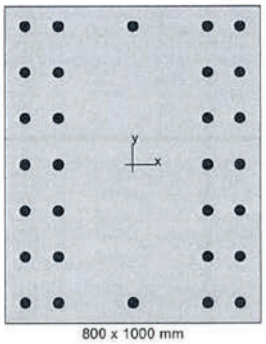
6.2. MM at P=13010 [kN]

เสา C6 ชั้น 6 ถึง ชั้น หลังคา



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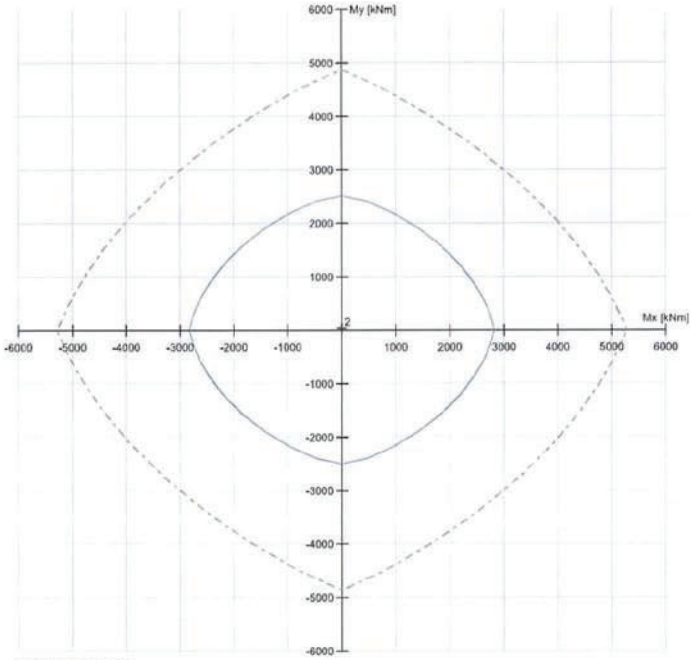

MM at P=13010.0 [kN]

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	800000 mm²
I_x	6.66667e+010 mm⁴
I_y	4.26667e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	29460 mm²
Rho	3.68 %
Min. clear spacing	66 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
2	13010.0	0.0	40.0	18047.93	0.00	40.00	0.72

Max. Capacity Ratio: 0.72

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spColumn

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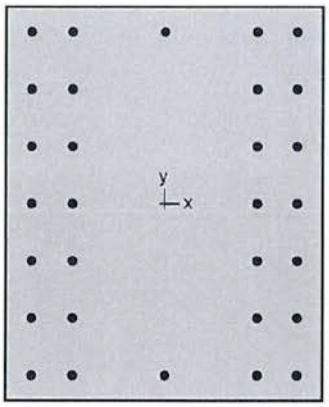
Computer program for the Strength Design of Reinforced Concrete Sections

เสา C9 ชั้น 2 ถึง ชั้น 5



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เสา C9 ชั้น 2 ถึง ชั้น 5

1. General Information

File Name	C:\193018\GCDT\SPcloumn\16-11-63(C3...\C9_2-5.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	800000	mm^2
I_x	6.66667e+010	mm^4
I_y	4.26667e+010	mm^4
r_x	288.675	mm
r_y	230.94	mm
X_o	0	mm
Y_o	0	mm

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เสา C9 ชั้น 2 ถึง ชั้น 5

3.2. Section Figure

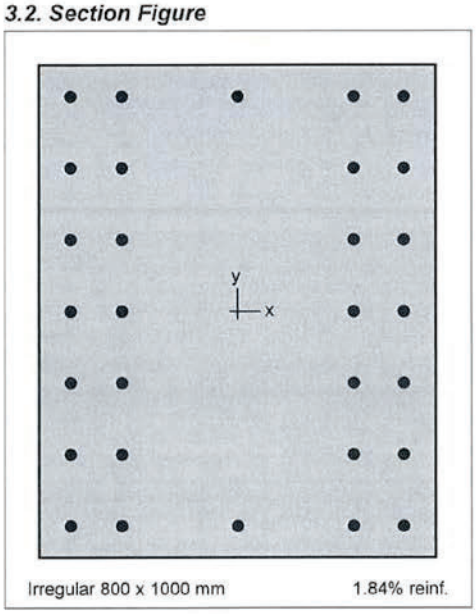

Figure 1: Column section

3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-400.0	-500.0	2	400.0	-500.0	3	400.0	500.0
4	-400.0	500.0						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

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4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---

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Bars	---
Total steel area, A_s	14730 mm^2
Rho	1.84 %
Minimum clear spacing	76 mm

4.4. Bars Provided

Area mm^2	X mm	Y mm	Area mm^2	X mm	Y mm	Area mm^2	X mm	Y mm
491.0	-336.0	-436.0	491.0	-336.0	-290.7	491.0	-336.0	-145.3
491.0	-336.0	0.0	491.0	-336.0	145.3	491.0	-336.0	290.7
491.0	-336.0	436.0	491.0	336.0	-436.0	491.0	336.0	-290.7
491.0	336.0	-145.3	491.0	336.0	0.0	491.0	336.0	145.3
491.0	336.0	290.7	491.0	336.0	436.0	491.0	-232.5	436.0
491.0	1.3	436.0	491.0	235.0	436.0	491.0	-232.5	-436.0
491.0	1.3	-436.0	491.0	235.0	-436.0	491.0	-232.5	-290.7
491.0	-232.5	-145.3	491.0	-232.5	0.0	491.0	-232.5	145.3
491.0	-232.5	290.7	491.0	235.0	-290.7	491.0	235.0	-145.3
491.0	235.0	0.0	491.0	235.0	145.3	491.0	235.0	290.7

5. Factored Loads and Moments with Corresponding Capacity Ratios*

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	Ratio
	kN	kNm	kNm	kN	kNm	kNm	mm			
1	1120.00	20.00	120.00	0.00	286.97	1721.84	170	0.01207	0.900	0.38
2	6750.00	10.00	40.00	15211.97	10.00	40.00	926	-0.00018	0.650	0.44
3	2520.00	520.00	100.00	0.00	2116.13	406.95	274	0.00868	0.900	0.42
4	4570.00	110.00	1240.00	82.94	156.13	1759.97	151	0.01311	0.900	0.65

* Factored Load และ Moment (พร้อม Capacity Ratio) ที่กระทำต่อ เสา C9 ชั้น 2 ถึง ชั้น 5

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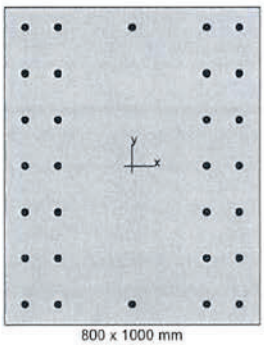
6. Diagrams

6.1. PM at θ=85 [deg]

เสา C9 ชั้น 2 ถึง ชั้น 5



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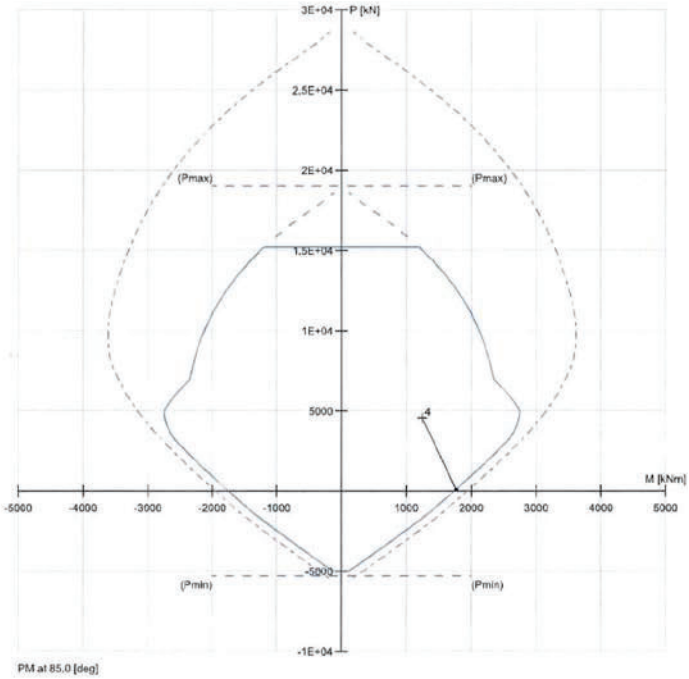

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	800000 mm²
I_x	6.66667e+010 mm⁴
I_y	4.26667e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	14730 mm²
Rho	1.84 %
Min. clear spacing	76 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	4570.0	110.0	1240.0	82.94	156.13	1759.97	0.65

Max. Capacity Ratio: 0.65

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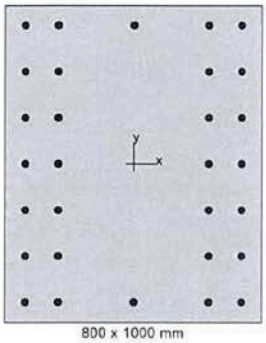
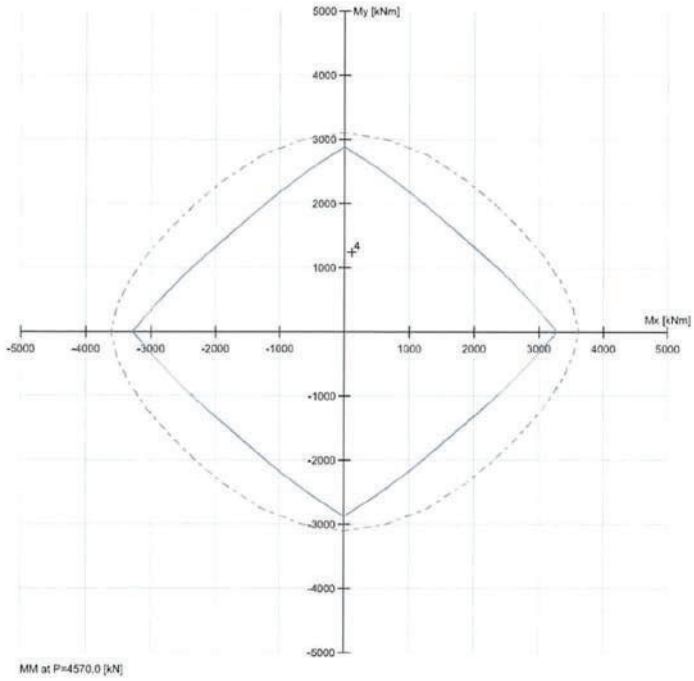
6.2. MM at P=4570 [kN]

เสา C9 ชั้น 2 ถึง ชั้น 5





General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	800000 mm²
I_x	6.66667e+010 mm⁴
I_y	4.26667e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	14730 mm²
Rho	1.84 %
Min. clear spacing	76 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	4570.0	110.0	1240.0	82.94	156.13	1759.97	0.65

Max. Capacity Ratio: 0.65

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Computer program for the Strength Design of Reinforced Concrete Sections

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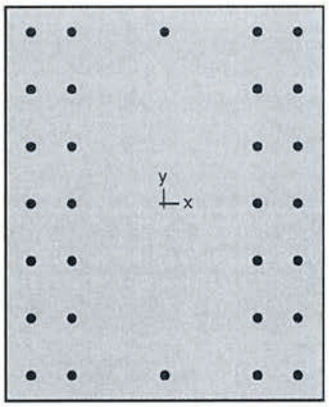

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1. General Information

File Name	C:\193018\GCDT\SPcloumn\16-11-63...\C9_6-Roof.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

เสา C9 ชั้น 6 ถึง ชั้น หลังคา

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	800000	mm^2
I_x	6.66667e+010	mm^4
I_y	4.26667e+010	mm^4
r_x	288.675	mm
r_y	230.94	mm
X_o	0	mm
Y_o	0	mm

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3.2. Section Figure

เสา C9 ชั้น 6 ถึง ชั้น หลังคา

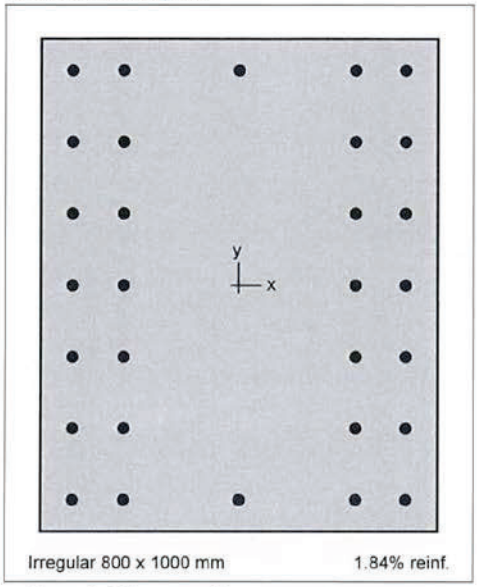

Figure 1: Column section

3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-400.0	-500.0	2	400.0	-500.0	3	400.0	500.0
4	-400.0	500.0						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

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4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---

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เสา C9 ชั้น 6 ถึง ชั้น หลังคา

Bars	---
Total steel area, A_s	14730 mm²
Rho	1.84 %
Minimum clear spacing	76 mm

4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-336.0	-436.0	491.0	-336.0	-290.7	491.0	-336.0	-145.3
491.0	-336.0	0.0	491.0	-336.0	145.3	491.0	-336.0	290.7
491.0	-336.0	436.0	491.0	336.0	-436.0	491.0	336.0	-290.7
491.0	336.0	-145.3	491.0	336.0	0.0	491.0	336.0	145.3
491.0	336.0	290.7	491.0	336.0	436.0	491.0	-232.5	436.0
491.0	1.3	436.0	491.0	235.0	436.0	491.0	-232.5	-436.0
491.0	1.3	-436.0	491.0	235.0	-436.0	491.0	-232.5	-290.7
491.0	-232.5	-145.3	491.0	-232.5	0.0	491.0	-232.5	145.3
491.0	-232.5	290.7	491.0	235.0	-290.7	491.0	235.0	-145.3
491.0	235.0	0.0	491.0	235.0	145.3	491.0	235.0	290.7

5. Factored Loads and Moments with Corresponding Capacity Ratios *

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity
	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	NA Depth mm	ε_t	ϕ	Ratio
1	120.00	0.00	0.00	388.06	2340.46	0.00	197	0.01127	0.900	0.29
2	4000.00	10.00	90.00	0.00	192.50	1732.54	155	0.01298	0.900	0.34
3	2060.00	140.00	50.00	0.00	1992.72	711.69	338	0.00712	0.900	0.25
4	2630.00	10.00	190.00	0.00	91.79	1743.95	139	0.01395	0.900	0.42

* Factored Load และ Moment (พร้อม Capacity Ratio) ที่กระทำต่อ เสา C9 ชั้น 6 ถึง ชั้น หลังคา

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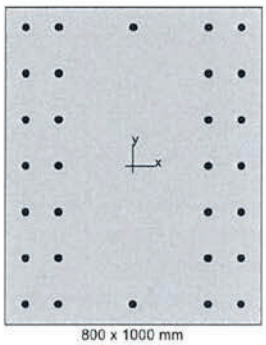
6. Diagrams

6.1. PM at θ=87 [deg]

เสา C9 ชั้น 6 ถึง ชั้น หลังคา



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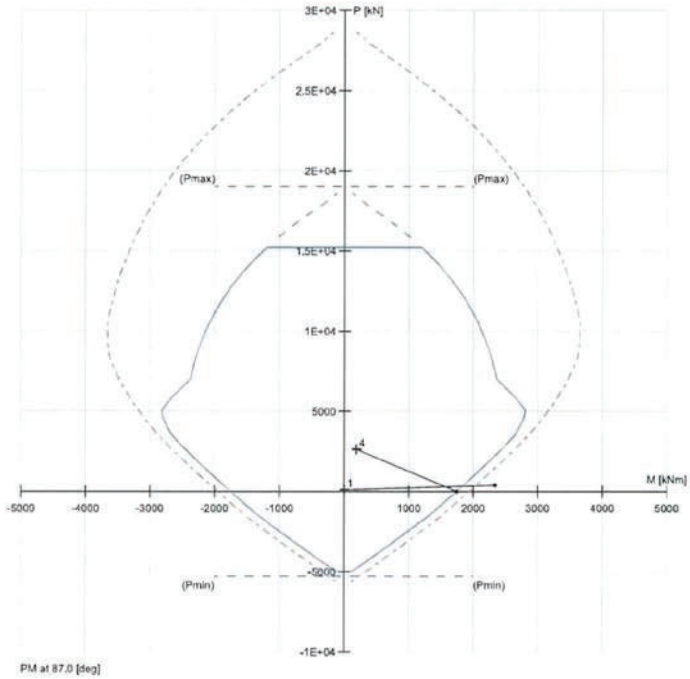

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	800000 mm²
I_x	6.66667e+010 mm⁴
I_y	4.26667e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	14730 mm²
Rho	1.84 %
Min. clear spacing	76 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	2630.0	10.0	190.0	0.00	91.79	1743.95	0.42
1	120.0	0.0	0.0	388.06	2340.46	0.00	0.29

Max. Capacity Ratio: 0.42

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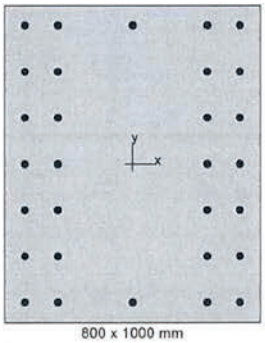
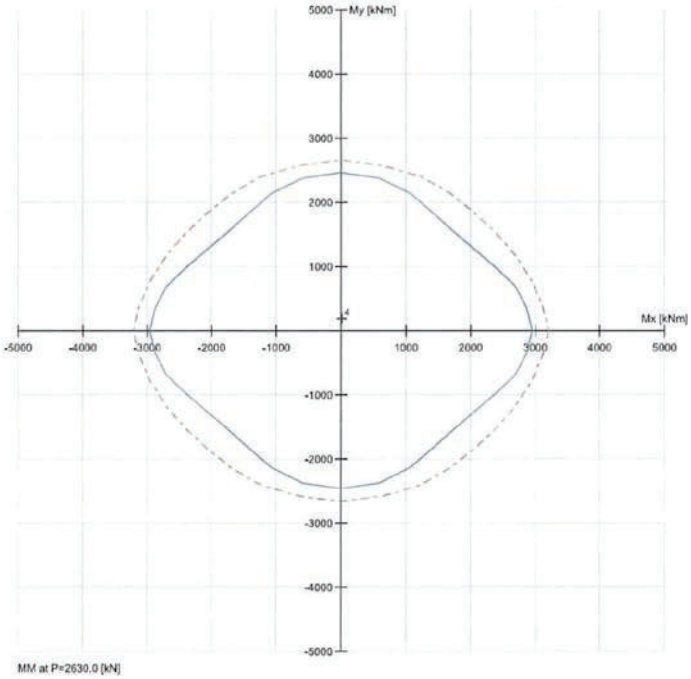
6.2. MM at P=2630 [kN]

เสา C9 ชั้น 6 ถึง ชั้น หลังคา



800 x 1000 mm



General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	800000 mm²
I_x	6.66667e+010 mm⁴
I_y	4.26667e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	14730 mm²
Rho	1.84 %
Min. clear spacing	76 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	2630.0	10.0	190.0	0.00	91.79	1743.95	0.42

Max. Capacity Ratio: 0.42

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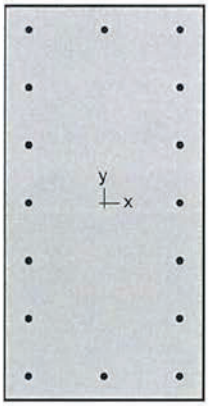
spColumn

เสา C10 ชั้น 2 ถึง ชั้น 5



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1. General Information

File Name	C:\193018\GCDT\SPcloumn\16-11-63(C...\C10_2-5.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

เสา C10 ชั้น 2 ถึง ชั้น 5

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	500000	mm^2
I_x	4.16667e+010	mm^4
I_y	1.04167e+010	mm^4
r_x	288.675	mm
r_y	144.338	mm
X_o	0	mm
Y_o	0	mm

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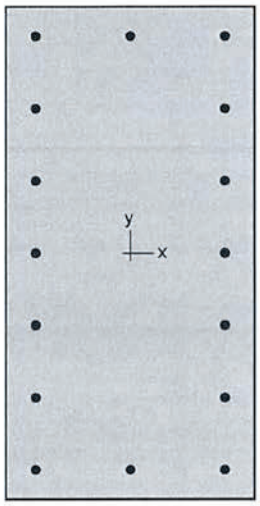
เสา C10 ชั้น 2 ถึง ชั้น 5

3.2. Section Figure



Irregular 500 x 1000 mm 1.00% reinf.

Figure 1: Column section

3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-250.0	-500.0	2	250.0	-500.0	3	250.0	500.0
4	-250.0	500.0						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

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4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---

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เสา C10 ชั้น 2 ถึง ชั้น 5

Clear cover	---
Bars	---
Total steel area, A_s	5024 mm²
Rho	1.00 %
Minimum clear spacing	127 mm

4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	-190.0	-293.3	314.0	-190.0	-146.7	314.0	-190.0	0.0
314.0	-190.0	146.7	314.0	-190.0	293.3	314.0	190.0	-293.3
314.0	190.0	-146.7	314.0	190.0	0.0	314.0	190.0	146.7
314.0	190.0	293.3	314.0	-190.0	440.0	314.0	0.0	440.0
314.0	190.0	440.0	314.0	-190.0	-440.0	314.0	0.0	-440.0
314.0	190.0	-440.0						

5. Factored Loads and Moments with Corresponding Capacity Ratios*

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity
	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	NA Depth mm	ε_t	ϕ	Ratio
1	4220.00	20.00	10.00	8702.27	20.00	10.00	809	0.00008	0.650	0.48
2	640.00	3.00	50.00	0.00	23.20	386.67	59	0.02077	0.900	0.62
3	2990.00	290.00	190.00	0.00	520.06	340.73	190	0.00822	0.900	0.56
4	2990.00	680.00	40.00	340.37	932.96	54.88	179	0.01381	0.900	0.66

* Factored Load และ Moment (พร้อม Capacity Ratio) ที่กระทำต่อ เสา C3 ชั้น 6 ถึง ชั้น 5

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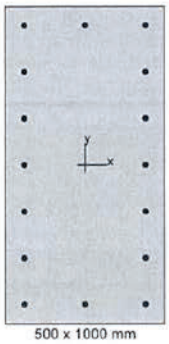
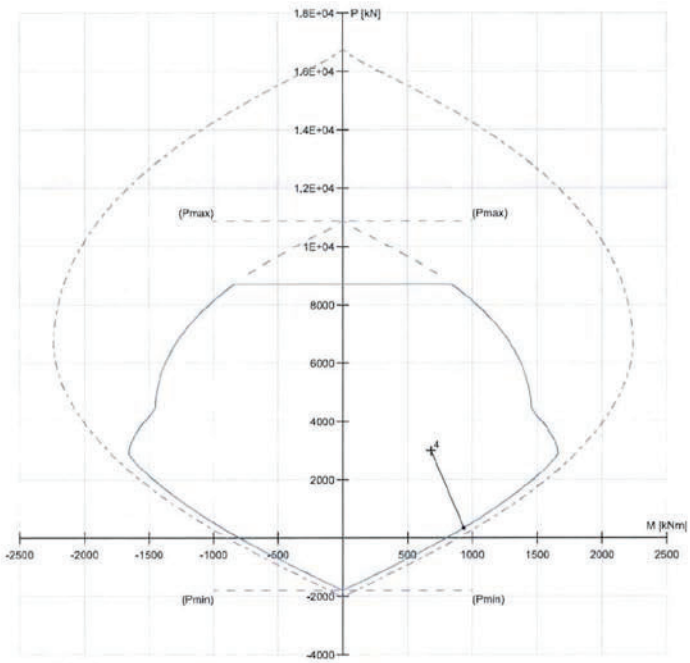
6. Diagrams

6.1. PM at θ=3 [deg]

เสา C10 ชั้น 2 ถึง ชั้น 5





PM at 3.0 [deg]

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	500000 mm²
I_x	4.16667e+010 mm⁴
I_y	1.04167e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	5024 mm²
Rho	1.00 %
Min. clear spacing	127 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	2990.0	680.0	40.0	340.37	932.96	54.88	0.66

Max. Capacity Ratio: 0.66

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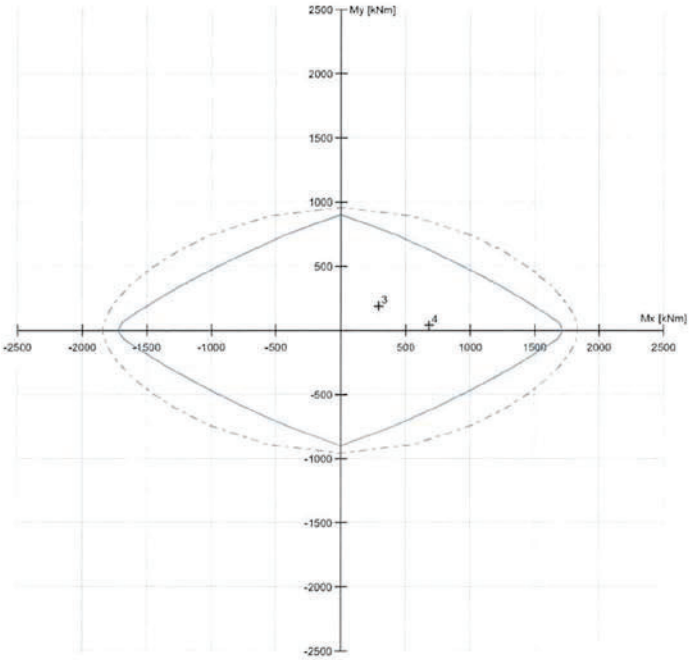
6.2. MM at P=2990 [kN]

เสา C10 ชั้น 2 ถึง ชั้น 5

500 x 1000 mm



MM at P=2990.0 [kN]

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	500000 mm²
I_x	4.16667e+010 mm⁴
I_y	1.04167e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	5024 mm²
Rho	1.00 %
Min. clear spacing	127 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	2990.0	680.0	40.0	340.37	932.96	54.88	0.66
3	2990.0	290.0	190.0	0.00	520.06	340.73	0.56

Max. Capacity Ratio: 0.66

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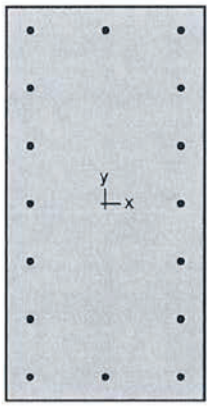
spColumn

spColumn v6.50
Computer program for the Strength Design of Reinforced Concrete Sections

เสา C10 ชั้น 6 ถึง ชั้น หลังคา



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StructurePoint

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1. General Information

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Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

เสา C10 ชั้น 6 ถึง ชั้น หลังคา

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	500000	mm^2
I_x	4.16667e+010	mm^4
I_y	1.04167e+010	mm^4
r_x	288.675	mm
r_y	144.338	mm
X_o	0	mm
Y_o	0	mm

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3.2. Section Figure

เสา C10 ชั้น 6 ถึง ชั้น หลังคา

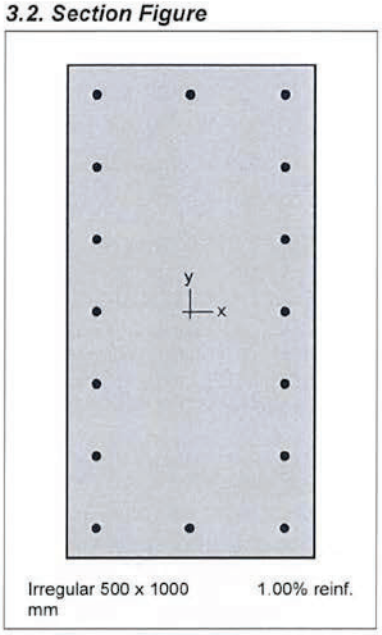

Figure 1: Column section

3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-250.0	-500.0	2	250.0	-500.0	3	250.0	500.0
4	-250.0	500.0						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

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4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---

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Clear cover	---
Bars	---
Total steel area, A_s	5024 mm²
Rho	1.00 %
Minimum clear spacing	127 mm

เสา C10 ชั้น 6 ถึง ชั้น หลังคา

4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	-190.0	-293.3	314.0	-190.0	-146.7	314.0	-190.0	0.0
314.0	-190.0	146.7	314.0	-190.0	293.3	314.0	190.0	-293.3
314.0	190.0	-146.7	314.0	190.0	0.0	314.0	190.0	146.7
314.0	190.0	293.3	314.0	-190.0	440.0	314.0	0.0	440.0
314.0	190.0	440.0	314.0	-190.0	-440.0	314.0	0.0	-440.0
314.0	190.0	-440.0						

5. Factored Loads and Moments with Corresponding Capacity Ratios*

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity
	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	NA Depth mm	ε_t	ϕ	Ratio
1	60.00	0.00	0.00	222.00	899.07	0.00	132	0.01838	0.900	0.49
2	2660.00	0.00	0.00	222.00	899.07	0.00	132	0.01838	0.900	0.42
3	2130.00	60.00	20.00	0.00	713.98	237.99	258	0.00864	0.900	0.39
4	1030.00	100.00	10.00	0.00	797.07	79.71	172	0.01460	0.900	0.54

* Factored Load และ Moment (พร้อม Capacity Ratio) ที่กระทำต่อ เสา C10 ชั้น 6 ถึง ชั้น หลังคา

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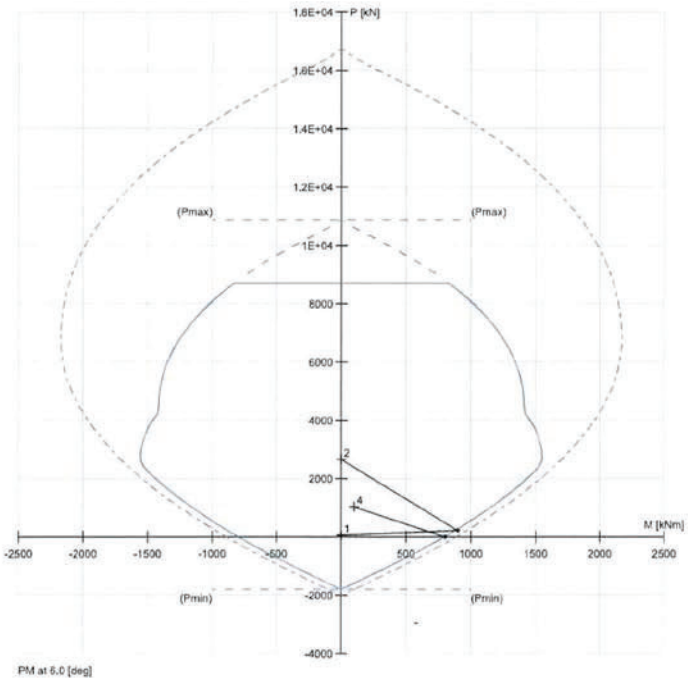
6. Diagrams

6.1. PM at θ=6 [deg]

เสา C10 ชั้น 6 ถึง ชั้น หลังคา

500 x 1000 mm



General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	500000 mm²
I_x	4.16667e+010 mm⁴
I_y	1.04167e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	5024 mm²
Rho	1.00 %
Min. clear spacing	127 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	1030.0	100.0	10.0	0.00	797.07	79.71	0.54
1	60.0	0.0	0.0	222.00	899.07	0.00	0.49
2	2660.0	0.0	0.0	222.00	899.07	0.00	0.42

Max. Capacity Ratio: 0.54

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6.2. MM at P=1030 [kN]

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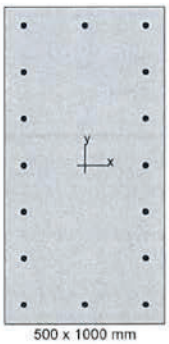

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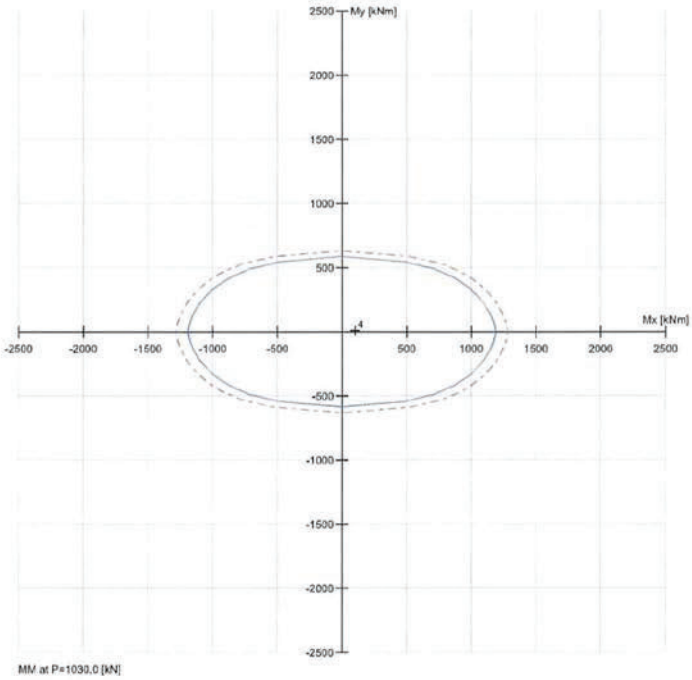

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	35 MPa
E_c	27805.6 MPa
f_y	400 MPa
E_s	200000 MPa

Section	
Type	Irregular
A_g	500000 mm²
I_x	4.16667e+010 mm⁴
I_y	1.04167e+010 mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	5024 mm²
Rho	1.00 %
Min. clear spacing	127 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
4	1030.0	100.0	10.0	0.00	797.07	79.71	0.54

Max. Capacity Ratio: 0.54

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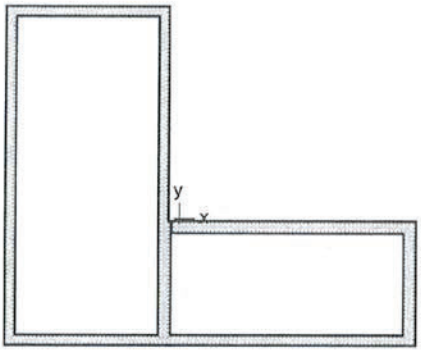
spColumn

spColumn v6.50
Computer program for the Strength Design of Reinforced Concrete Sections

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา



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StructurePoint

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1. General Information

File Name	c:\193018\gcdt\spcloumn\25-08-63\c4-p2-l1.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	1.00675e+007	mm^2
I_x	7.5098e+013	mm^4
I_y	1.04135e+014	mm^4
r_x	2731.2	mm
r_y	3216.16	mm
X_o	0.000813707	mm
Y_o	-0.000406854	mm

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3.2. Section Figure

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา

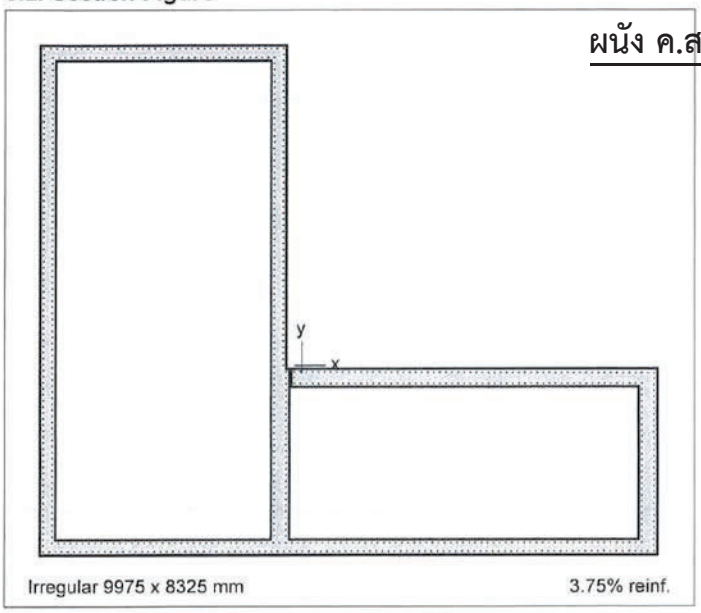

Figure 1: Column section

3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	5745.3	-54.7	2	-179.7	-54.7	3	-179.7	-354.7
4	5445.3	-354.7	5	5445.3	-2854.7	6	-204.7	-2854.7
7	-204.7	-54.7	8	-254.7	-54.7	9	-254.7	5220.3
10	-4229.7	5220.3	11	-4229.7	-3104.7	12	5745.3	-3104.7

3.4. Interior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-3979.7	-2854.7	2	-3979.7	4970.3	3	-504.7	4970.3
4	-504.7	-2854.7						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9

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Compression controlled ϕ, (c)	0.65

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา

4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Total steel area, A_s	377088 mm²
Rho	3.75 %
Minimum clear spacing	71 mm

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4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-4177.2	-3048.0	491.0	-4177.2	-2949.0	491.0	-4177.2	-2850.0
491.0	-4177.2	-2751.0	491.0	-4177.2	-2652.1	491.0	-4177.2	-2553.1
491.0	-4177.2	-2454.1	491.0	-4177.2	-2355.1	491.0	-4177.2	-2256.1
491.0	-4177.2	-2157.1	491.0	-4177.2	-2058.1	491.0	-4177.2	-1959.2
491.0	-4177.2	-1860.2	491.0	-4177.2	-1761.2	491.0	-4177.2	-1662.2
491.0	-4177.2	-1563.2	491.0	-4177.2	-1464.2	491.0	-4177.2	-1365.3
491.0	-4177.2	-1266.3	491.0	-4177.2	-1167.3	491.0	-4177.2	-1068.3
491.0	-4177.2	-969.3	491.0	-4177.2	-870.3	491.0	-4177.2	-771.3
491.0	-4177.2	-672.4	491.0	-4177.2	-573.4	491.0	-4177.2	-474.4
491.0	-4177.2	-375.4	491.0	-4177.2	-276.4	491.0	-4177.2	-177.4
491.0	-4177.2	-78.4	491.0	-4177.2	20.5	491.0	-4177.2	119.5
491.0	-4177.2	218.5	491.0	-4177.2	317.5	491.0	-4177.2	416.5
491.0	-4177.2	515.5	491.0	-4177.2	614.4	491.0	-4177.2	713.4
491.0	-4177.2	812.4	491.0	-4177.2	911.4	491.0	-4177.2	1010.4
491.0	-4177.2	1109.4	491.0	-4177.2	1208.4	491.0	-4177.2	1307.3
491.0	-4177.2	1406.3	491.0	-4177.2	1505.3	491.0	-4177.2	1604.3
491.0	-4177.2	1703.3	491.0	-4177.2	1802.3	491.0	-4177.2	1901.3
491.0	-4177.2	2000.2	491.0	-4177.2	2099.2	491.0	-4177.2	2198.2
491.0	-4177.2	2297.2	491.0	-4177.2	2396.2	491.0	-4177.2	2495.2
491.0	-4177.2	2594.1	491.0	-4177.2	2693.1	491.0	-4177.2	2792.1
491.0	-4177.2	2891.1	491.0	-4177.2	2990.1	491.0	-4177.2	3089.1
491.0	-4177.2	3188.1	491.0	-4177.2	3287.0	491.0	-4177.2	3386.0
491.0	-4177.2	3485.0	491.0	-4177.2	3584.0	491.0	-4177.2	3683.0
491.0	-4177.2	3782.0	491.0	-4177.2	3881.0	491.0	-4177.2	3979.9
491.0	-4177.2	4078.9	491.0	-4177.2	4177.9	491.0	-4177.2	4276.9
491.0	-4177.2	4375.9	491.0	-4177.2	4474.9	491.0	-4177.2	4573.8
491.0	-4177.2	4672.8	491.0	-4177.2	4771.8	491.0	-4177.2	4870.8
491.0	-4177.2	4969.8	491.0	-4177.2	5068.8	491.0	-4177.2	5167.8
491.0	-4077.5	-3048.0	491.0	-4032.2	-2907.2	491.0	-4032.2	-2808.1
491.0	-4032.2	-2709.0	491.0	-4032.2	-2609.9	491.0	-4032.2	-2510.7
491.0	-4032.2	-2411.6	491.0	-4032.2	-2312.5	491.0	-4032.2	-2213.4
491.0	-4032.2	-2114.2	491.0	-4032.2	-2015.1	491.0	-4032.2	-1916.0
491.0	-4032.2	-1816.9	491.0	-4032.2	-1717.7	491.0	-4032.2	-1618.6
491.0	-4032.2	-1519.5	491.0	-4032.2	-1420.4	491.0	-4032.2	-1321.2
491.0	-4032.2	-1222.1	491.0	-4032.2	-1123.0	491.0	-4032.2	-1023.9
491.0	-4032.2	-924.7	491.0	-4032.2	-825.6	491.0	-4032.2	-726.5
491.0	-4032.2	-627.4	491.0	-4032.2	-528.2	491.0	-4032.2	-429.1
491.0	-4032.2	-330.0	491.0	-4032.2	-230.9	491.0	-4032.2	-131.7
491.0	-4032.2	-32.6	491.0	-4032.2	66.5	491.0	-4032.2	165.6
491.0	-4032.2	264.8	491.0	-4032.2	363.9	491.0	-4032.2	463.0
491.0	-4032.2	562.1	491.0	-4032.2	661.3	491.0	-4032.2	760.4
491.0	-4032.2	859.5	491.0	-4032.2	958.6	491.0	-4032.2	1057.8
491.0	-4032.2	1156.9	491.0	-4032.2	1256.0	491.0	-4032.2	1355.1

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-4032.2	1454.3	491.0	-4032.2	1553.4	491.0	-4032.2	1652.5
491.0	-4032.2	1751.6	491.0	-4032.2	1850.8	491.0	-4032.2	1949.9
491.0	-4032.2	2049.0	491.0	-4032.2	2148.1	491.0	-4032.2	2247.3
491.0	-4032.2	2346.4	491.0	-4032.2	2445.5	491.0	-4032.2	2544.6
491.0	-4032.2	2643.8	491.0	-4032.2	2742.9	491.0	-4032.2	2842.0
491.0	-4032.2	2941.1	491.0	-4032.2	3040.3	491.0	-4032.2	3139.4
491.0	-4032.2	3238.5	491.0	-4032.2	3337.6	491.0	-4032.2	3436.8
491.0	-4032.2	3535.9	491.0	-4032.2	3635.0	491.0	-4032.2	3734.1
491.0	-4032.2	3833.3	491.0	-4032.2	3932.4	491.0	-4032.2	4031.5
491.0	-4032.2	4130.6	491.0	-4032.2	4229.8	491.0	-4032.2	4328.9
491.0	-4032.2	4428.0	491.0	-4032.2	4527.1	491.0	-4032.2	4626.3
491.0	-4032.2	4725.4	491.0	-4032.2	4824.5	491.0	-4032.2	4923.6
491.0	-4032.2	5022.8	491.0	-3977.8	-3048.1	491.0	-3932.9	-2907.2
491.0	-3932.7	5022.8	491.0	-3878.1	-3048.1	491.0	-3833.6	-2907.2
491.0	-3833.3	5022.8	491.0	-3778.4	-3048.2	491.0	-3734.4	-2907.2
491.0	-3733.8	5022.8	491.0	-3678.7	-3048.2	491.0	-3635.1	-2907.2
491.0	-3634.4	5022.8	491.0	-3579.0	-3048.3	491.0	-3535.8	-2907.2
491.0	-3535.0	5022.8	491.0	-3479.3	-3048.3	491.0	-3436.5	-2907.2
491.0	-3435.5	5022.8	491.0	-3379.6	-3048.3	491.0	-3337.3	-2907.2
491.0	-3336.1	5022.8	491.0	-3279.9	-3048.4	491.0	-3238.0	-2907.2
491.0	-3236.6	5022.8	491.0	-3180.2	-3048.4	491.0	-3138.7	-2907.2
491.0	-3137.2	5022.8	491.0	-3080.5	-3048.5	491.0	-3039.5	-2907.2
491.0	-3037.7	5022.8	491.0	-2980.8	-3048.5	491.0	-2940.2	-2907.2
491.0	-2938.3	5022.8	491.0	-2881.1	-3048.6	491.0	-2840.9	-2907.2
491.0	-2838.8	5022.8	491.0	-2781.4	-3048.6	491.0	-2741.7	-2907.2
491.0	-2739.4	5022.8	491.0	-2681.7	-3048.6	491.0	-2642.4	-2907.2
491.0	-2640.0	5022.8	491.0	-2582.0	-3048.7	491.0	-2543.1	-2907.2
491.0	-2540.5	5022.8	491.0	-2482.3	-3048.7	491.0	-2443.8	-2907.2
491.0	-2441.1	5022.8	491.0	-2382.6	-3048.8	491.0	-2344.6	-2907.2
491.0	-2341.6	5022.8	491.0	-2282.9	-3048.8	491.0	-2245.3	-2907.2
491.0	-2242.2	5022.8	491.0	-2183.2	-3048.9	491.0	-2146.0	-2907.2
491.0	-2142.7	5022.8	491.0	-2083.5	-3048.9	491.0	-2046.8	-2907.2
491.0	-2043.3	5022.8	491.0	-1983.8	-3048.9	491.0	-1947.5	-2907.2
491.0	-1943.8	5022.8	491.0	-1884.1	-3049.0	491.0	-1848.2	-2907.2
491.0	-1844.4	5022.8	491.0	-1784.4	-3049.0	491.0	-1748.9	-2907.2
491.0	-1744.9	5022.8	491.0	-1684.7	-3049.1	491.0	-1649.7	-2907.2
491.0	-1645.5	5022.8	491.0	-1585.1	-3049.1	491.0	-1550.4	-2907.2
491.0	-1546.1	5022.8	491.0	-1485.4	-3049.2	491.0	-1451.1	-2907.2
491.0	-1446.6	5022.8	491.0	-1385.7	-3049.2	491.0	-1351.9	-2907.2
491.0	-1347.2	5022.8	491.0	-1286.0	-3049.2	491.0	-1252.6	-2907.2
491.0	-1247.7	5022.8	491.0	-1186.3	-3049.3	491.0	-1153.3	-2907.2
491.0	-1148.3	5022.8	491.0	-1086.6	-3049.3	491.0	-1054.0	-2907.2
491.0	-1048.8	5022.8	491.0	-986.9	-3049.4	491.0	-954.8	-2907.2
491.0	-949.4	5022.8	491.0	-887.2	-3049.4	491.0	-855.5	-2907.2
491.0	-849.9	5022.8	491.0	-787.5	-3049.5	491.0	-756.2	-2907.2
491.0	-750.5	5022.8	491.0	-687.8	-3049.5	491.0	-657.0	-2907.2
491.0	-651.1	5022.8	491.0	-588.1	-3049.5	491.0	-557.7	-2907.2
491.0	-551.6	5022.8	491.0	-488.4	-3049.6	491.0	-458.4	-2907.2
491.0	-452.2	5022.8	491.0	-452.2	4528.0	491.0	-452.2	4627.0
491.0	-452.2	4725.9	491.0	-452.2	4824.9	491.0	-452.2	4923.8
491.0	-452.2	3439.6	491.0	-452.2	3538.6	491.0	-452.2	3637.5
491.0	-452.2	3736.5	491.0	-452.2	3835.4	491.0	-452.2	393[illegible]
491.0	-452.2	4033.3	491.0	-452.2	4132.2	491.0	-452.2	42[illegible].2
491.0	-452.2	4330.1	491.0	-452.2	4429.1	491.0	-452.2	22[illegible].3
491.0	-452.2	2351.2	491.0	-452.2	2450.2	491.0	-452.2	254[illegible]
491.0	-452.2	2648.0	491.0	-452.2	2747.0	491.0	-452.2	2845.9
491.0	-452.2	2944.9	491.0	-452.2	3043.8	491.0	-452.2	3142.8
491.0	-452.2	3241.7	491.0	-452.2	3340.7	491.0	-452.2	1163.9
491.0	-452.2	1262.8	491.0	-452.2	1361.7	491.0	-452.2	1460.7

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-452.2	1559.6	491.0	-452.2	1658.6	491.0	-452.2	1757.5
491.0	-452.2	1856.5	491.0	-452.2	1955.4	491.0	-452.2	2054.4
491.0	-452.2	2153.3	491.0	-452.2	75.4	491.0	-452.2	174.4
491.0	-452.2	273.3	491.0	-452.2	372.3	491.0	-452.2	471.2
491.0	-452.2	570.2	491.0	-452.2	669.1	491.0	-452.2	768.1
491.0	-452.2	867.0	491.0	-452.2	966.0	491.0	-452.2	1064.9
491.0	-452.2	-1111.9	491.0	-452.2	-1013.0	491.0	-452.2	-914.0
491.0	-452.2	-815.1	491.0	-452.2	-716.1	491.0	-452.2	-617.2
491.0	-452.2	-518.2	491.0	-452.2	-419.3	491.0	-452.2	-320.3
491.0	-452.2	-221.4	491.0	-452.2	-122.4	491.0	-452.2	-23.5
491.0	-452.2	-2200.3	491.0	-452.2	-2101.4	491.0	-452.2	-2002.4
491.0	-452.2	-1903.5	491.0	-452.2	-1804.5	491.0	-452.2	-1705.6
491.0	-452.2	-1606.6	491.0	-452.2	-1507.7	491.0	-452.2	-1408.8
491.0	-452.2	-1309.8	491.0	-452.2	-1210.9	491.0	-452.2	-2794.0
491.0	-452.2	-2695.1	491.0	-452.2	-2596.1	491.0	-452.2	-2497.2
491.0	-452.2	-2398.2	491.0	-452.2	-2299.3	491.0	-388.7	-3049.6
491.0	-359.2	-2907.2	491.0	-289.0	-3049.7	491.0	-259.9	-2907.2
491.0	-189.3	-3049.7	491.0	-160.6	-2907.2	491.0	-127.0	-302.2
491.0	-127.0	-204.7	491.0	-127.0	-107.2	491.0	-89.6	-3049.8
491.0	-61.3	-2907.2	491.0	-28.4	-107.6	491.0	-28.3	-302.2
491.0	10.1	-3049.8	491.0	37.9	-2907.2	491.0	70.3	-107.9
491.0	70.4	-302.2	491.0	109.8	-3049.8	491.0	137.2	-2907.2
491.0	168.9	-108.2	491.0	169.0	-302.2	491.0	209.5	-3049.9
491.0	236.5	-2907.2	491.0	267.6	-108.6	491.0	267.7	-302.2
491.0	309.2	-3049.9	491.0	335.7	-2907.2	491.0	366.2	-108.9
491.0	366.4	-302.2	491.0	408.9	-3050.0	491.0	435.0	-2907.2
491.0	464.8	-109.3	491.0	465.1	-302.2	491.0	508.6	-3050.0
491.0	534.3	-2907.2	491.0	563.5	-109.6	491.0	563.8	-302.2
491.0	608.3	-3050.1	491.0	633.6	-2907.2	491.0	662.1	-109.9
491.0	662.4	-302.2	491.0	708.0	-3050.1	491.0	732.8	-2907.2
491.0	760.8	-110.3	491.0	761.1	-302.2	491.0	807.7	-3050.1
491.0	832.1	-2907.2	491.0	859.4	-110.6	491.0	859.8	-302.2
491.0	907.4	-3050.2	491.0	931.4	-2907.2	491.0	958.1	-110.9
491.0	958.5	-302.2	491.0	1007.1	-3050.2	491.0	1030.6	-2907.2
491.0	1056.7	-111.3	491.0	1057.2	-302.2	491.0	1106.8	-3050.3
491.0	1129.9	-2907.2	491.0	1155.3	-111.6	491.0	1155.9	-302.2
491.0	1206.5	-3050.3	491.0	1229.2	-2907.2	491.0	1254.0	-111.9
491.0	1254.5	-302.2	491.0	1306.2	-3050.4	491.0	1328.5	-2907.2
491.0	1352.6	-112.3	491.0	1353.2	-302.2	491.0	1405.9	-3050.4
491.0	1427.7	-2907.2	491.0	1451.3	-112.6	491.0	1451.9	-302.2
491.0	1505.6	-3050.4	491.0	1527.0	-2907.2	491.0	1549.9	-112.9
491.0	1550.6	-302.2	491.0	1605.3	-3050.5	491.0	1626.3	-2907.2
491.0	1648.5	-113.3	491.0	1649.3	-302.2	491.0	1704.9	-3050.5
491.0	1725.5	-2907.2	491.0	1747.2	-113.6	491.0	1747.9	-302.2
491.0	1804.6	-3050.6	491.0	1824.8	-2907.2	491.0	1845.8	-113.9
491.0	1846.6	-302.2	491.0	1904.3	-3050.6	491.0	1924.1	-2907.2
491.0	1944.5	-114.3	491.0	1945.3	-302.2	491.0	2004.0	-3050.7
491.0	2023.3	-2907.2	491.0	2043.1	-114.6	491.0	2044.0	-302.2
491.0	2103.7	-3050.7	491.0	2122.6	-2907.2	491.0	2141.7	-114.9
491.0	2142.7	-302.2	491.0	2203.4	-3050.7	491.0	2221.9	-2907.2
491.0	2240.4	-115.3	491.0	2241.3	-302.2	491.0	2303.1	-3050.8
491.0	2321.2	-2907.2	491.0	2339.0	-115.6	491.0	2340.0	-302.2
491.0	2402.8	-3050.8	491.0	2420.4	-2907.2	491.0	2437.7	-115.9
491.0	2438.7	-302.2	491.0	2502.5	-3050.9	491.0	2519.7	-2907.2
491.0	2536.3	-116.3	491.0	2537.4	-302.2	491.0	2602.2	-3050.9
491.0	2619.0	-2907.2	491.0	2635.0	-116.6	491.0	2636.1	-302.2
491.0	2701.9	-3051.0	491.0	2718.2	-2907.2	491.0	2733.6	-117.0
491.0	2734.8	-302.2	491.0	2801.6	-3051.0	491.0	2817.5	-2907.2
491.0	2832.2	-117.3	491.0	2833.4	-302.2	491.0	2901.3	-3051.0

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	2916.8	-2907.2	491.0	2930.9	-117.6	491.0	2932.1	-302.2
491.0	3001.0	-3051.1	491.0	3016.1	-2907.2	491.0	3029.5	-118.0
491.0	3030.8	-302.2	491.0	3100.7	-3051.1	491.0	3115.3	-2907.2
491.0	3128.2	-118.3	491.0	3129.5	-302.2	491.0	3200.4	-3051.2
491.0	3214.6	-2907.2	491.0	3226.8	-118.6	491.0	3228.2	-302.2
491.0	3300.1	-3051.2	491.0	3313.9	-2907.2	491.0	3325.4	-119.0
491.0	3326.8	-302.2	491.0	3399.8	-3051.3	491.0	3413.1	-2907.2
491.0	3424.1	-119.3	491.0	3425.5	-302.2	491.0	3499.5	-3051.3
491.0	3512.4	-2907.2	491.0	3522.7	-119.6	491.0	3524.2	-302.2
491.0	3599.2	-3051.3	491.0	3611.7	-2907.2	491.0	3621.4	-120.0
491.0	3622.9	-302.2	491.0	3698.9	-3051.4	491.0	3711.0	-2907.2
491.0	3720.0	-120.3	491.0	3721.6	-302.2	491.0	3798.6	-3051.4
491.0	3810.2	-2907.2	491.0	3818.6	-120.6	491.0	3820.2	-302.2
491.0	3898.3	-3051.5	491.0	3909.5	-2907.2	491.0	3917.3	-121.0
491.0	3918.9	-302.2	491.0	3998.0	-3051.5	491.0	4008.8	-2907.2
491.0	4015.9	-121.3	491.0	4017.6	-302.2	491.0	4097.7	-3051.6
491.0	4108.0	-2907.2	491.0	4114.6	-121.6	491.0	4116.3	-302.2
491.0	4197.4	-3051.6	491.0	4207.3	-2907.2	491.0	4213.2	-122.0
491.0	4215.0	-302.2	491.0	4297.1	-3051.6	491.0	4306.6	-2907.2
491.0	4311.9	-122.3	491.0	4313.7	-302.2	491.0	4396.8	-3051.7
491.0	4405.8	-2907.2	491.0	4410.5	-122.6	491.0	4412.3	-302.2
491.0	4496.5	-3051.7	491.0	4505.1	-2907.2	491.0	4509.1	-123.0
491.0	4511.0	-302.2	491.0	4596.2	-3051.8	491.0	4604.4	-2907.2
491.0	4607.8	-123.3	491.0	4609.7	-302.2	491.0	4695.9	-3051.8
491.0	4703.7	-2907.2	491.0	4706.4	-123.7	491.0	4708.4	-302.2
491.0	4795.6	-3051.9	491.0	4802.9	-2907.2	491.0	4805.1	-124.0
491.0	4807.1	-302.2	491.0	4895.3	-3051.9	491.0	4902.2	-2907.2
491.0	4903.7	-124.3	491.0	4905.7	-302.2	491.0	4994.9	-3051.9
491.0	5001.5	-2907.2	491.0	5002.3	-124.7	491.0	5004.4	-302.2
491.0	5094.6	-3052.0	491.0	5100.7	-2907.2	491.0	5101.0	-125.0
491.0	5103.1	-302.2	491.0	5194.3	-3052.0	491.0	5199.6	-125.3
491.0	5200.0	-2907.2	491.0	5201.8	-302.2	491.0	5294.0	-3052.1
491.0	5298.3	-125.7	491.0	5299.3	-2907.2	491.0	5300.5	-302.2
491.0	5393.7	-3052.1	491.0	5396.9	-126.0	491.0	5398.6	-2907.2
491.0	5399.1	-302.2	491.0	5493.4	-3052.2	491.0	5495.5	-126.3
491.0	5497.8	-2907.2	491.0	5497.8	-2810.8	491.0	5497.8	-2714.3
491.0	5497.8	-2617.8	491.0	5497.8	-2521.3	491.0	5497.8	-2424.8
491.0	5497.8	-2328.4	491.0	5497.8	-2231.9	491.0	5497.8	-2135.4
491.0	5497.8	-2038.9	491.0	5497.8	-1942.4	491.0	5497.8	-1845.9
491.0	5497.8	-1749.5	491.0	5497.8	-1653.0	491.0	5497.8	-1556.5
491.0	5497.8	-1460.0	491.0	5497.8	-1363.5	491.0	5497.8	-1267.1
491.0	5497.8	-1170.6	491.0	5497.8	-1074.1	491.0	5497.8	-977.6
491.0	5497.8	-881.1	491.0	5497.8	-784.6	491.0	5497.8	-688.2
491.0	5497.8	-591.7	491.0	5497.8	-495.2	491.0	5497.8	-398.7
491.0	5497.8	-302.2	491.0	5593.1	-3052.2	491.0	5594.2	-126.[illegible]
491.0	5692.8	-3052.2	491.0	5692.8	-2954.7	491.0	5692.8	-28[illegible]
491.0	5692.8	-2759.7	491.0	5692.8	-2662.2	491.0	5692.8	-2[illegible]
491.0	5692.8	-2467.2	491.0	5692.8	-2369.7	491.0	5692.8	-2[illegible]
491.0	5692.8	-2174.7	491.0	5692.8	-2077.2	491.0	5692.8	-2[illegible]
491.0	5692.8	-1882.1	491.0	5692.8	-1784.6	491.0	5692.8	-1[illegible]
491.0	5692.8	-1589.6	491.0	5692.8	-1492.1	491.0	5692.8	-1394.[illegible]
491.0	5692.8	-1297.1	491.0	5692.8	-1199.6	491.0	5692.8	-110[illegible]
491.0	5692.8	-1004.6	491.0	5692.8	-907.1	491.0	5692.8	-809.6
491.0	5692.8	-712.0	491.0	5692.8	-614.5	491.0	5692.8	-517.0
491.0	5692.8	-419.5	491.0	5692.8	-322.0	491.0	5692.8	-224.5
491.0	5692.8	-127.0	491.0	-257.2	-704.3	491.0	-257.2	-604.8
491.0	-257.2	-505.3	491.0	-257.2	-405.8	491.0	-257.2	-306.3
491.0	-257.2	-206.8	491.0	-257.2	-107.2	491.0	-257.2	-2097.4
491.0	-257.2	-1997.9	491.0	-257.2	-1898.4	491.0	-257.2	-1798.9

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-257.2	-1699.4	491.0	-257.2	-1599.9	491.0	-257.2	-1500.4
491.0	-257.2	-1400.9	491.0	-257.2	-1301.4	491.0	-257.2	-1201.8
491.0	-257.2	-1102.3	491.0	-257.2	-1002.8	491.0	-257.2	-903.3
491.0	-257.2	-803.8	491.0	-257.2	-2794.0	491.0	-257.2	-2694.5
491.0	-257.2	-2595.0	491.0	-257.2	-2495.5	491.0	-257.2	-2396.0
491.0	-257.2	-2296.5	491.0	-257.2	-2196.9	491.0	-4064.0	5167.8
491.0	-3965.1	5167.8	491.0	-3866.3	5167.8	491.0	-3767.4	5167.8
491.0	-3668.5	5167.8	491.0	-3569.7	5167.8	491.0	-3470.8	5167.8
491.0	-3372.0	5167.8	491.0	-3273.1	5167.8	491.0	-3174.2	5167.8
491.0	-3075.4	5167.8	491.0	-2976.5	5167.8	491.0	-2877.6	5167.8
491.0	-2778.8	5167.8	491.0	-2679.9	5167.8	491.0	-2581.0	5167.8
491.0	-2482.2	5167.8	491.0	-2383.3	5167.8	491.0	-2284.5	5167.8
491.0	-2185.6	5167.8	491.0	-2086.7	5167.8	491.0	-1987.9	5167.8
491.0	-1889.0	5167.8	491.0	-1790.1	5167.8	491.0	-1691.3	5167.8
491.0	-1592.4	5167.8	491.0	-1493.5	5167.8	491.0	-1394.7	5167.8
491.0	-1295.8	5167.8	491.0	-1196.9	5167.8	491.0	-1098.1	5167.8
491.0	-999.2	5167.8	491.0	-900.4	5167.8	491.0	-801.5	5167.8
491.0	-702.6	5167.8	491.0	-603.8	5167.8	491.0	-504.9	5167.8
491.0	-406.0	5167.8	491.0	-307.2	4969.0	491.0	-307.2	5068.4
491.0	-307.2	5167.8	491.0	-307.2	4472.1	491.0	-307.2	4571.5
491.0	-307.2	4670.9	491.0	-307.2	4770.2	491.0	-307.2	4869.6
491.0	-307.2	3875.8	491.0	-307.2	3975.2	491.0	-307.2	4074.6
491.0	-307.2	4174.0	491.0	-307.2	4273.3	491.0	-307.2	4372.7
491.0	-307.2	3378.9	491.0	-307.2	3478.3	491.0	-307.2	3577.7
491.0	-307.2	3677.1	491.0	-307.2	3776.4	491.0	-307.2	2882.0
491.0	-307.2	2981.4	491.0	-307.2	3080.8	491.0	-307.2	3180.2
491.0	-307.2	3279.5	491.0	-307.2	2385.1	491.0	-307.2	2484.5
491.0	-307.2	2583.9	491.0	-307.2	2683.3	491.0	-307.2	2782.6
491.0	-307.2	1888.2	491.0	-307.2	1987.6	491.0	-307.2	2087.0
491.0	-307.2	2186.4	491.0	-307.2	2285.7	491.0	-307.2	1391.3
491.0	-307.2	1490.7	491.0	-307.2	1590.1	491.0	-307.2	1689.5
491.0	-307.2	1788.8	491.0	-307.2	795.0	491.0	-307.2	894.4
491.0	-307.2	993.8	491.0	-307.2	1093.2	491.0	-307.2	1192.6
491.0	-307.2	1291.9	491.0	-307.2	298.1	491.0	-307.2	397.5
491.0	-307.2	496.9	491.0	-307.2	596.3	491.0	-307.2	695.7
491.0	-307.2	0.0	491.0	-307.2	99.4	491.0	-307.2	198.8

5. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	NA Depth mm	ε_t	ϕ	
1	58370.00	26470.00	30990.00	154812.27	280975.06	328954.22	9540	0.00105	0.650	0.27
2	49610.00	177470.00	307300.00	93202.05	247083.06	427839.19	7553	0.00193	0.650	0.72
3	22830.00	448240.00	123300.00	18840.71	458286.56	126063.59	831	0.02790	0.900	0.97

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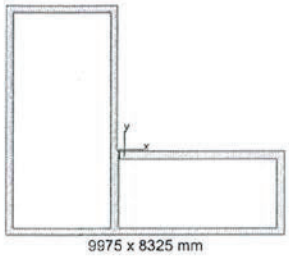
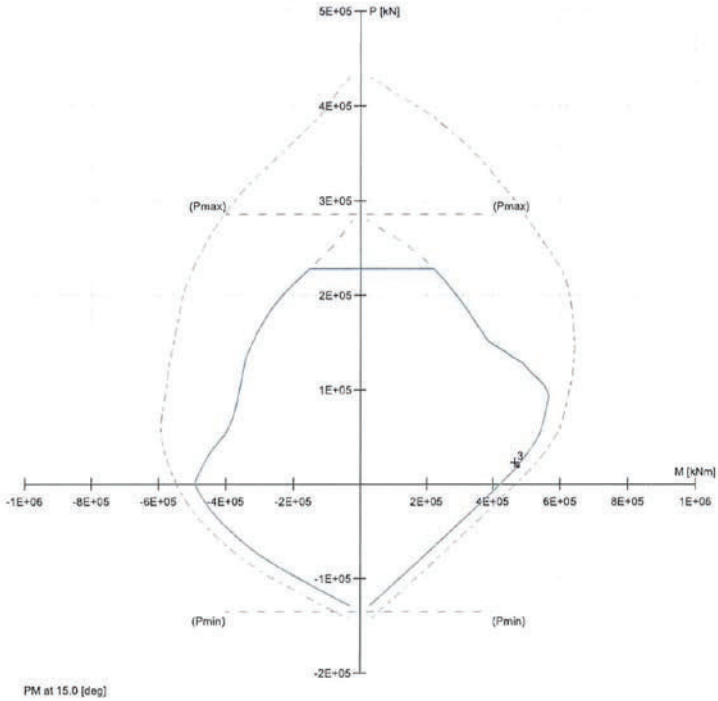
6. Diagrams

6.1. PM at θ=15 [deg]

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา





General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials		
f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section		
Type	Irregular	
A_g	1.00675e+007	mm²
I_x	7.5098e+013	mm⁴
I_y	1.04135e+014	mm⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	377088 mm²
Rho	3.75 %
Min. clear spacing	71 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	22830.0	448240.0	123300.0	18840.71	458286.56	126063.59	0.97

Max. Capacity Ratio: 0.97

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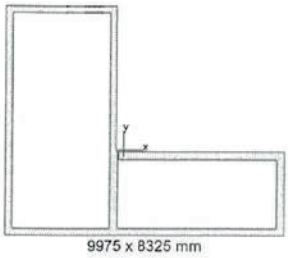
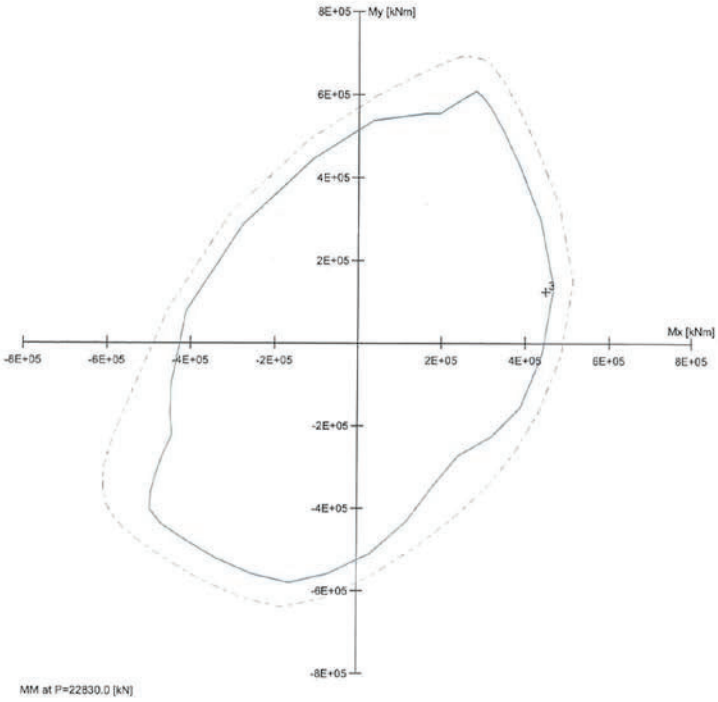
6.2. MM at P=22830 [kN]

ผนัง ค.ส.ล. LC1, LC2.SW ชั้น 1 ถึงหลังคา





General Information

Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section

Type	Irregular	
A_g	1.00675e+007	mm^2
I_x	7.5098e+013	mm^4
I_y	1.04135e+014	mm^4

Reinforcement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	377088 mm^2
Rho	3.75 %
Min. clear spacing	71 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	22830.0	448240.0	123300.0	18840.71	458286.56	126063.59	0.97

Max. Capacity Ratio: 0.97

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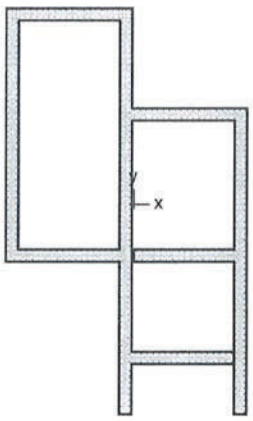
Computer program for the Strength Design of Reinforced Concrete Sections

ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 1 ถึง ชั้น 3



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1. General Information

File Name	C:\193018\GCDT\SPcloumn\25-08-63\C4-P4-L1.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 1 ถึง ชั้น 3

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4
r_x	2774.59	mm
r_y	1925.09	mm
X_o	0.00019029	mm
Y_o	0	mm

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3.2. Section Figure

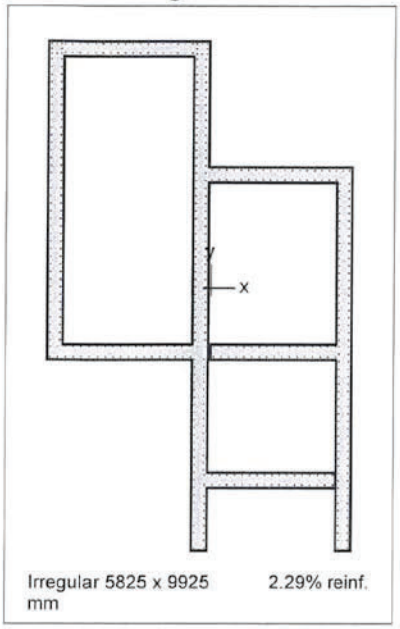

Figure 1: Column section

ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 1 ถึง ชั้น 3

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3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-53.7	-3900.5	2	2421.3	-3900.5	3	2421.3	-3600.5
4	-53.7	-3600.5	5	-53.7	-1400.5	6	-51.7	-1400.5
7	-51.7	2049.5	8	2423.3	2049.5	9	2423.3	-1100.5
10	-1.7	-1100.5	11	-1.7	-1400.5	12	2423.3	-1400.5
13	2423.3	-5125.5	14	2723.3	-5125.5	15	2723.3	2349.5
16	-51.7	2349.5	17	-51.7	4799.5	18	-3101.7	4799.5
19	-3101.7	-1400.5	20	-353.7	-1400.5	21	-353.7	-5125.5
22	-53.7	-5125.5						

3.4. Interior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-2801.7	-1100.5	2	-2801.7	4499.5	3	-351.7	4499.5
4	-351.7	-1100.5						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties

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ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 1 ถึง ชั้น 3

Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Total steel area, A_s	246482 mm²
Rho	2.29 %
Minimum clear spacing	37 mm

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4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-3048.0	-1016.0	491.0	-3048.0	-868.4	491.0	-3048.0	-720.8
491.0	-3048.0	-573.2	491.0	-3048.0	-425.6	491.0	-3048.0	-278.0
491.0	-3048.0	-130.4	491.0	-3048.0	17.2	491.0	-3048.0	164.8
491.0	-3048.0	312.4	491.0	-3048.0	459.9	491.0	-3048.0	607.5
491.0	-3048.0	755.1	491.0	-3048.0	902.7	491.0	-3048.0	1050.3
491.0	-3048.0	1197.9	491.0	-3048.0	1345.5	491.0	-3048.0	1493.1
491.0	-3048.0	1640.7	491.0	-3048.0	1788.3	491.0	-3048.0	1935.9
491.0	-3048.0	2083.5	491.0	-3048.0	2231.1	491.0	-3048.0	2378.7
491.0	-3048.0	2526.3	491.0	-3048.0	2673.9	491.0	-3048.0	2821.5
491.0	-3048.0	2969.1	491.0	-3048.0	3116.6	491.0	-3048.0	3264.2
491.0	-3048.0	3411.8	491.0	-3048.0	3559.4	491.0	-3048.0	3707.0
491.0	-3048.0	3854.6	491.0	-3048.0	4002.2	491.0	-3048.0	4149.8
491.0	-3048.0	4297.4	491.0	-3048.0	4445.0	491.0	-2855.7	-1016.0
491.0	-2855.7	-868.4	491.0	-2855.7	-720.8	491.0	-2855.7	-573.2
491.0	-2855.7	-425.6	491.0	-2855.7	-278.0	491.0	-2855.7	-130.4
491.0	-2855.7	17.2	491.0	-2855.7	164.8	491.0	-2855.7	312.4
491.0	-2855.7	459.9	491.0	-2855.7	607.5	491.0	-2855.7	755.1
491.0	-2855.7	902.7	491.0	-2855.7	1050.3	491.0	-2855.7	1197.9
491.0	-2855.7	1345.5	491.0	-2855.7	1493.1	491.0	-2855.7	1640.7
491.0	-2855.7	1788.3	491.0	-2855.7	1935.9	491.0	-2855.7	2083.5
491.0	-2855.7	2231.1	491.0	-2855.7	2378.7	491.0	-2855.7	2526.3
491.0	-2855.7	2673.9	491.0	-2855.7	2821.5	491.0	-2855.7	2969.1
491.0	-2855.7	3116.6	491.0	-2855.7	3264.2	491.0	-2855.7	3411.8
491.0	-2855.7	3559.4	491.0	-2855.7	3707.0	491.0	-2855.7	3854.6
491.0	-2855.7	4002.2	491.0	-2855.7	4149.8	491.0	-2855.7	4297.4
491.0	-2855.7	4445.0	491.0	-2794.0	4745.5	491.0	-2652.1	4745.5
491.0	-2510.1	4745.5	491.0	-2368.2	4745.5	491.0	-2226.2	4745.5
491.0	-2084.3	4745.5	491.0	-1942.4	4745.5	491.0	-1800.4	4745.5
491.0	-1658.5	4745.5	491.0	-1516.5	4745.5	491.0	-1374.6	4745.5
491.0	-1232.6	4745.5	491.0	-1090.7	4745.5	491.0	-948.8	4745.5
491.0	-806.8	4745.5	491.0	-664.9	4745.5	491.0	-522.9	4745.5
491.0	-381.0	4745.5	491.0	-2794.0	4572.0	491.0	-2652.1	4572.0
491.0	-2510.1	4572.0	491.0	-2368.2	4572.0	491.0	-2226.2	4572.0
491.0	-2084.3	4572.0	491.0	-1942.4	4572.0	491.0	-1800.4	4572.0
491.0	-1658.5	4572.0	491.0	-1516.5	4572.0	491.0	-1374.6	4572.0
491.0	-1232.6	4572.0	491.0	-1090.7	4572.0	491.0	-948.8	4572.0
491.0	-806.8	4572.0	491.0	-664.9	4572.0	491.0	-522.9	4572.0
491.0	-381.0	4572.0	491.0	-297.7	-1016.0	491.0	-297.7	-868.4

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-297.7	-720.8	491.0	-297.7	-573.2	491.0	-297.7	-425.6
491.0	-297.7	-278.0	491.0	-297.7	-130.4	491.0	-297.7	17.2
491.0	-297.7	164.8	491.0	-297.7	312.4	491.0	-297.7	459.9
491.0	-297.7	607.5	491.0	-297.7	755.1	491.0	-297.7	902.7
491.0	-297.7	1050.3	491.0	-297.7	1197.9	491.0	-297.7	1345.5
491.0	-297.7	1493.1	491.0	-297.7	1640.7	491.0	-297.7	1788.3
491.0	-297.7	1935.9	491.0	-297.7	2083.5	491.0	-297.7	2231.1
491.0	-297.7	2378.7	491.0	-297.7	2526.3	491.0	-297.7	2673.9
491.0	-297.7	2821.5	491.0	-297.7	2969.1	491.0	-297.7	3116.6
491.0	-297.7	3264.2	491.0	-297.7	3411.8	491.0	-297.7	3559.4
491.0	-297.7	3707.0	491.0	-297.7	3854.6	491.0	-297.7	4002.2
491.0	-297.7	4149.8	491.0	-297.7	4297.4	491.0	-297.7	4445.0
491.0	-127.0	4445.0	491.0	-126.4	4297.4	491.0	-125.8	4149.8
491.0	-125.3	4002.2	491.0	-124.7	3854.6	491.0	-124.1	3707.0
491.0	-123.5	3559.4	491.0	-123.0	3411.8	491.0	-122.4	3264.2
491.0	-121.8	3116.6	491.0	-121.2	2969.1	491.0	-120.7	2821.5
491.0	-120.1	2673.9	491.0	-119.5	2526.3	491.0	-118.9	2378.7
491.0	-118.4	2231.1	491.0	-117.8	2083.5	491.0	-117.2	1935.9
491.0	-116.6	1788.3	491.0	-116.1	1640.7	491.0	-115.5	1493.1
491.0	-114.9	1345.5	491.0	-114.3	1197.9	491.0	-113.8	1050.3
491.0	-113.2	902.7	491.0	-112.6	755.1	491.0	-112.0	607.5
491.0	-111.5	459.9	491.0	-110.9	312.4	491.0	-110.3	164.8
491.0	-109.7	17.2	491.0	-109.2	-130.4	491.0	-108.6	-278.0
491.0	-108.0	-425.6	491.0	-107.4	-573.2	491.0	-106.9	-720.8
491.0	-106.3	-868.4	491.0	-105.7	-1016.0	491.0	52.3	-1154.5
491.0	199.8	-1153.8	491.0	347.4	-1153.1	491.0	494.9	-1152.3
491.0	642.5	-1151.6	491.0	790.0	-1150.9	491.0	937.5	-1150.2
491.0	1085.1	-1149.5	491.0	1232.6	-1148.7	491.0	1380.2	-1148.0
491.0	1527.7	-1147.3	491.0	1675.3	-1146.6	491.0	1822.8	-1145.9
491.0	1970.4	-1145.2	491.0	2117.9	-1144.4	491.0	2265.5	-1143.7
491.0	2413.0	-1143.0	491.0	52.3	-1346.5	491.0	199.8	-1346.5
491.0	347.4	-1346.5	491.0	494.9	-1346.5	491.0	642.5	-1346.5
491.0	790.0	-1346.5	491.0	937.5	-1346.5	491.0	1085.1	-1346.5
491.0	1232.6	-1346.5	491.0	1380.2	-1346.5	491.0	1527.7	-1346.5
491.0	1675.3	-1346.5	491.0	1822.8	-1346.5	491.0	1970.4	-1346.5
491.0	2117.9	-1346.5	491.0	2265.5	-1346.5	491.0	2413.0	-1346.5
491.0	0.0	2295.5	491.0	141.9	2294.9	491.0	283.9	2294.4
491.0	425.8	2293.8	491.0	567.8	2293.3	491.0	709.7	2292.7
491.0	851.6	2292.1	491.0	993.6	2291.6	491.0	1135.5	2291.0
491.0	1277.5	2290.5	491.0	1419.4	2289.9	491.0	1561.4	2289.4
491.0	1703.3	2288.8	491.0	1845.2	2288.2	491.0	1987.2	2287.7
491.0	2129.1	2287.1	491.0	2271.1	2286.6	491.0	2413.0	2286.0
491.0	0.0	2103.5	491.0	141.9	2103.5	491.0	283.9	2103.5
491.0	425.8	2103.5	491.0	567.8	2103.5	491.0	709.7	2103.5
491.0	851.6	2103.5	491.0	993.6	2103.5	491.0	1135.5	2103.5
491.0	1277.5	2103.5	491.0	1419.4	2103.5	491.0	1561.4	2103.5
491.0	1703.3	2103.5	491.0	1845.2	2103.5	491.0	1987.2	2103.5
491.0	2129.1	2103.5	491.0	2271.1	2103.5	491.0	2413.0	2103.5
491.0	2540.0	2286.0	491.0	2667.0	2286.0	491.0	2477.3	-1016.0
491.0	2477.3	-870.9	491.0	2477.3	-725.7	491.0	2477.3	-580.6
491.0	2477.3	-435.4	491.0	2477.3	-290.3	491.0	2477.3	-145.1
491.0	2477.3	0.0	491.0	2477.3	145.1	491.0	2477.3	290.3
491.0	2477.3	435.4	491.0	2477.3	580.6	491.0	2477.3	725.7
491.0	2477.3	870.9	491.0	2477.3	1016.0	491.0	2477.3	1161.1
491.0	2477.3	1306.3	491.0	2477.3	1451.4	491.0	2477.3	1596.6
491.0	2477.3	1741.7	491.0	2477.3	1886.9	491.0	2477.3	2032.0
491.0	2667.0	2032.0	491.0	2667.1	1886.9	491.0	2667.2	1741.7
491.0	2667.3	1596.6	491.0	2667.4	1451.4	491.0	2667.5	1306.3
491.0	2667.7	1161.1	491.0	2667.8	1016.0	491.0	2667.9	870.9

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	2668.0	725.7	491.0	2668.1	580.6	491.0	2668.2	435.4
491.0	2668.3	290.3	491.0	2668.4	145.1	491.0	2668.5	0.0
491.0	2668.6	-145.1	491.0	2668.7	-290.3	491.0	2668.9	-435.4
491.0	2669.0	-580.6	491.0	2669.1	-725.7	491.0	2669.2	-870.9
491.0	2669.3	-1016.0	491.0	2477.3	-5071.5	491.0	2477.3	-4926.0
491.0	2477.3	-4780.5	491.0	2477.3	-4635.0	491.0	2477.3	-4489.5
491.0	2477.3	-4344.0	491.0	2477.3	-4198.5	491.0	2477.3	-4053.0
491.0	2477.3	-3907.5	491.0	2477.3	-3762.0	491.0	2477.3	-3616.5
491.0	2477.3	-3471.0	491.0	2477.3	-3325.5	491.0	2477.3	-3180.0
491.0	2477.3	-3034.5	491.0	2477.3	-2889.0	491.0	2477.3	-2743.5
491.0	2477.3	-2598.0	491.0	2477.3	-2452.5	491.0	2477.3	-2307.0
491.0	2477.3	-2161.5	491.0	2477.3	-2016.0	491.0	2477.3	-1870.5
491.0	2477.3	-1725.0	491.0	2477.3	-1579.5	491.0	2477.3	-1434.0
491.0	2477.3	-1288.5	491.0	2477.3	-1143.0	491.0	2667.0	-5071.5
491.0	2667.1	-4926.0	491.0	2667.2	-4780.5	491.0	2667.3	-4635.0
491.0	2667.3	-4489.5	491.0	2667.4	-4344.0	491.0	2667.5	-4198.5
491.0	2667.6	-4053.0	491.0	2667.7	-3907.5	491.0	2667.8	-3762.0
491.0	2667.8	-3616.5	491.0	2667.9	-3471.0	491.0	2668.0	-3325.5
491.0	2668.1	-3180.0	491.0	2668.2	-3034.5	491.0	2668.3	-2889.0
491.0	2668.4	-2743.5	491.0	2668.4	-2598.0	491.0	2668.5	-2452.5
491.0	2668.6	-2307.0	491.0	2668.7	-2161.5	491.0	2668.8	-2016.0
491.0	2668.9	-1870.5	491.0	2669.0	-1725.0	491.0	2669.0	-1579.5
491.0	2669.1	-1434.0	491.0	2669.2	-1288.5	491.0	2669.3	-1143.0
491.0	-107.7	-3654.5	491.0	37.9	-3654.5	491.0	183.5	-3654.5
491.0	329.1	-3654.5	491.0	474.6	-3654.5	491.0	620.2	-3654.5
491.0	765.8	-3654.5	491.0	911.4	-3654.5	491.0	1057.0	-3654.5
491.0	1202.6	-3654.5	491.0	1348.2	-3654.5	491.0	1493.8	-3654.5
491.0	1639.3	-3654.5	491.0	1784.9	-3654.5	491.0	1930.5	-3654.5
491.0	2076.1	-3654.5	491.0	2221.7	-3654.5	491.0	2367.3	-3654.5
491.0	-107.7	-3846.5	491.0	37.9	-3846.5	491.0	183.5	-3846.5
491.0	329.1	-3846.5	491.0	474.6	-3846.5	491.0	620.2	-3846.5
491.0	765.8	-3846.5	491.0	911.4	-3846.5	491.0	1057.0	-3846.5
491.0	1202.6	-3846.5	491.0	1348.2	-3846.5	491.0	1493.8	-3846.5
491.0	1639.3	-3846.5	491.0	1784.9	-3846.5	491.0	1930.5	-3846.5
491.0	2076.1	-3846.5	491.0	2221.7	-3846.5	491.0	2367.3	-3846.5
491.0	-127.0	-3556.0	491.0	-127.0	-3412.1	491.0	-127.0	-3268.1
491.0	-127.0	-3124.2	491.0	-127.0	-2980.3	491.0	-127.0	-2836.3
491.0	-127.0	-2692.4	491.0	-127.0	-2548.5	491.0	-127.0	-2404.5
491.0	-127.0	-2260.6	491.0	-127.0	-2116.7	491.0	-127.0	-1972.7
491.0	-127.0	-1828.8	491.0	-127.0	-1684.9	491.0	-127.0	-1540.9
491.0	-127.0	-1397.0	491.0	-299.7	-1837.9	491.0	-299.7	-1691.0
491.0	-299.7	-1544.0	491.0	-299.7	-1397.0	491.0	-299.7	-2719.8
491.0	-299.7	-2572.8	491.0	-299.7	-2425.9	491.0	-299.7	-2278.9
491.0	-299.7	-2131.9	491.0	-299.7	-1984.9	491.0	-299.7	-3601.7
491.0	-299.7	-3454.7	491.0	-299.7	-3307.7	491.0	-299.7	-3160.8
491.0	-299.7	-3013.8	491.0	-299.7	-2866.8	491.0	-299.7	-4483.6
491.0	-299.7	-4336.6	491.0	-299.7	-4189.6	491.0	-299.7	-4042.7
491.0	-299.7	-3895.7	491.0	-299.7	-3748.7	491.0	-299.7	-5071.5
491.0	-299.7	-4924.5	491.0	-299.7	-4777.6	491.0	-299.7	-4630.6
491.0	-107.7	-4064.0	491.0	-107.7	-4207.9	491.0	-107.7	-4351.9
491.0	-107.7	-4495.8	491.0	-107.7	-4639.7	491.0	-107.7	-4783.7
491.0	-107.7	-4927.6	491.0	-107.7	-5071.5	491.0	-3047.7	-1143.0
491.0	-2900.6	-1143.0	491.0	-2753.5	-1143.0	491.0	-2606.4	-1143.0
491.0	-2459.3	-1143.0	491.0	-2312.2	-1143.0	491.0	-2165.1	-1143.0
491.0	-2018.0	-1143.0	491.0	-1870.9	-1143.0	491.0	-1723.8	-1143.0
491.0	-1576.7	-1143.0	491.0	-1429.6	-1143.0	491.0	-1282.5	-1143.0
491.0	-1135.4	-1143.0	491.0	-988.3	-1143.0	491.0	-841.2	-1143.0
491.0	-694.1	-1143.0	491.0	-547.0	-1143.0	491.0	-399.9	-1143.0
491.0	-252.8	-1143.0	491.0	-105.7	-1143.0	491.0	-3047.7	-1346.5

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
491.0	-2899.6	-1346.5	491.0	-2751.4	-1346.5	491.0	-2603.3	-1346.5
491.0	-2455.1	-1346.5	491.0	-2307.0	-1346.5	491.0	-2158.8	-1346.5
491.0	-2010.7	-1346.5	491.0	-1862.5	-1346.5	491.0	-1714.4	-1346.5
491.0	-1566.2	-1346.5	491.0	-1418.1	-1346.5	491.0	-1269.9	-1346.5
491.0	-1121.8	-1346.5	491.0	-973.6	-1346.5	491.0	-825.5	-1346.5
491.0	-677.3	-1346.5	491.0	-529.2	-1346.5	491.0	-381.0	-1346.5
491.0	-3047.7	4745.5	491.0	-2951.7	4745.5	491.0	-2855.7	4745.5
491.0	-2855.7	4649.5	491.0	-2855.7	4553.5	491.0	-2951.7	4553.5
491.0	-3047.7	4553.5	491.0	-3047.7	4649.5	491.0	-105.7	4745.5
491.0	-201.7	4745.5	491.0	-297.7	4745.5	491.0	-297.7	4649.5
491.0	-297.7	4553.5	491.0	-201.7	4553.5	491.0	-105.7	4553.5
491.0	-105.7	4649.5						

5. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kN	kNm	kNm	kN	kNm	kNm	mm			
1	50660.00	1860.00	11920.00	213951.05	1860.00	11920.00	6599	-0.00006	0.650	0.24
2	36750.00	51460.00	146830.00	0.00	78806.67	224857.83	932	0.02593	0.900	0.70
3	19540.00	275420.00	77490.00	0.00	341457.88	96069.89	2608	0.00832	0.900	0.83

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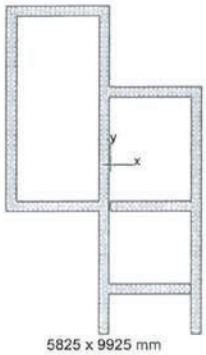
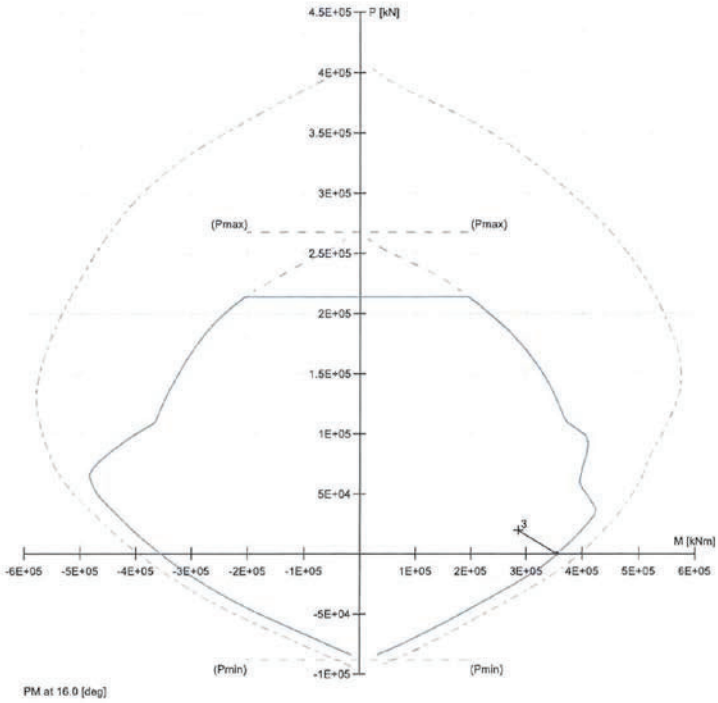
6. Diagrams

6.1. PM at θ=16 [deg]

ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 1 ถึง ชั้น 3





General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials		
f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section		
Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	246482 mm^2
Rho	2.29 %
Min. clear spacing	37 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	19540.0	275420.0	77490.0	0.00	341457.88	96069.89	0.83

Max. Capacity Ratio: 0.83

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6.2. MM at P=19540 [kN]

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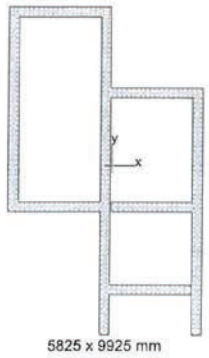

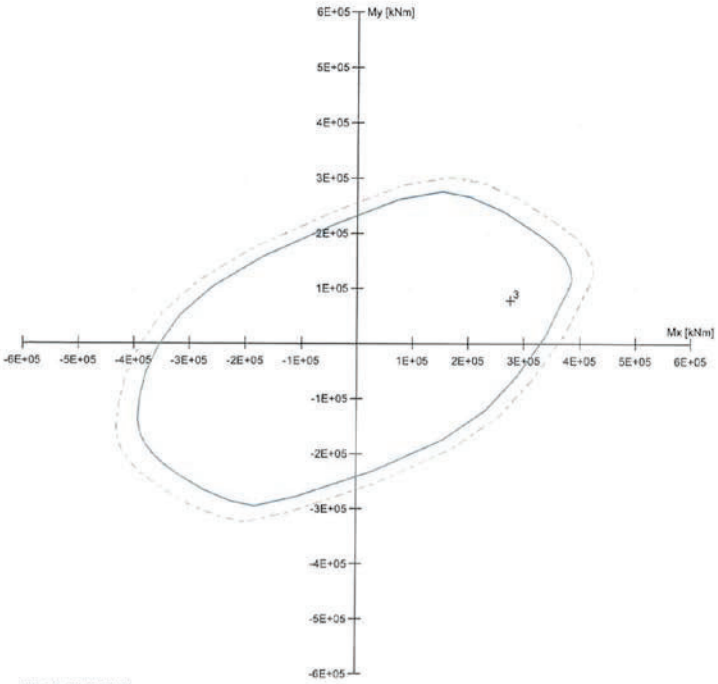

General Information

Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section

Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4

Reinforcement

Pattern	Irregular	
Bar layout	---	
Cover to	---	
Clear cover	---	
Bars	---	
Confinement type	Tied	
Total steel area, A_s	246482	mm^2
Rho	2.29	%
Min. clear spacing	37	mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	19540.0	275420.0	77490.0	0.00	341457.88	96069.89	0.83

Max. Capacity Ratio: 0.83

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spColumn

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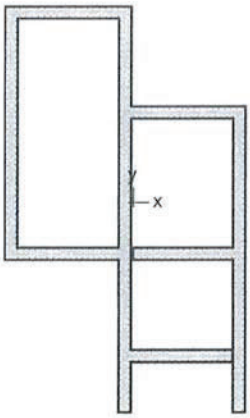

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1. General Information

File Name	C:\193018\GCDT\SPcloumn\25-0...\C4-P4-L5-roof.col
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	35	MPa
E_c	27805.6	MPa
f_c	29.75	MPa
ε_u	0.003	mm/mm
β_1	0.796192	

2.2. Steel

Type	Standard	
f_y	400	MPa
E_s	200000	MPa
ε_{yt}	0.002	mm/mm

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4
r_x	2774.59	mm
r_y	1925.09	mm
X_o	0.00019029	mm
Y_o	0	mm

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3.2. Section Figure

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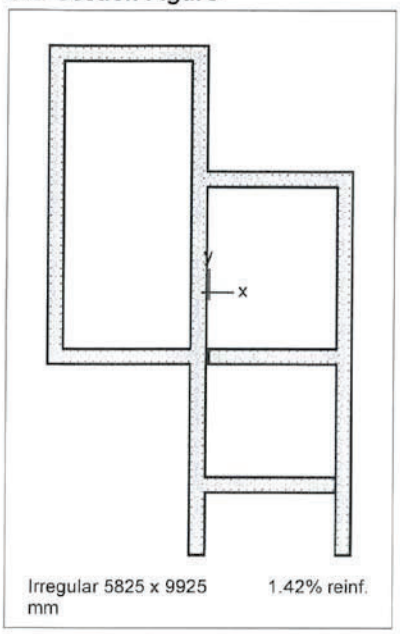

Figure 1: Column section

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3.3. Exterior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-53.7	-3900.5	2	2421.3	-3900.5	3	2421.3	-3600.5
4	-53.7	-3600.5	5	-53.7	-1400.5	6	-51.7	-1400.5
7	-51.7	2049.5	8	2423.3	2049.5	9	2423.3	-1100.5
10	-1.7	-1100.5	11	-1.7	-1400.5	12	2423.3	-1400.5
13	2423.3	-5125.5	14	2723.3	-5125.5	15	2723.3	2349.5
16	-51.7	2349.5	17	-51.7	4799.5	18	-3101.7	4799.5
19	-3101.7	-1400.5	20	-353.7	-1400.5	21	-353.7	-5125.5
22	-53.7	-5125.5						

3.4. Interior Points

Points	X mm	Y mm	Points	X mm	Y mm	Points	X mm	Y mm
1	-2801.7	-1100.5	2	-2801.7	4499.5	3	-351.7	4499.5
4	-351.7	-1100.5						

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²	Bar	Diameter mm	Area mm²
#3	9.53	70.97	#4	12.70	129.03	#5	15.88	200.00
#6	19.05	283.87	#7	22.23	387.10	#8	25.40	509.68
#9	28.65	645.16	#10	32.26	819.35	#11	35.81	1006.45
#14	43.00	1451.61	#18	57.33	2580.64			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties

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Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Total steel area, A_s	152290 mm²
Rho	1.42 %
Minimum clear spacing	45 mm

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4.4. Bars Provided

Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	-3048.0	-1016.0	314.0	-3048.0	-868.4	314.0	-3048.0	-720.8
314.0	-3048.0	-573.2	314.0	-3048.0	-425.6	314.0	-3048.0	-278.0
314.0	-3048.0	-130.4	314.0	-3048.0	17.2	314.0	-3048.0	164.8
314.0	-3048.0	312.4	314.0	-3048.0	459.9	314.0	-3048.0	607.5
314.0	-3048.0	755.1	314.0	-3048.0	902.7	314.0	-3048.0	1050.3
314.0	-3048.0	1197.9	314.0	-3048.0	1345.5	314.0	-3048.0	1493.1
314.0	-3048.0	1640.7	314.0	-3048.0	1788.3	314.0	-3048.0	1935.9
314.0	-3048.0	2083.5	314.0	-3048.0	2231.1	314.0	-3048.0	2378.7
314.0	-3048.0	2526.3	314.0	-3048.0	2673.9	314.0	-3048.0	2821.5
314.0	-3048.0	2969.1	314.0	-3048.0	3116.6	314.0	-3048.0	3264.2
314.0	-3048.0	3411.8	314.0	-3048.0	3559.4	314.0	-3048.0	3707.0
314.0	-3048.0	3854.6	314.0	-3048.0	4002.2	314.0	-3048.0	4149.8
314.0	-3048.0	4297.4	314.0	-3048.0	4445.0	314.0	-2851.7	-1016.0
314.0	-2851.7	-868.4	314.0	-2851.7	-720.8	314.0	-2851.7	-573.2
314.0	-2851.7	-425.6	314.0	-2851.7	-278.0	314.0	-2851.7	-130.4
314.0	-2851.7	17.2	314.0	-2851.7	164.8	314.0	-2851.7	312.4
314.0	-2851.7	459.9	314.0	-2851.7	607.5	314.0	-2851.7	755.1
314.0	-2851.7	902.7	314.0	-2851.7	1050.3	314.0	-2851.7	1197.9
314.0	-2851.7	1345.5	314.0	-2851.7	1493.1	314.0	-2851.7	1640.7
314.0	-2851.7	1788.3	314.0	-2851.7	1935.9	314.0	-2851.7	2083.5
314.0	-2851.7	2231.1	314.0	-2851.7	2378.7	314.0	-2851.7	2526.3
314.0	-2851.7	2673.9	314.0	-2851.7	2821.5	314.0	-2851.7	2969.1
314.0	-2851.7	3116.6	314.0	-2851.7	3264.2	314.0	-2851.7	3411.8
314.0	-2851.7	3559.4	314.0	-2851.7	3707.0	314.0	-2851.7	3854.6
314.0	-2851.7	4002.2	314.0	-2851.7	4149.8	314.0	-2851.7	4297.4
314.0	-2851.7	4445.0	314.0	-2794.0	-1150.5	314.0	-2652.1	-1150.1
314.0	-2510.1	-1149.6	314.0	-2368.2	-1149.2	314.0	-2226.2	-1148.7
314.0	-2084.3	-1148.3	314.0	-1942.4	-1147.9	314.0	-1800.4	-1147.4
314.0	-1658.5	-1147.0	314.0	-1516.5	-1146.5	314.0	-1374.6	-1146.1
314.0	-1232.6	-1145.6	314.0	-1090.7	-1145.2	314.0	-948.8	-1144.8
314.0	-806.8	-1144.3	314.0	-664.9	-1143.9	314.0	-522.9	-1143.4
314.0	-381.0	-1143.0	314.0	-2794.0	-1350.5	314.0	-2652.1	-1350.5
314.0	-2510.1	-1350.5	314.0	-2368.2	-1350.5	314.0	-2226.2	-1350.5
314.0	-2084.3	-1350.5	314.0	-1942.4	-1350.5	314.0	-1800.4	-1350.5
314.0	-1658.5	-1350.5	314.0	-1516.5	-1350.5	314.0	-1374.6	-1350.5
314.0	-1232.6	-1350.5	314.0	-1090.7	-1350.5	314.0	-948.8	-1350.5
314.0	-806.8	-1350.5	314.0	-664.9	-1350.5	314.0	-522.9	-1350.5
314.0	-381.0	-1350.5	314.0	-303.7	-1544.1	314.0	-303.7	-1397.0

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	-303.7	-1985.6	314.0	-303.7	-1838.4	314.0	-303.7	-1691.3
314.0	-303.7	-2427.0	314.0	-303.7	-2279.8	314.0	-303.7	-2132.7
314.0	-303.7	-2868.4	314.0	-303.7	-2721.3	314.0	-303.7	-2574.1
314.0	-303.7	-3457.0	314.0	-303.7	-3309.8	314.0	-303.7	-3162.7
314.0	-303.7	-3015.5	314.0	-303.7	-3898.4	314.0	-303.7	-3751.2
314.0	-303.7	-3604.1	314.0	-303.7	-4339.8	314.0	-303.7	-4192.7
314.0	-303.7	-4045.5	314.0	-303.7	-4781.2	314.0	-303.7	-4634.1
314.0	-303.7	-4486.9	314.0	-303.7	-5075.5	314.0	-303.7	-4928.4
314.0	-127.0	4749.5	314.0	-126.6	4600.6	314.0	-126.3	4451.8
314.0	-125.9	4302.9	314.0	-125.6	4154.0	314.0	-125.2	4005.2
314.0	-124.9	3856.3	314.0	-124.5	3707.5	314.0	-124.2	3558.6
314.0	-123.8	3409.7	314.0	-123.5	3260.9	314.0	-123.1	3112.0
314.0	-122.8	2963.1	314.0	-122.4	2814.3	314.0	-122.1	2665.4
314.0	-121.7	2516.5	314.0	-121.4	2367.7	314.0	-121.0	2218.8
314.0	-120.6	2070.0	314.0	-120.3	1921.1	314.0	-119.9	1772.2
314.0	-119.6	1623.4	314.0	-119.2	1474.5	314.0	-118.9	1325.6
314.0	-118.5	1176.8	314.0	-118.2	1027.9	314.0	-117.8	879.0
314.0	-117.5	730.2	314.0	-117.1	581.3	314.0	-116.8	432.4
314.0	-116.4	283.6	314.0	-116.1	134.7	314.0	-115.7	-14.1
314.0	-115.4	-163.0	314.0	-115.0	-311.9	314.0	-114.7	-460.7
314.0	-114.3	-609.6	314.0	-113.9	-758.5	314.0	-113.6	-907.3
314.0	-113.2	-1056.2	314.0	-112.9	-1205.1	314.0	-112.5	-1353.9
314.0	-112.2	-1502.8	314.0	-111.8	-1651.6	314.0	-111.5	-1800.5
314.0	-111.1	-1949.4	314.0	-110.8	-2098.2	314.0	-110.4	-2247.1
314.0	-110.1	-2396.0	314.0	-109.7	-2544.8	314.0	-109.4	-2693.7
314.0	-109.0	-2842.6	314.0	-108.7	-2991.4	314.0	-108.3	-3140.3
314.0	-107.9	-3289.1	314.0	-107.6	-3438.0	314.0	-107.2	-3586.9
314.0	-106.9	-3735.7	314.0	-106.5	-3884.6	314.0	-106.2	-4033.5
314.0	-105.8	-4182.3	314.0	-105.5	-4331.2	314.0	-105.1	-4480.1
314.0	-104.8	-4628.9	314.0	-104.4	-4777.8	314.0	-104.1	-4926.6
314.0	-103.7	-5075.5	314.0	-3048.0	4749.5	314.0	-2899.8	4749.5
314.0	-2751.7	4749.5	314.0	-2603.5	4749.5	314.0	-2455.3	4749.5
314.0	-2307.2	4749.5	314.0	-2159.0	4749.5	314.0	-2010.8	4749.5
314.0	-1862.7	4749.5	314.0	-1714.5	4749.5	314.0	-1566.3	4749.5
314.0	-1418.2	4749.5	314.0	-1270.0	4749.5	314.0	-1121.8	4749.5
314.0	-973.7	4749.5	314.0	-825.5	4749.5	314.0	-677.3	4749.5
314.0	-529.2	4749.5	314.0	-381.0	4749.5	314.0	-3048.0	4572.0
314.0	-2899.8	4570.7	314.0	-2751.7	4569.5	314.0	-2603.5	4568.4
314.0	-2455.3	4567.0	314.0	-2307.2	4565.7	314.0	-2159.0	4564.5
314.0	-2010.8	4563.2	314.0	-1862.7	4562.0	314.0	-1714.5	4560.7
314.0	-1566.3	4559.5	314.0	-1418.2	4558.2	314.0	-1270.0	4557.0
314.0	-1121.8	4555.7	314.0	-973.7	4554.5	314.0	-825.5	4553.2
314.0	-677.3	4552.0	314.0	-529.2	4550.7	314.0	-381.0	4549.5
314.0	-301.7	-1150.5	314.0	-301.7	-1003.3	314.0	-301.7	-856.0
314.0	-301.7	-708.8	314.0	-301.7	-561.5	314.0	-301.7	-414.3
314.0	-301.7	-267.0	314.0	-301.7	-119.8	314.0	-301.7	27.5
314.0	-301.7	174.7	314.0	-301.7	322.0	314.0	-301.7	469.2
314.0	-301.7	616.5	314.0	-301.7	763.7	314.0	-301.7	911.0
314.0	-301.7	1058.2	314.0	-301.7	1205.5	314.0	-301.7	1352.7
314.0	-301.7	1500.0	314.0	-301.7	1647.2	314.0	-301.7	1794.5
314.0	-301.7	1941.7	314.0	-301.7	2089.0	314.0	-301.7	2236.2
314.0	-301.7	2383.5	314.0	-301.7	2530.7	314.0	-301.7	2678.0
314.0	-301.7	2825.2	314.0	-301.7	2972.5	314.0	-301.7	3119.7
314.0	-301.7	3267.0	314.0	-301.7	3414.2	314.0	-301.7	3561.5
314.0	-301.7	3708.7	314.0	-301.7	3856.0	314.0	-301.7	4003.2
314.0	-301.7	4150.5	314.0	-301.7	4297.8	314.0	-301.7	4445.0
314.0	0.0	2286.0	314.0	148.2	2286.0	314.0	296.3	2286.0
314.0	444.5	2286.0	314.0	592.7	2286.0	314.0	740.8	2286.0
314.0	889.0	2286.0	314.0	1037.2	2286.0	314.0	1185.3	2286.0

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	1333.5	2286.0	314.0	1481.7	2286.0	314.0	1629.8	2286.0
314.0	1778.0	2286.0	314.0	1926.2	2286.0	314.0	2074.3	2286.0
314.0	2222.5	2286.0	314.0	2370.7	2286.0	314.0	2518.8	2286.0
314.0	2667.0	2286.0	314.0	0.0	2099.5	314.0	141.9	2099.5
314.0	283.9	2099.5	314.0	425.8	2099.5	314.0	567.8	2099.5
314.0	709.7	2099.5	314.0	851.6	2099.5	314.0	993.6	2099.5
314.0	1135.5	2099.5	314.0	1277.5	2099.5	314.0	1419.4	2099.5
314.0	1561.4	2099.5	314.0	1703.3	2099.5	314.0	1845.2	2099.5
314.0	1987.2	2099.5	314.0	2129.1	2099.5	314.0	2271.1	2099.5
314.0	2413.0	2099.5	314.0	2473.3	-1521.8	314.0	2473.3	-1373.7
314.0	2473.3	-1225.6	314.0	2473.3	-1077.5	314.0	2473.3	-929.5
314.0	2473.3	-781.4	314.0	2473.3	-633.3	314.0	2473.3	-485.2
314.0	2473.3	-337.2	314.0	2473.3	-189.1	314.0	2473.3	-41.0
314.0	2473.3	107.0	314.0	2473.3	255.1	314.0	2473.3	403.2
314.0	2473.3	551.3	314.0	2473.3	699.3	314.0	2473.3	847.4
314.0	2473.3	995.5	314.0	2473.3	1143.6	314.0	2473.3	1291.6
314.0	2473.3	1439.7	314.0	2473.3	1587.8	314.0	2473.3	1735.9
314.0	2473.3	1883.9	314.0	2473.3	2032.0	314.0	2473.3	-5075.5
314.0	2473.3	-4927.4	314.0	2473.3	-4779.4	314.0	2473.3	-4631.3
314.0	2473.3	-4483.2	314.0	2473.3	-4335.1	314.0	2473.3	-4187.1
314.0	2473.3	-4039.0	314.0	2473.3	-3890.9	314.0	2473.3	-3742.9
314.0	2473.3	-3594.8	314.0	2473.3	-3446.7	314.0	2473.3	-3298.6
314.0	2473.3	-3150.6	314.0	2473.3	-3002.5	314.0	2473.3	-2854.4
314.0	2473.3	-2706.3	314.0	2473.3	-2558.3	314.0	2473.3	-2410.2
314.0	2473.3	-2262.1	314.0	2473.3	-2114.0	314.0	2473.3	-1966.0
314.0	2473.3	-1817.9	314.0	2473.3	-1669.8	314.0	2667.0	-5075.5
314.0	2667.0	-4927.4	314.0	2667.0	-4779.4	314.0	2667.0	-4631.3
314.0	2667.0	-4483.2	314.0	2667.0	-4335.1	314.0	2667.0	-4187.1
314.0	2667.0	-4039.0	314.0	2667.0	-3890.9	314.0	2667.0	-3742.9
314.0	2667.0	-3594.8	314.0	2667.0	-3446.7	314.0	2667.0	-3298.6
314.0	2667.0	-3150.6	314.0	2667.0	-3002.5	314.0	2667.0	-2854.4
314.0	2667.0	-2706.3	314.0	2667.0	-2558.3	314.0	2667.0	-2410.2
314.0	2667.0	-2262.1	314.0	2667.0	-2114.0	314.0	2667.0	-1966.0
314.0	2667.0	-1817.9	314.0	2667.0	-1669.8	314.0	2667.0	-1521.8
314.0	2667.0	-1373.7	314.0	2667.0	-1225.6	314.0	2667.0	-1077.5
314.0	2667.0	-929.5	314.0	2667.0	-781.4	314.0	2667.0	-633.3
314.0	2667.0	-485.2	314.0	2667.0	-337.2	314.0	2667.0	-189.1
314.0	2667.0	-41.0	314.0	2667.0	107.0	314.0	2667.0	255.1
314.0	2667.0	403.2	314.0	2667.0	551.3	314.0	2667.0	699.3
314.0	2667.0	847.4	314.0	2667.0	995.5	314.0	2667.0	1143.6
314.0	2667.0	1291.6	314.0	2667.0	1439.7	314.0	2667.0	1587.8
314.0	2667.0	1735.9	314.0	2667.0	1883.9	314.0	2667.0	2032.0
314.0	48.3	-1150.5	314.0	196.1	-1150.0	314.0	343.9	-1149.6
314.0	491.7	-1149.1	314.0	639.5	-1148.6	314.0	787.3	-1148.2
314.0	935.0	-1147.7	314.0	1082.8	-1147.2	314.0	1230.6	-1146.8
314.0	1378.4	-1146.3	314.0	1526.2	-1145.8	314.0	1674.0	-1145.3
314.0	1821.8	-1144.9	314.0	1969.6	-1144.4	314.0	2117.4	-1143.9
314.0	2265.2	-1143.5	314.0	2413.0	-1143.0	314.0	48.3	-1350.5
314.0	196.1	-1350.5	314.0	343.9	-1350.5	314.0	491.7	-1350.5
314.0	639.5	-1350.5	314.0	787.3	-1350.5	314.0	935.0	-1350.5
314.0	1082.8	-1350.5	314.0	1230.6	-1350.5	314.0	1378.4	-1350.5
314.0	1526.2	-1350.5	314.0	1674.0	-1350.5	314.0	1821.8	-1350.5
314.0	1969.6	-1350.5	314.0	2117.4	-1350.5	314.0	2265.2	-1350.5
314.0	2413.0	-1350.5	314.0	0.0	-3650.5	314.0	148.2	-3650.5
314.0	296.4	-3650.5	314.0	444.6	-3650.5	314.0	592.8	-3650.5
314.0	741.0	-3650.5	314.0	889.2	-3650.5	314.0	1037.4	-3650.5
314.0	1185.6	-3650.5	314.0	1333.8	-3650.5	314.0	1482.1	-3650.5
314.0	1630.3	-3650.5	314.0	1778.5	-3650.5	314.0	1926.7	-3650.5
314.0	2074.9	-3650.5	314.0	2223.1	-3650.5	314.0	2371.3	-3650.5

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Area mm²	X mm	Y mm	Area mm²	X mm	Y mm	Area mm²	X mm	Y mm
314.0	0.0	-3850.5	314.0	148.2	-3850.5	314.0	296.4	-3850.5
314.0	444.6	-3850.5	314.0	592.8	-3850.5	314.0	741.0	-3850.5
314.0	889.2	-3850.5	314.0	1037.4	-3850.5	314.0	1185.6	-3850.5
314.0	1333.8	-3850.5	314.0	1482.1	-3850.5	314.0	1630.3	-3850.5
314.0	1778.5	-3850.5	314.0	1926.7	-3850.5	314.0	2074.9	-3850.5
314.0	2223.1	-3850.5	314.0	2371.3	-3850.5			

5. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	Ratio
	kN	kNm	kNm	kN	kNm	kNm	mm			
1	34600.00	611.00	14100.00	0.00	5989.95	138229.73	886	0.02640	0.900	0.42
2	24730.00	28410.00	79970.00	0.00	50128.07	141103.20	479	0.05328	0.900	0.74
3	13220.00	154230.00	46030.00	0.00	223752.91	66779.17	1906	0.01290	0.900	0.81

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6. Diagrams

6.1. PM at θ=17 [deg]

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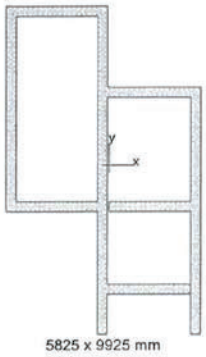

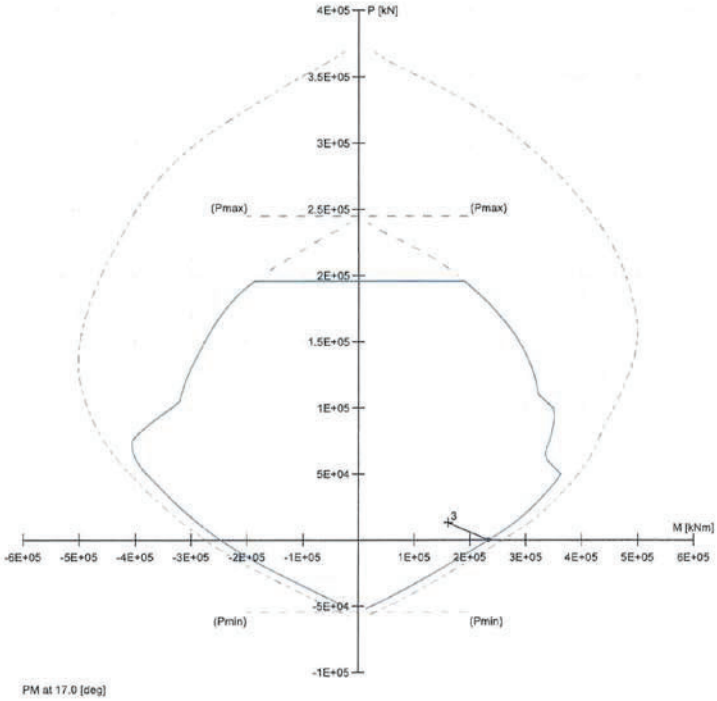

General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials		
f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section		
Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_{st}	152290 mm^2
Rho	1.42 %
Min. clear spacing	45 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	13220.0	154230.0	46030.0	0.00	223752.91	66779.17	0.81

Max. Capacity Ratio: 0.81

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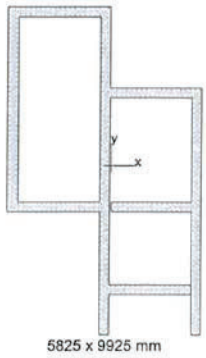
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

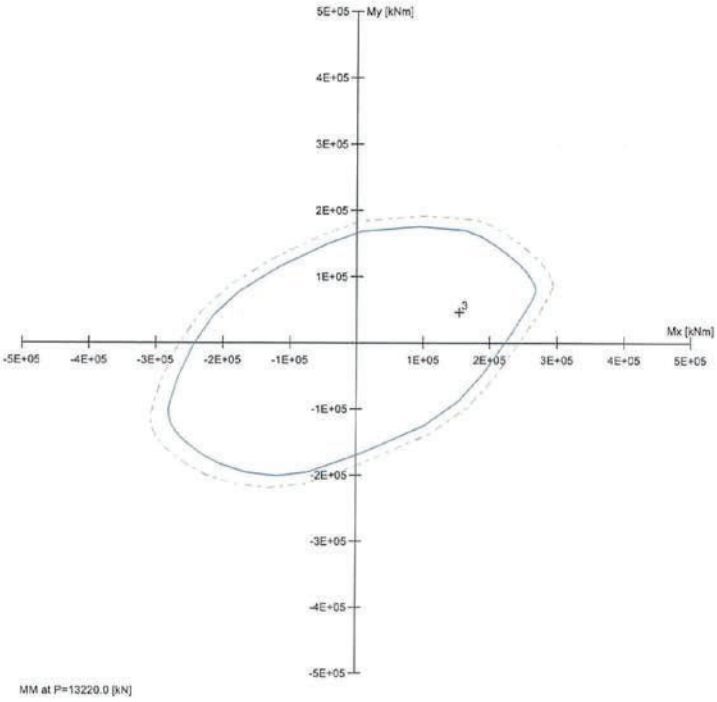
STRUCTUREPOINT - spColumn v6.50
Licensed to: Dynamic Engineering Consultants Co., Ltd License ID: 68794-1062303-4-2667D-XXXXX
C:\193018\GCDT\SPcloumn\25-08-63\C4-P4-L5-roof.col

Page | 10
9/3/2020
2:23 PM

6.2. MM at P=13220 [kN]

ผนัง ค.ส.ล. LC3, LC4, LC5, LC6 ชั้น 4 ถึง ชั้น หลังคา





General Information	
Project	---
Column	---
Engineer	---
Code	ACI 318-14
Bar Set	ASTM A615
Units	Metric
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials		
f'_c	35	MPa
E_c	27805.6	MPa
f_y	400	MPa
E_s	200000	MPa

Section		
Type	Irregular	
A_g	1.07625e+007	mm^2
I_x	8.28533e+013	mm^4
I_y	3.98854e+013	mm^4

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	152290 mm^2
Rho	1.42 %
Min. clear spacing	45 mm

No.	P_u kN	M_{ux} kNm	M_{uy} kNm	ϕP_n kN	ϕM_{nx} kNm	ϕM_{ny} kNm	Capacity Ratio
3	13220.0	154230.0	46030.0	0.00	223752.91	66779.17	0.81

Max. Capacity Ratio: 0.81

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สย. 4522
REGISTERED PROFESSIONAL ENGINEER

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-1 1st

Project : อาคารทิศตะวันออก

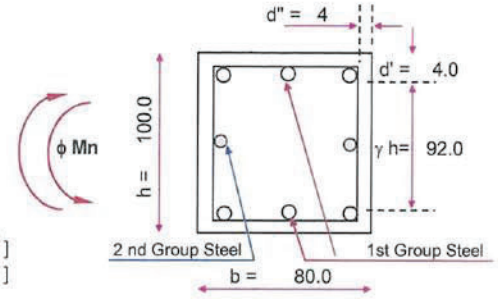
filename : COLUMN

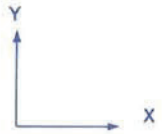
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1815	[T]		
Moment	ϕ Mn	=	181	[T-m]		
Separate Steel 2 group	1 st.	=	40	As =	246.3	[cm^2]
	2 nd.	=	28	As =	172.4	[cm^2]
Steel Reinforcement	No.	=	68			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.052	OK		

Main Steel Used 68 DB 28 — DB 28

Stirrup RB 12 @ 0.400 — RB 12

e b = 0.57 [cm]





Clumn (80 x 100)

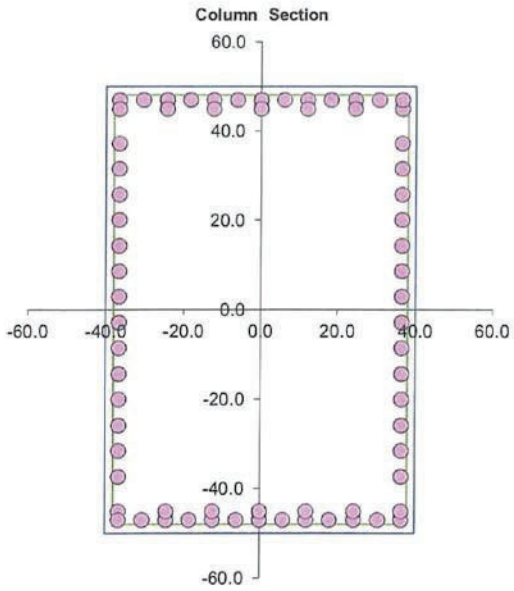
Steel 68 DB 28

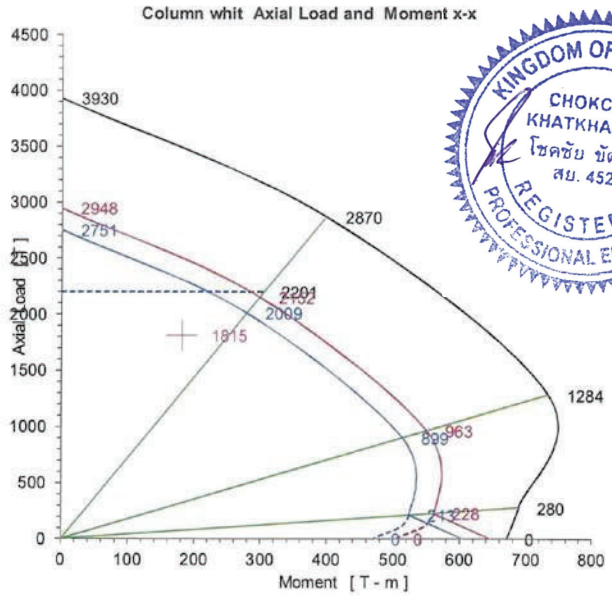
Stirrup RB 12 @ 0.400

Boundary of tie stirrup Column

Boundary of sprial stirrup Column

Boundary of Ultimate Capacity





Column C-1 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-1 2nd-3rd

Project : อาคารทิศตะวันออก

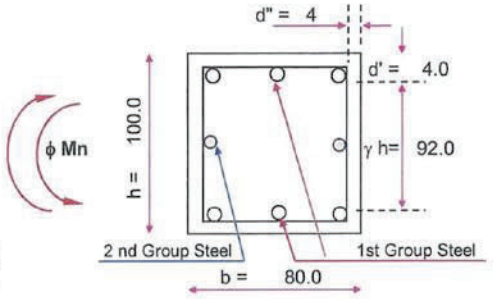
filename : COLUMN

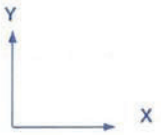
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1685	[T]		
Moment	ϕ Mn	=	168	[T-m]		
Separate Steel 2 group	1 st.	=	36	As =	221.7	[cm^2]
	2 nd.	=	22	As =	135.5	[cm^2]
Steel Reinforcement	No.	=	58			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.045	OK		

Main Steel Used 58 DB 28 — DB 28

Stirrup RB 12 @ 0.400 — RB 12

e b = 0.55 [cm]





Clumn (80 x 100)

Steel 58 DB 28

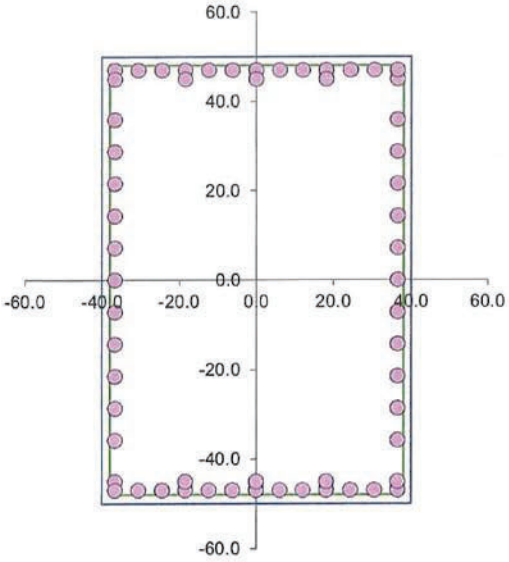
Stirrup RB 12 @ 0.400

Boundary of tie stirrup Column

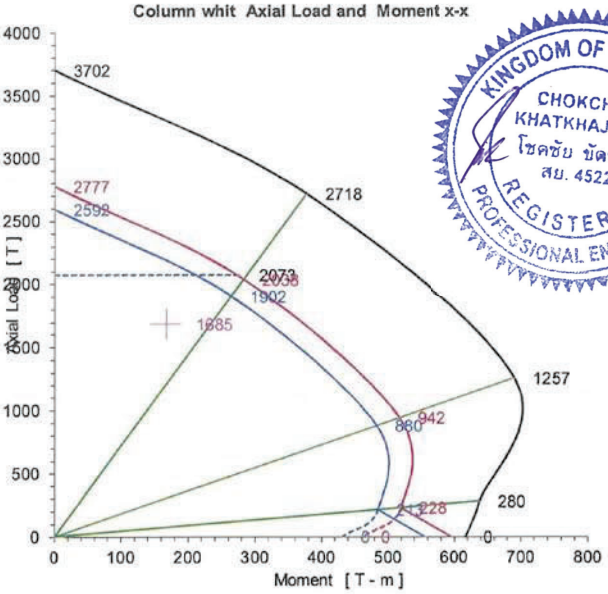
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
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สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-1 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-1 4th-5th

Project : อาคารทิศตะวันออก

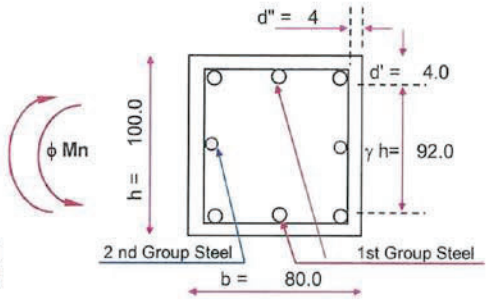
filename : COLUMN

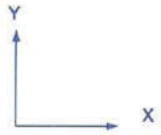
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1425	[T]		
Moment	ϕ Mn	=	142	[T-m]		
Separate Steel 2 group	1 st.	=	36	As =	176.7	[cm^2]
	2 nd.	=	22	As =	108.0	[cm^2]
Steel Reinforcement	No.	=	58			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.036	OK		

Main Steel Used 58 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.49 [cm]



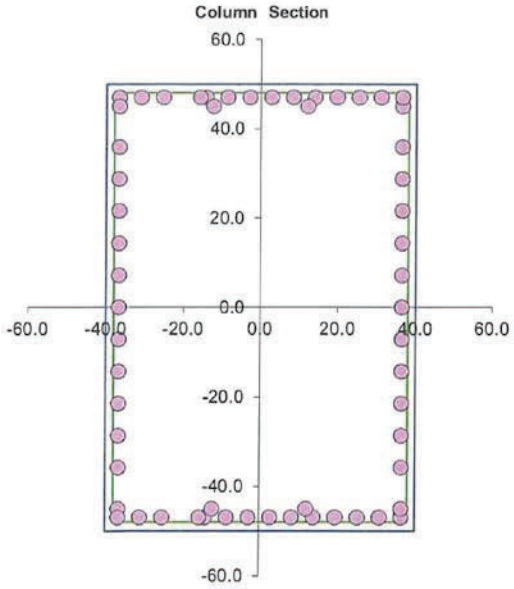


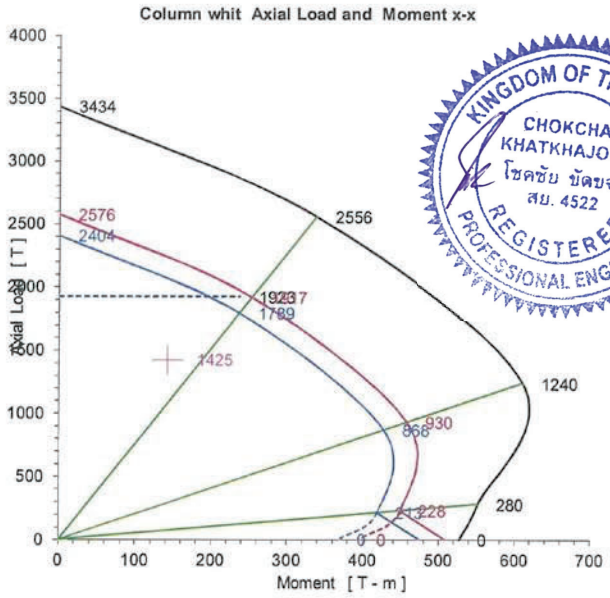
Clumn (80 x 100)

Steel 58 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-1 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-1 6th-7th

Project : อาคารทิศตะวันออก

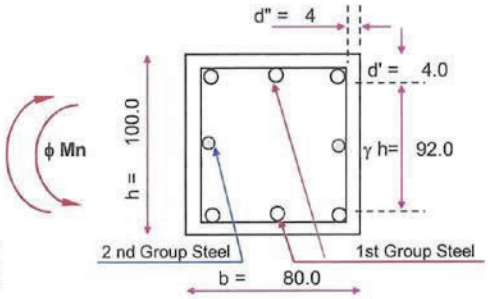
filename : COLUMN

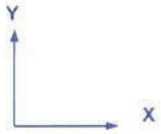
Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1165	[T]		
Moment	ϕ Mn	=	116	[T-m]		
Separate Steel 2 group	1 st.	=	18	As =	88.4	[cm²]
	2 nd.	=	12	As =	58.9	[cm²]
Steel Reinforcement	No.	=	30			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	p of Steel	=	0.018	OK		

Main Steel Used 30 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.37 [cm]





Clumn (80 x 100)

Steel 30 DB 25

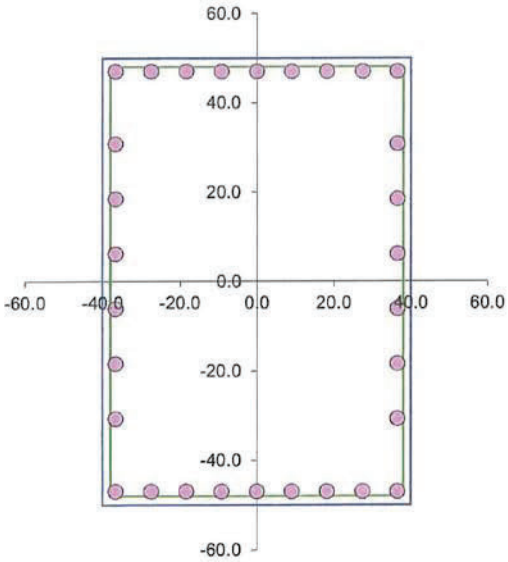
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column

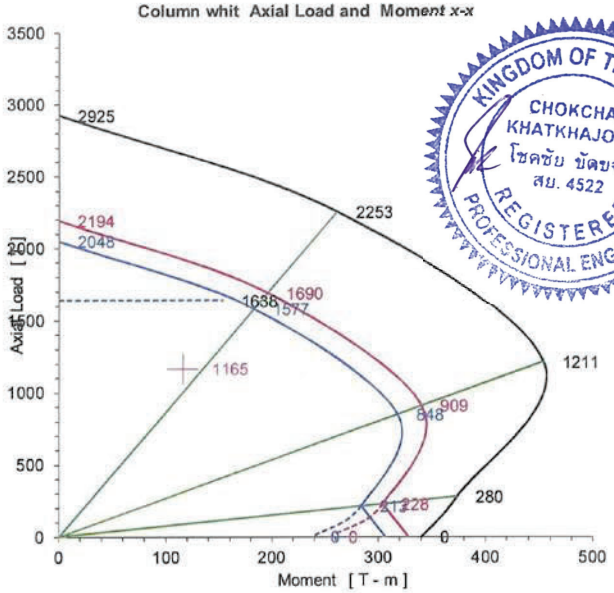
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-1 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-1 8th-Roof

Project : อาคารทิศตะวันออก

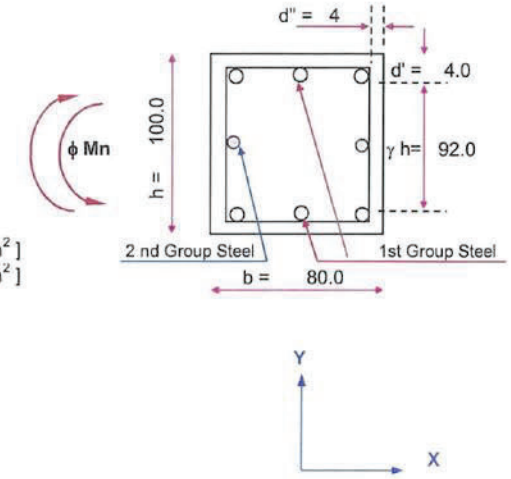
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	905	[T]		
Moment	ϕ Mn	=	90	[T-m]		
Separate Steel 2 group	1 st.	=	14	As =	68.7	[cm²]
	2 nd.	=	10	As =	49.1	[cm²]
Steel Reinforcement	No.	=	24			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.015	OK		

Main Steel Used 24 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.35 [cm]

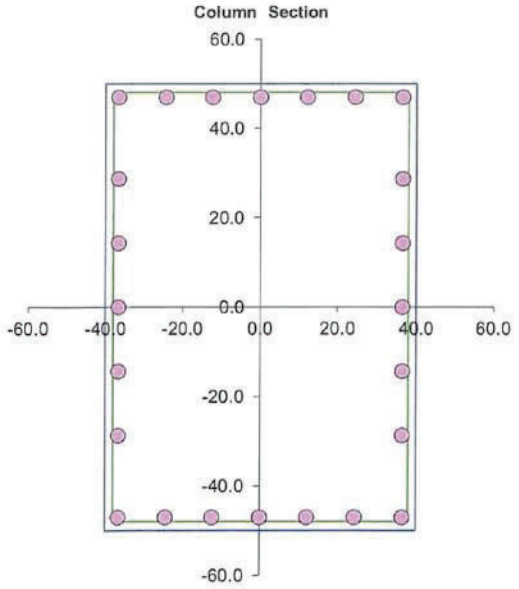


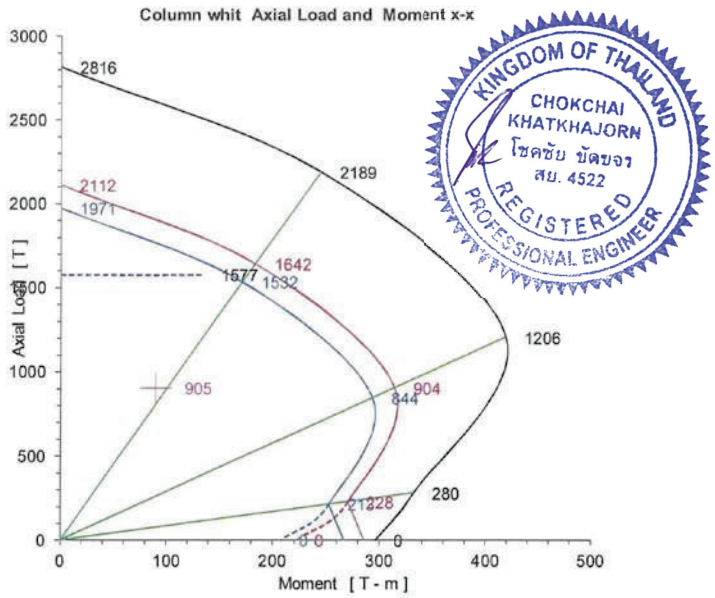
Clumn (80 x 100)

Steel 24 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-1 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-1A 1st-5th

Project : อาคารทิศตะวันออก

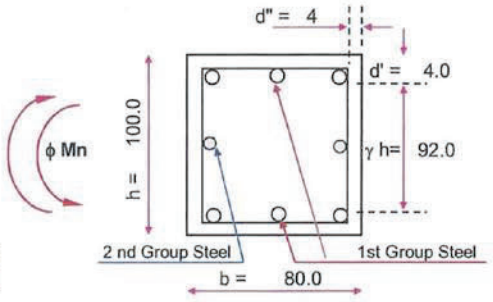
filename : COLUMN

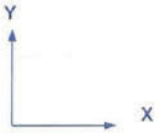
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1400	[T]		
Moment	ϕ Mn	=	140	[T-m]		
Separate Steel 2 group	1 st.	=	20	As =	123.2	[cm^2]
	2 nd.	=	14	As =	86.2	[cm^2]
Steel Reinforcement	No.	=	34			
	d	=	96	[cm]		
d (ε u / (ε y + ε u))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.026	OK		

Main Steel Used 34 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.42 [cm]





Clumn (80 x 100)

Steel 34 DB 28

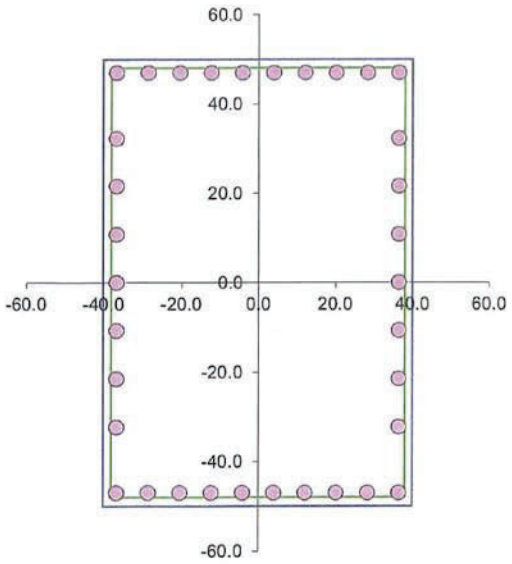
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column

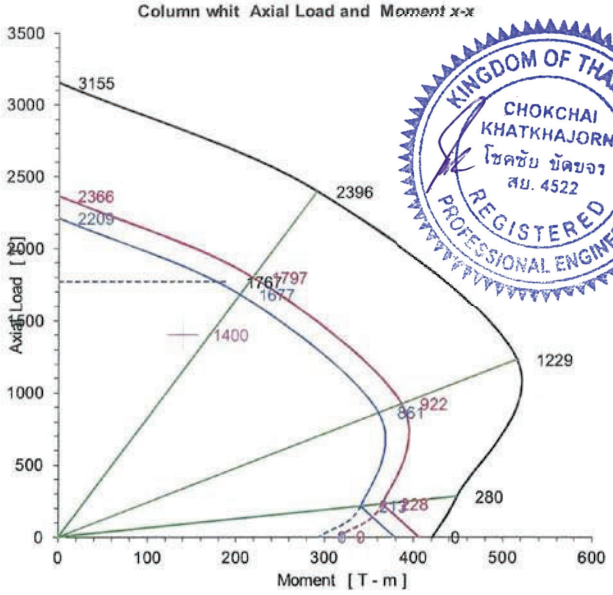
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-1A (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-1A 6th-7th

Project : อาคารทิศตะวันออก

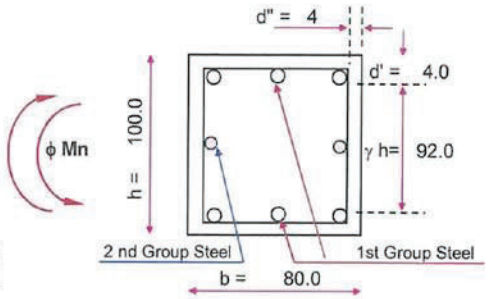
filename : COLUMN

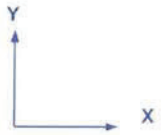
Concrete Strength	fc'	=	350	[kg/cm^2]	
	fy SD	=	4000	[kg/cm^2]	
	fy RD	=	2400	[kg/cm^2]	
Column Dimension	b	=	80	[cm]	
	h	=	100	[cm]	
	d'	=	4	[cm]	
	d"	=	4	[cm]	
Load	ϕ Pn	=	1165	[T]	
Moment	ϕ Mn	=	116	[T-m]	
Separate Steel 2 group	1 st.	=	18	As = 88.4	[cm^2]
	2 nd.	=	12	As = 58.9	[cm^2]
Steel Reinforcement	No.	=	30		
	d	=	96	[cm]	
d (εu / (εy + εu))	Cb	=	58.055	[cm]	
	ρ of Steel	=	0.018	OK	

Main Steel Used 30 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.37 [cm]





Clumn (80 x 100)

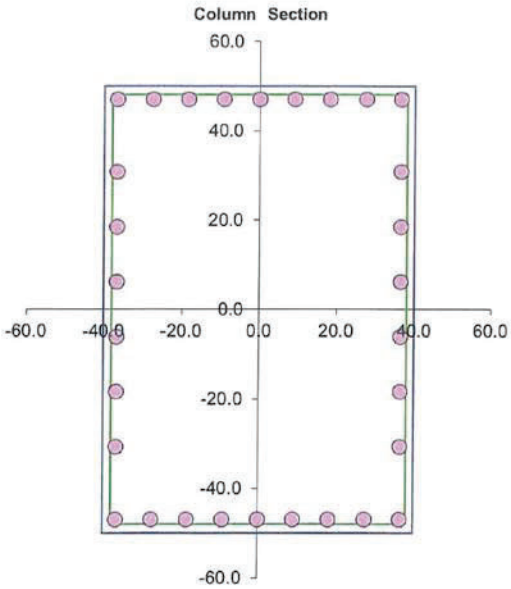
Steel 30 DB 25

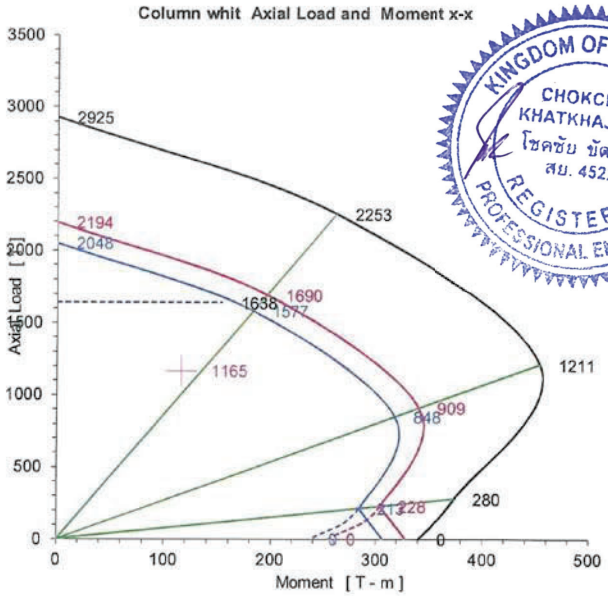
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column

Boundary of sprial stirrup Column

Boundary of Ultimate Capacity





Column C-1A (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-1A 8th-Roof

Project : อาคารทิศตะวันออก

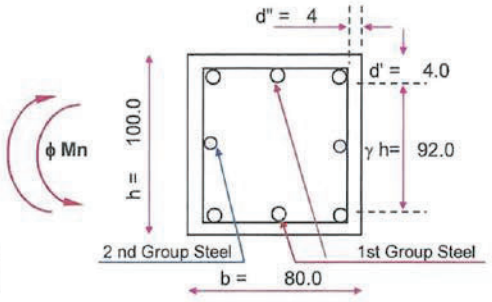
filename : COLUMN

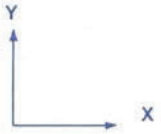
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	905	[T]		
Moment	ϕ Mn	=	90	[T-m]		
Separate Steel 2 group	1 st.	=	14	As =	68.7	[cm^2]
	2 nd.	=	10	As =	49.1	[cm^2]
Steel Reinforcement	No.	=	24			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.015	OK		

Main Steel Used 24 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.35 [cm]





Clumn (80 x 100)

Steel 24 DB 25

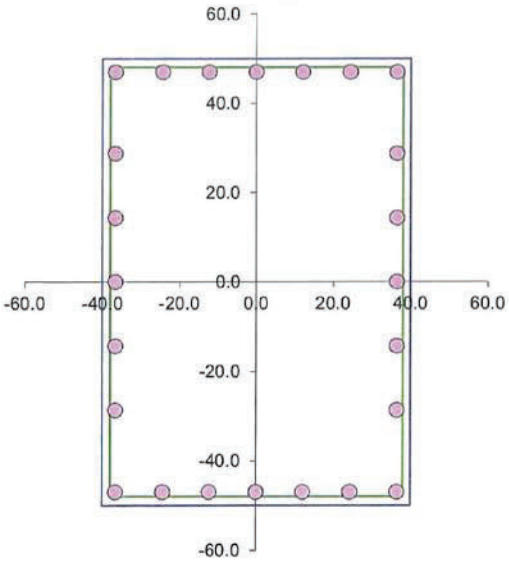
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column

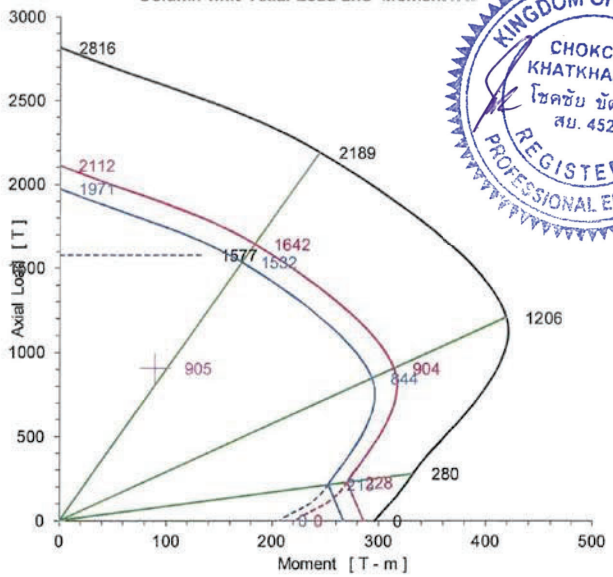
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-1A (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-2 1st

Project : อาคารทิศตะวันออก

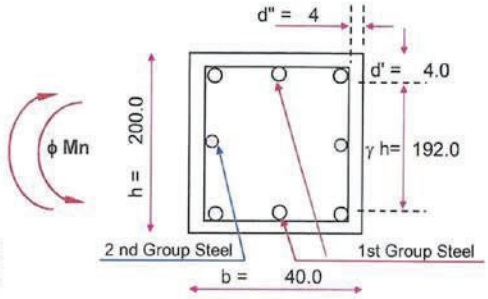
filename : COLUMN

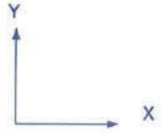
Concrete Strength	fc'	=	350	[kg/cm^2]	
	fy SD	=	4000	[kg/cm^2]	
	fy RD	=	2400	[kg/cm^2]	
Column Dimension	b	=	40	[cm]	
	h	=	200	[cm]	
	d'	=	4	[cm]	
	d"	=	4	[cm]	
Load	ϕ Pn	=	2075	[T]	
Moment	ϕ Mn	=	207	[T-m]	
Separate Steel 2 group	1 st.	=	18	As = 110.8	[cm^2]
	2 nd.	=	54	As = 332.5	[cm^2]
Steel Reinforcement	No.	=	72		
	d	=	196	[cm]	
d (εu / (εy + εu))	Cb	=	118.530	[cm]	
	ρ of Steel	=	0.055	OK	

Main Steel Used 72 DB 28 — DB 28

Stirrup DB 12 @ 0.350 — DB 12

e b = 0.67 [cm]





Clumn (40 x 200)

Steel 72 DB 28

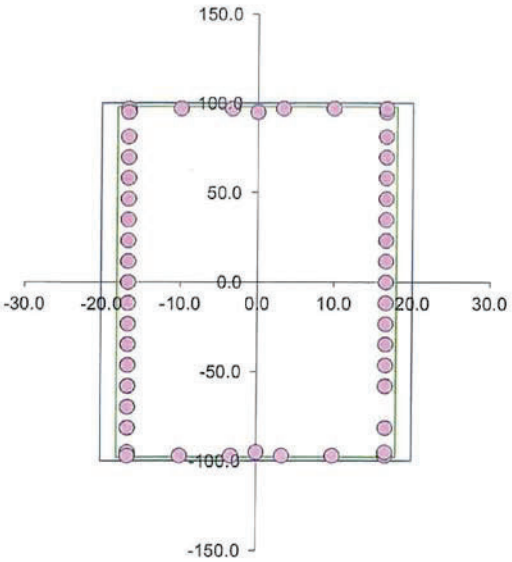
Stirrup DB 12 @ 0.350

Boundary of tie stirrup Column

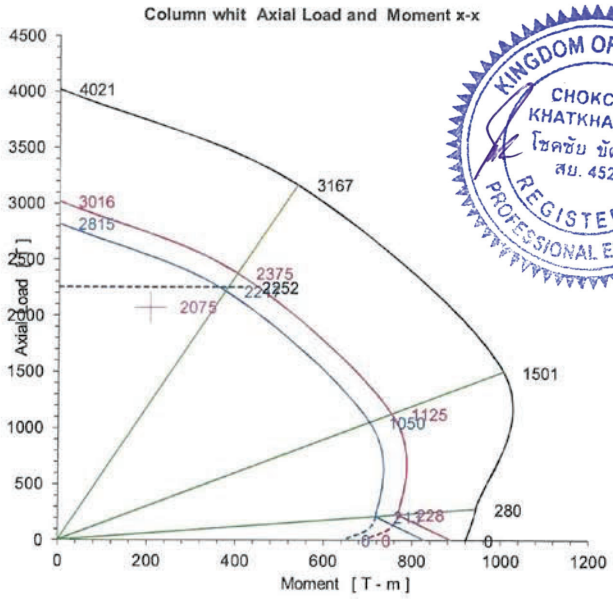
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
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สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-2 (40 x 200)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-2 2nd

Project : อาคารทิศตะวันออก

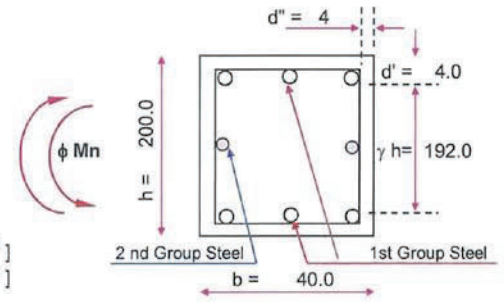
filename : COLUMN

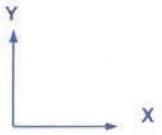
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	40	[cm]		
	h	=	200	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1925	[T]		
Moment	ϕ Mn	=	193	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	98.5	[cm^2]
	2 nd.	=	44	As =	270.9	[cm^2]
Steel Reinforcement	No.	=	60			
	d	=	196	[cm]		
d(εu/(εy+εu))	Cb	=	118.530	[cm]		
	p of Steel	=	0.046	OK		

Main Steel Used 60 DB 28 — DB 28

Stirrup DB 12 @ 0.350 — DB 12

e b = 0.66 [cm]





1925

Clumn (40 x 200)

Steel 60 DB 28

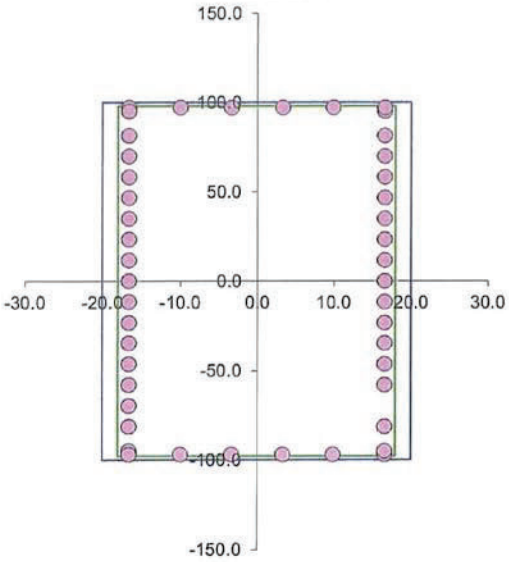
Stirrup DB 12 @ 0.350

Boundary of tie stirrup Column

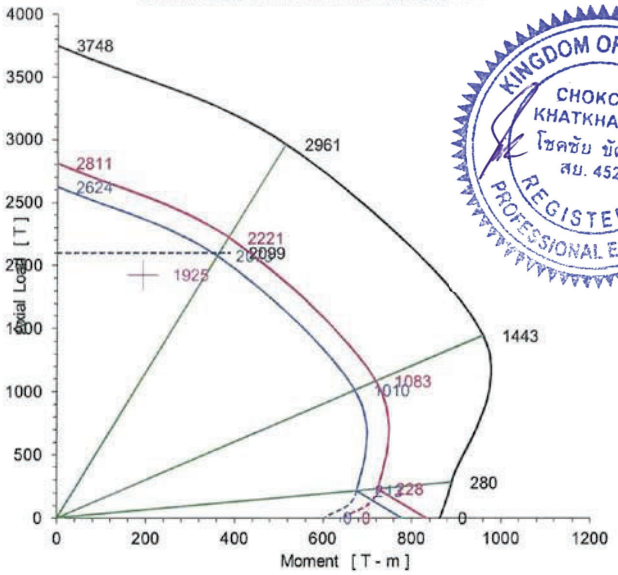
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-2 (40 x 200)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-2 3rd-5th

Project : อาคารทิศตะวันออก

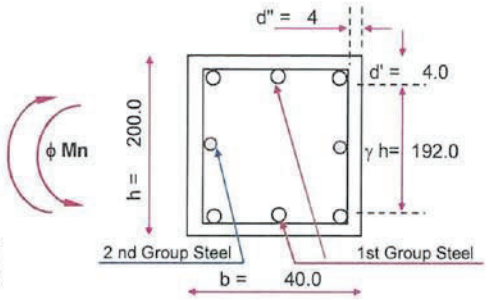
filename : COLUMN

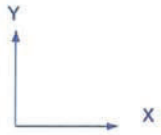
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	40	[cm]		
	h	=	200	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1425	[T]		
Moment	ϕ Mn	=	142	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	78.5	[cm^2]
	2 nd.	=	44	As =	216.0	[cm^2]
Steel Reinforcement	No.	=	60			
	d	=	196	[cm]		
d (εu / (εy + εu))	Cb	=	118.530	[cm]		
	ρ of Steel	=	0.037	OK		

Main Steel Used 60 DB 25 — DB 25

Stirrup RB 12 @ 0.350 — RB 12

e b = 0.64 [cm]

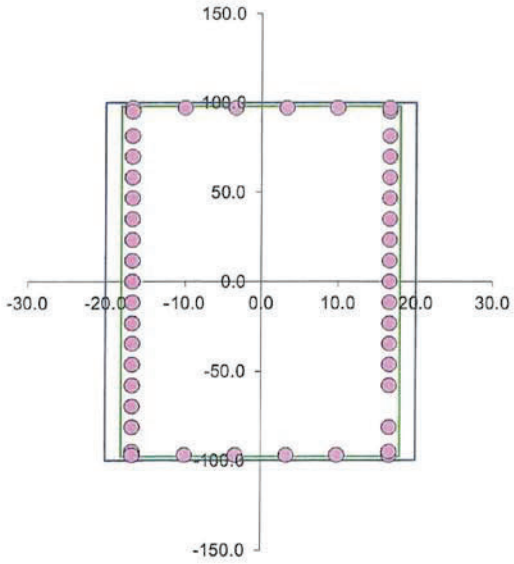




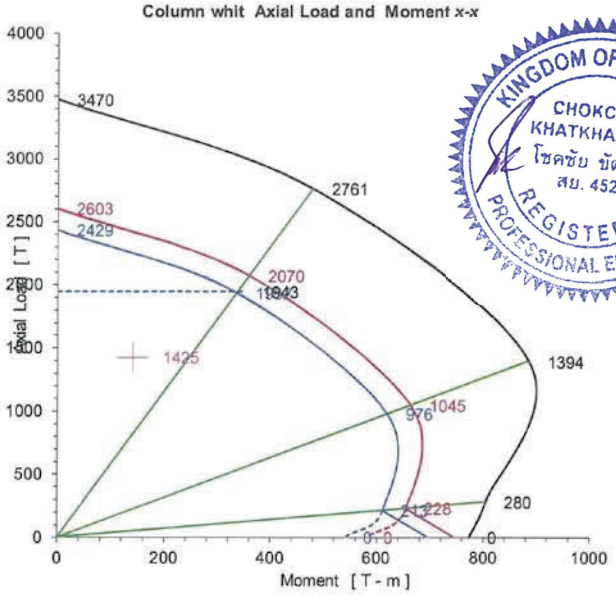
Clumn (40 x 200)
Steel 60 DB 25
Stirrup RB 12 @ 0.350

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัตขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-2 (40 x 200)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-2 6th-Roof

Project : อาคารทิศตะวันออก

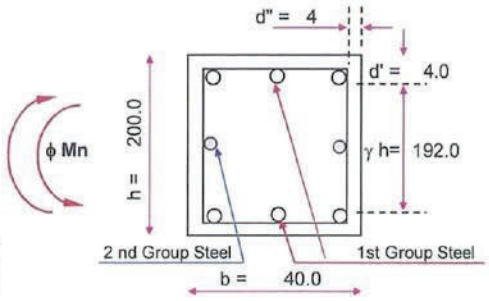
filename : COLUMN

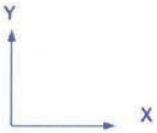
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	40	[cm]		
	h	=	200	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1165	[T]		
Moment	ϕ Mn	=	116	[T-m]		
Separate Steel 2 group	1 st.	=	8	As =	39.3	[cm^2]
	2 nd.	=	22	As =	108.0	[cm^2]
Steel Reinforcement	No.	=	30			
	d	=	196	[cm]		
d (εu/(εy+εu))	Cb	=	118.530	[cm]		
	ρ of Steel	=	0.018	OK		

Main Steel Used 30 DB 25 — DB 25

Stirrup RB 12 @ 0.350 — RB 12

e b = 0.57 [cm]



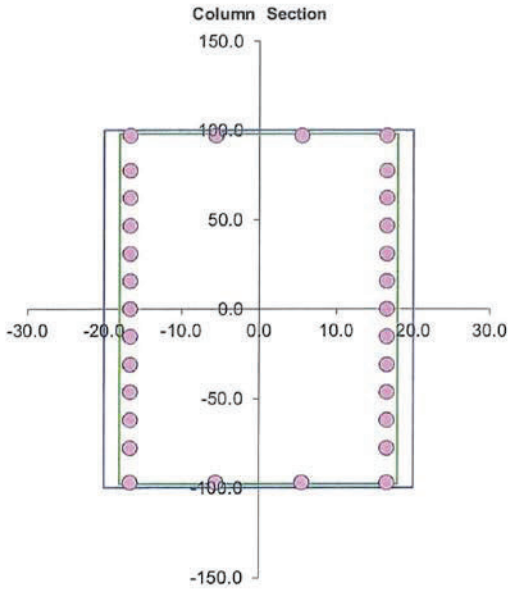


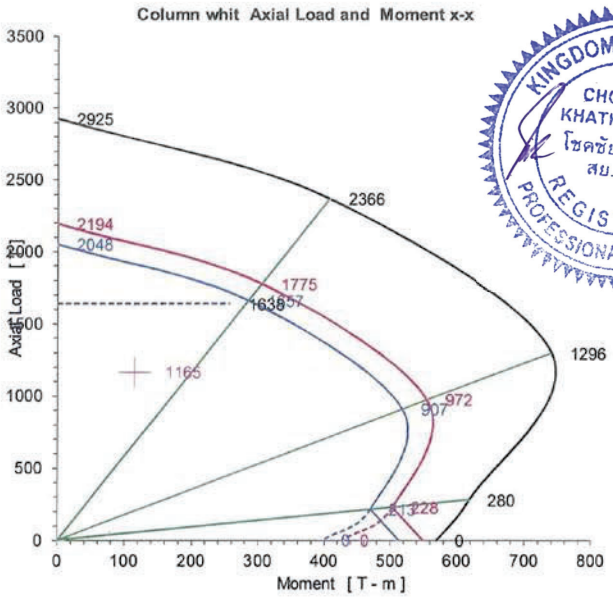
Clumn (40 x 200)

Steel 30 DB 25

Stirrup RB 12 @ 0.350

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-2 (40 x 200)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-3 1st

Project : อาคารทิศตะวันออก

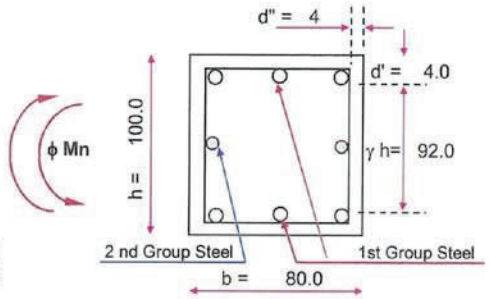
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1900	[T]		
Moment	ϕ Mn	=	190	[T-m]		
Separate Steel 2 group	1 st.	=	30	As =	184.7	[cm²]
	2 nd.	=	48	As =	295.6	[cm²]
Steel Reinforcement	No.	=	78			
	d	=	96	[cm]		
d(εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.060	OK		

Main Steel Used 78 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.45 [cm]



Clumn (80 x 100)

Steel 78 DB 28

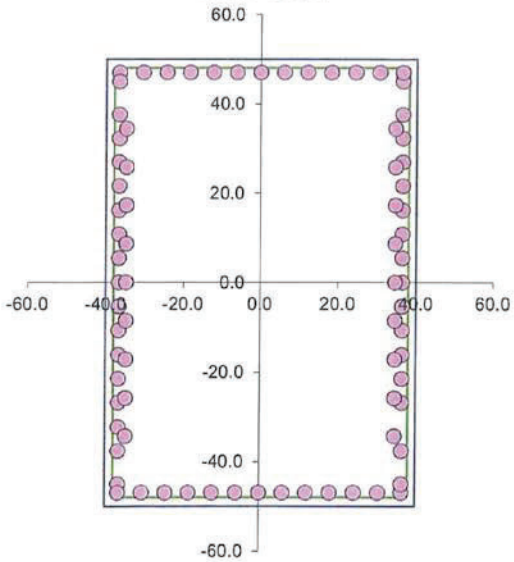
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column

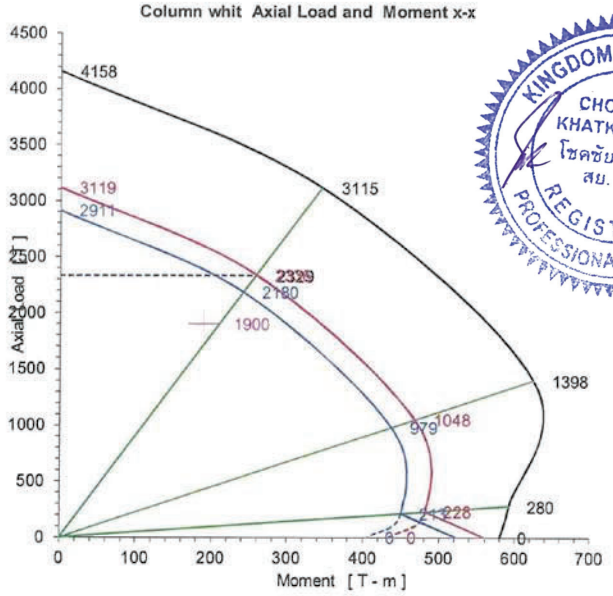
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-3 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-3 2nd-3rd

Project : อาคารทิศตะวันออก

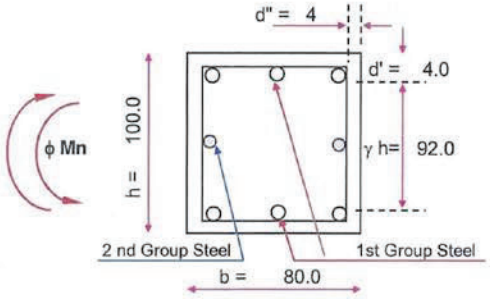
filename : COLUMN

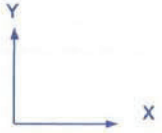
Concrete Strength	fc'	=	350	[kg/cm^2]	
	fy SD	=	4000	[kg/cm^2]	
	fy RD	=	2400	[kg/cm^2]	
Column Dimension	b	=	80	[cm]	
	h	=	100	[cm]	
	d'	=	4	[cm]	
	d"	=	4	[cm]	
Load	ϕ Pn	=	1640	[T]	
Moment	ϕ Mn	=	164	[T-m]	
Separate Steel 2 group	1 st.	=	30	As = 184.7	[cm^2]
	2 nd.	=	34	As = 209.4	[cm^2]
Steel Reinforcement	No.	=	64		
	d	=	96	[cm]	
d (εu/(εy+εu))	Cb	=	58.055	[cm]	
	ρ of Steel	=	0.049	OK	

Main Steel Used 64 DB 28 — DB 28

Stirrup RB 12 @ 0.400 — RB 12

e b = 0.47 [cm]





Clumn (80 x 100)

Steel 64 DB 28

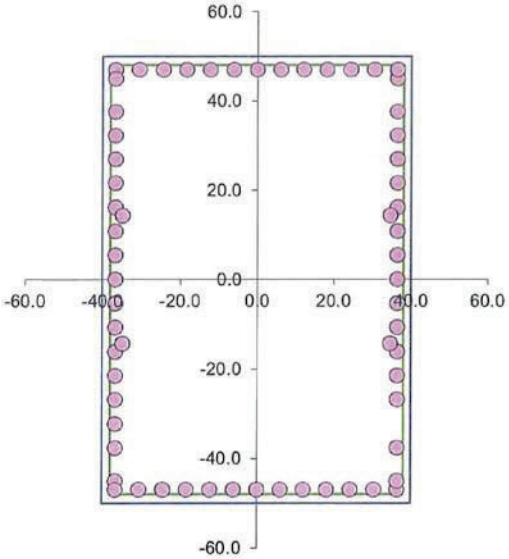
Stirrup RB 12 @ 0.400

Boundary of tie stirrup Column

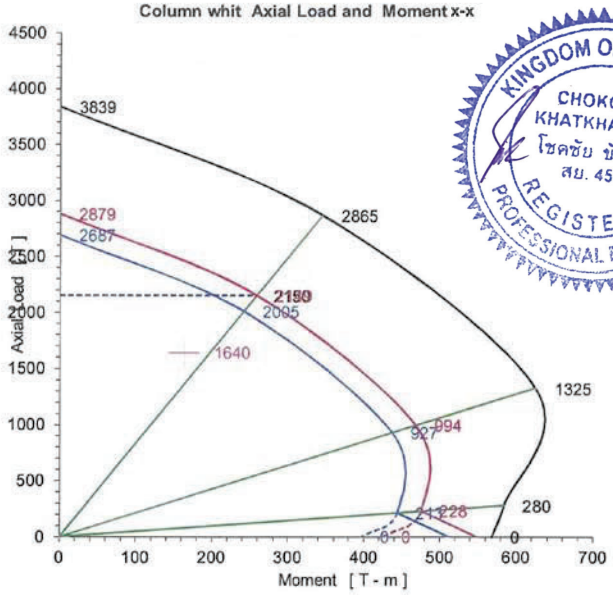
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
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โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-3 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-3 4h-5th

Project : อาคารทิศตะวันออก

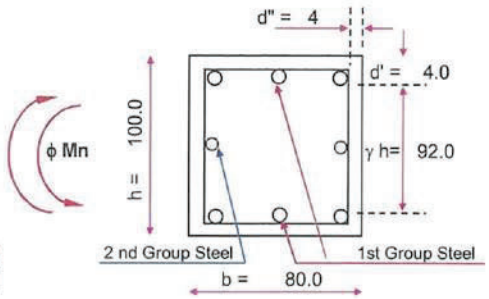
filename : COLUMN

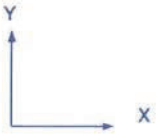
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1380	[T]		
Moment	ϕ Mn	=	138	[T-m]		
Separate Steel 2 group	1 st.	=	36	As =	176.7	[cm^2]
	2 nd.	=	22	As =	108.0	[cm^2]
Steel Reinforcement	No.	=	58			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.036	OK		

Main Steel Used 58 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.49 [cm]



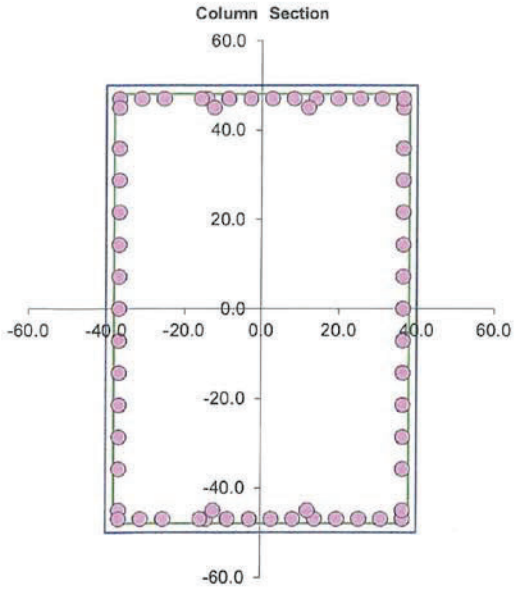


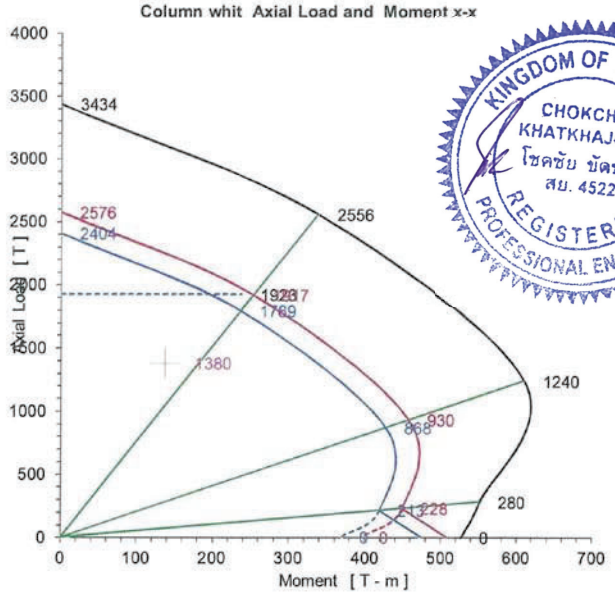
Clumn (80 x 100)

Steel 58 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-3 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-3 6th-7th

Project : อาคารทิศตะวันออก

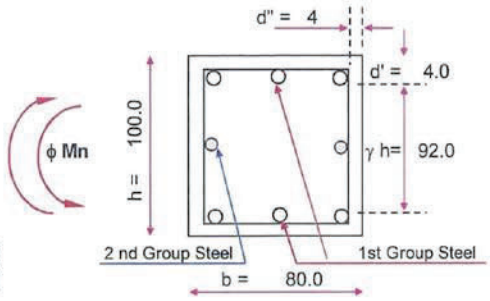
filename : COLUMN

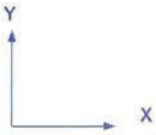
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1165	[T]		
Moment	ϕ Mn	=	116	[T-m]		
Separate Steel 2 group	1 st.	=	18	As =	88.4	[cm^2]
	2 nd.	=	12	As =	58.9	[cm^2]
Steel Reinforcement	No.	=	30			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.018	OK		

Main Steel Used 30 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.37 [cm]





Clumn (80 x 100)

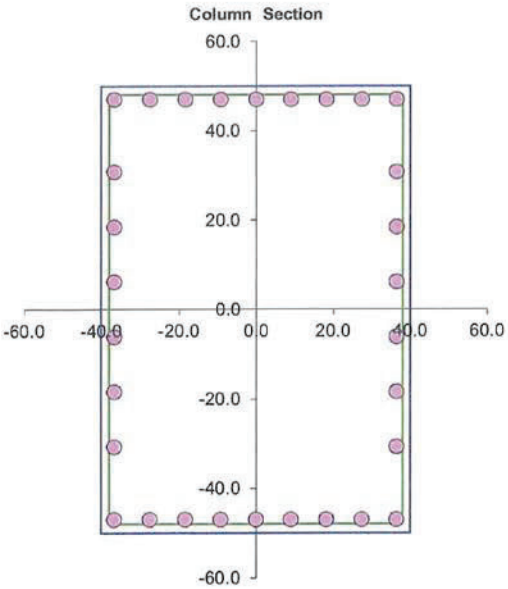
Steel 30 DB 25

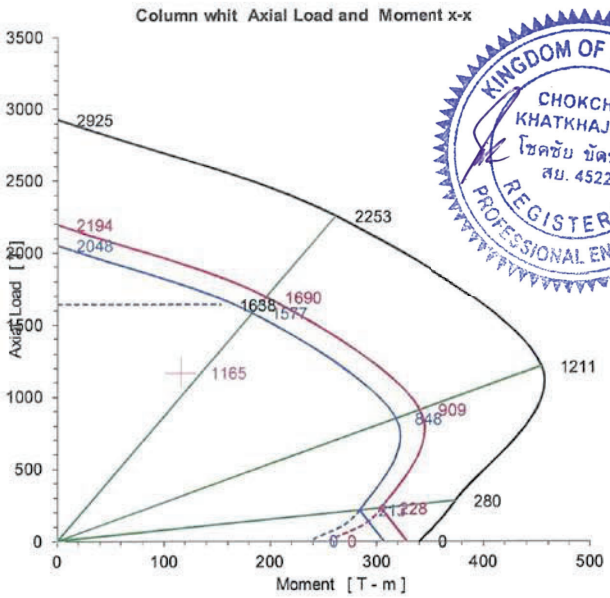
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column

Boundary of sprial stirrup Column

Boundary of Ultimate Capacity





Column C-3 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-3 8th-Roof

Project : อาคารทิศตะวันออก

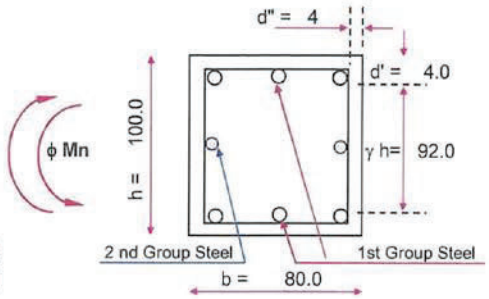
filename : COLUMN

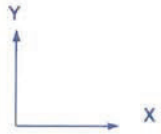
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	905	[T]		
Moment	ϕ Mn	=	90	[T-m]		
Separate Steel 2 group	1 st.	=	14	As =	68.7	[cm^2]
	2 nd.	=	10	As =	49.1	[cm^2]
Steel Reinforcement	No.	=	24			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.015	OK		

Main Steel Used 24 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.35 [cm]





Clumn (80 x 100)

Steel 24 DB 25

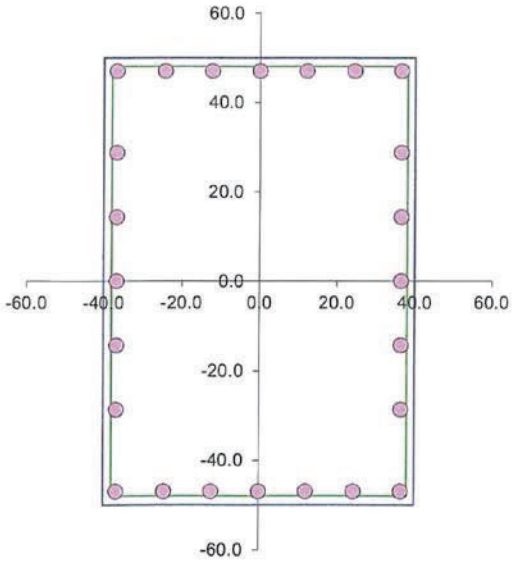
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column

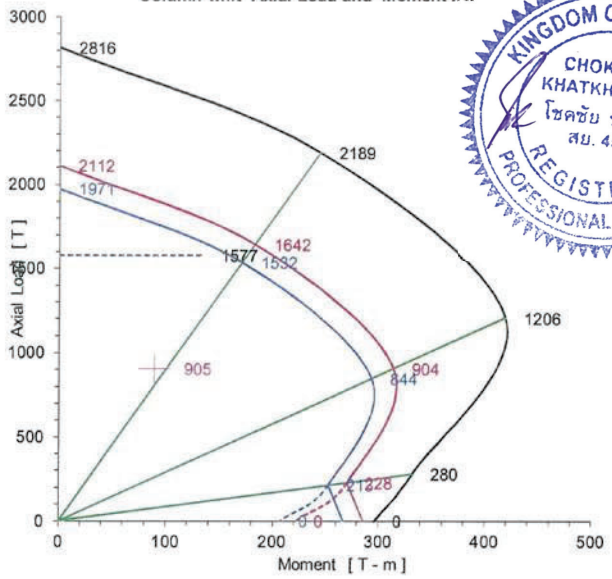
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-3 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-4 1st

Project : อาคารทิศตะวันออก

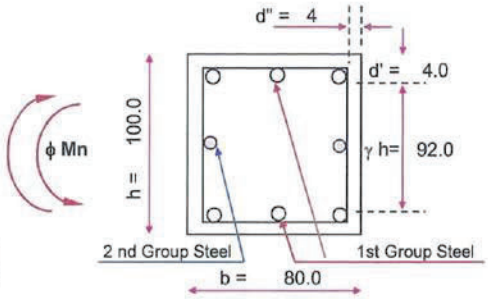
filename : COLUMN

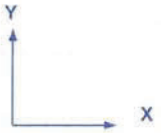
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	1815	[T]		
Moment	ϕ Mn	=	181	[T-m]		
Separate Steel 2 group	1 st.	=	30	As =	184.7	[cm^2]
	2 nd.	=	36	As =	221.7	[cm^2]
Steel Reinforcement	No.	=	66			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.051	OK		

Main Steel Used 66 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.47 [cm]





Clumn (80 x 100)

Steel 66 DB 28

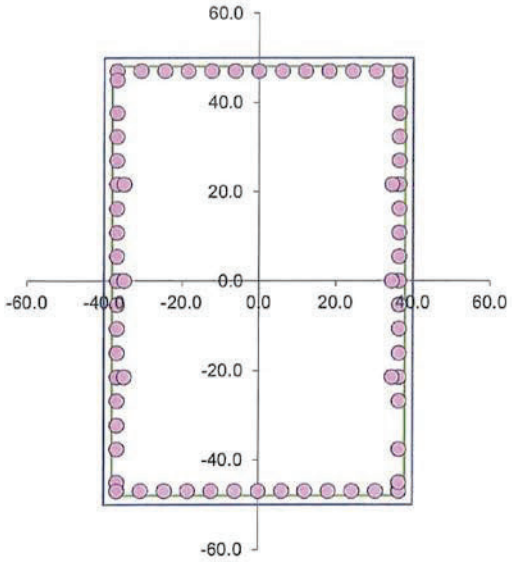
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column

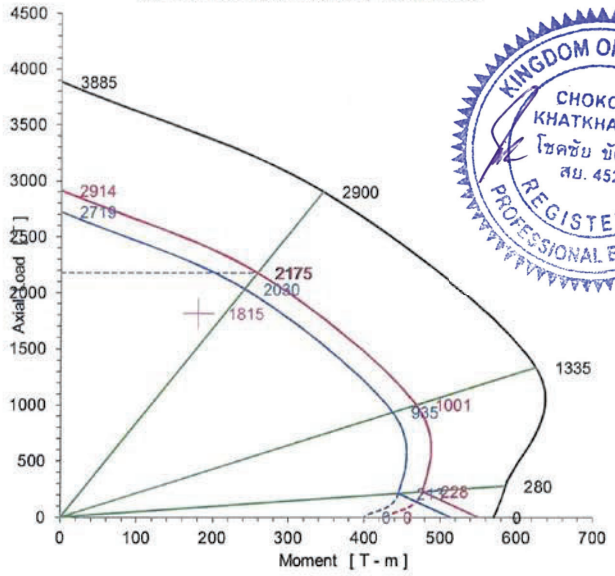
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



Column C-4 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-4 2nd-3rd

Project : อาคารทิศตะวันออก

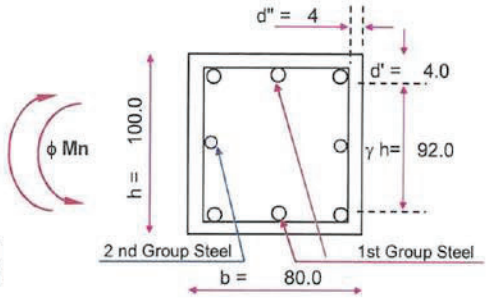
filename : COLUMN

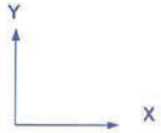
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1685	[T]		
Moment	ϕ Mn	=	168	[T-m]		
Separate Steel 2 group	1 st.	=	20	As =	123.2	[cm^2]
	2 nd.	=	36	As =	221.7	[cm^2]
Steel Reinforcement	No.	=	56			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.043	OK		

Main Steel Used 56 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.38 [cm]





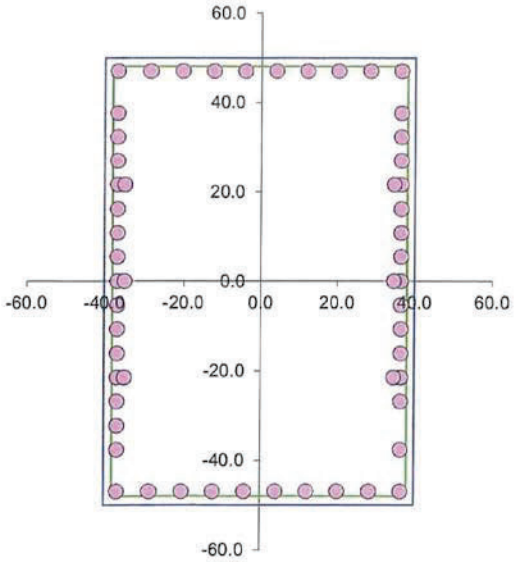
Clumn (80 x 100)

Steel 56 DB 28

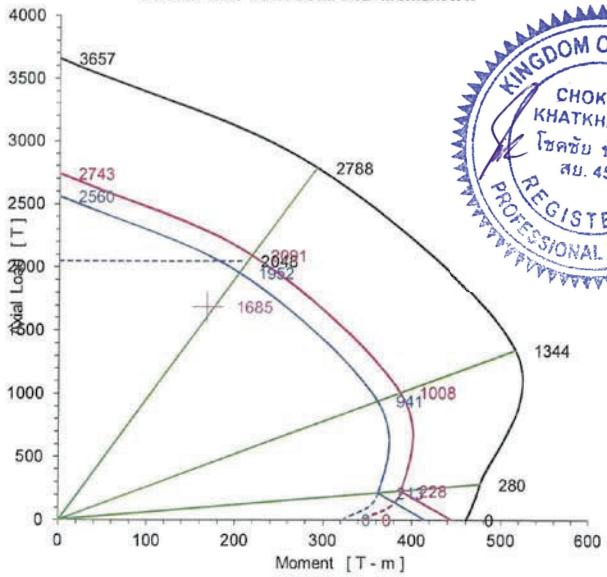
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-4 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-4 4th-5th

Project : อาคารทิศตะวันออก

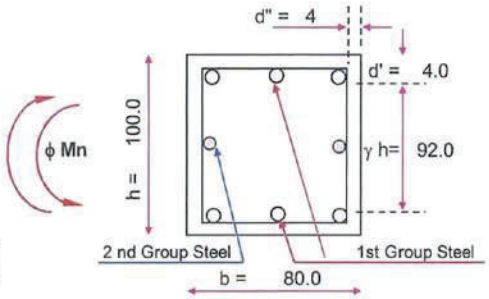
filename : COLUMN

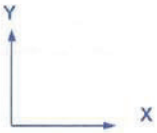
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1425	[T]		
Moment	ϕ Mn	=	142	[T-m]		
Separate Steel 2 group	1 st.	=	20	As =	98.2	[cm^2]
	2 nd.	=	30	As =	147.3	[cm^2]
Steel Reinforcement	No.	=	50			
	d	=	96	[cm]		
d(εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.031	OK		

Main Steel Used 50 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.37 [cm]



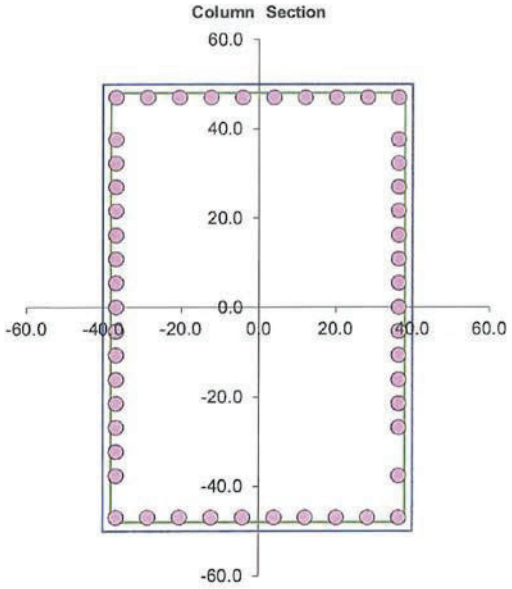


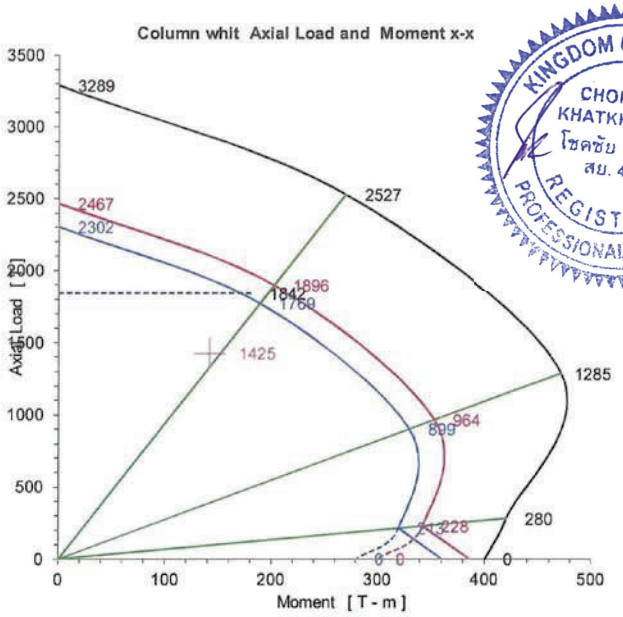
Clumn (80 x 100)

Steel 50 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-4 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-4 6th-7th

Project : อาคารทิศตะวันออก

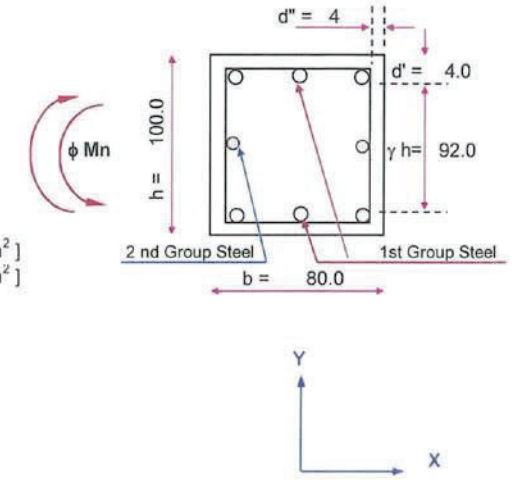
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1165	[T]		
Moment	ϕ Mn	=	116	[T-m]		
Separate Steel 2 group	1 st.	=	18	As =	88.4	[cm^2]
	2 nd.	=	12	As =	58.9	[cm^2]
Steel Reinforcement	No.	=	30			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.018	OK		

Main Steel Used 30 DB 25 — DB 25

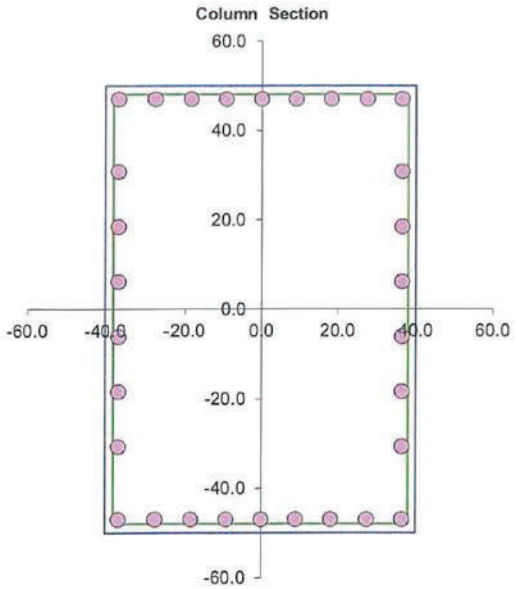
Stirrup RB 9 @ 0.400 — RB 9

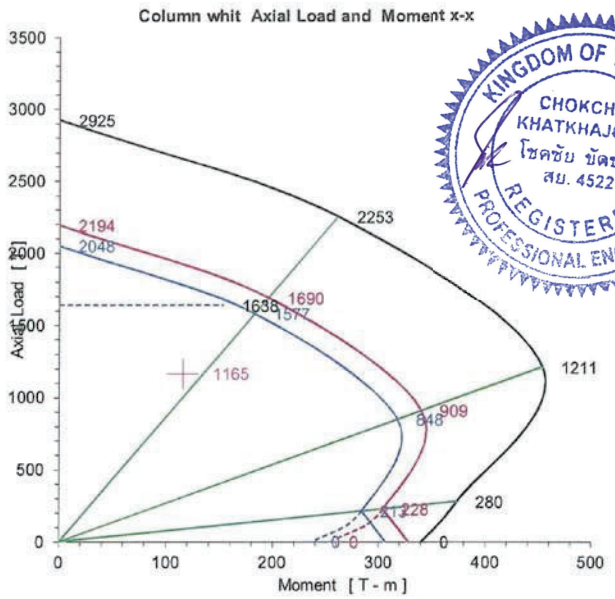
e b = 0.37 [cm]



Clumn (80 x 100)
Steel 30 DB 25
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-4 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-4 8th-Roof

Project : อาคารทิศตะวันออก

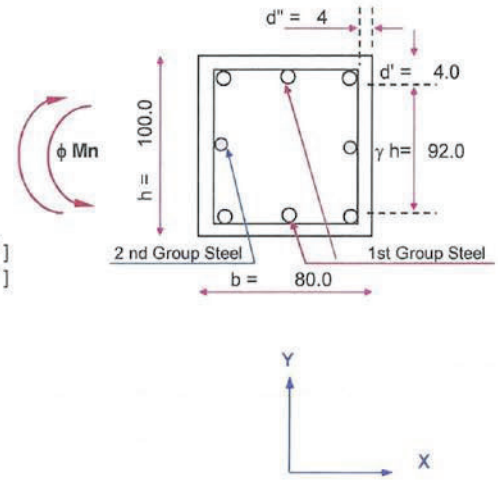
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	905	[T]		
Moment	ϕ Mn	=	90	[T-m]		
Separate Steel 2 group	1 st.	=	14	As =	68.7	[cm^2]
	2 nd.	=	10	As =	49.1	[cm^2]
Steel Reinforcement	No.	=	24			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.015	OK		

Main Steel Used 24 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.35 [cm]

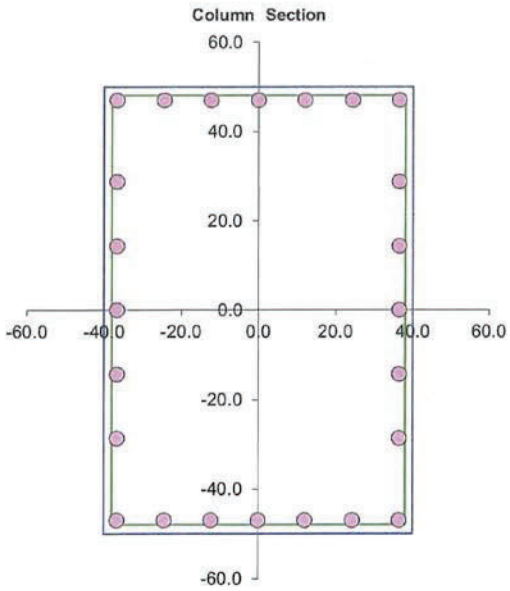


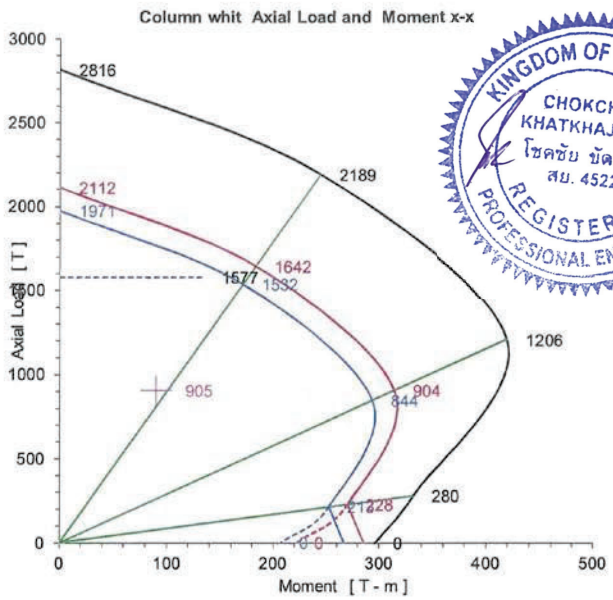
Clumn (80 x 100)

Steel 24 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-4 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-5 1st

Project : อาคารทิศตะวันออก

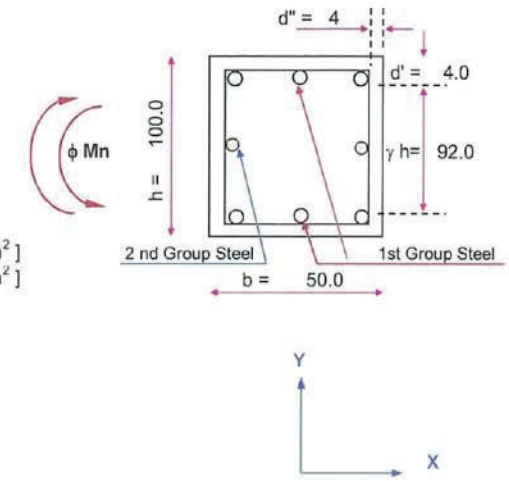
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	855	[T]		
Moment	ϕ Mn	=	86	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	98.5	[cm²]
	2 nd.	=	20	As =	123.2	[cm²]
Steel Reinforcement	No.	=	36			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.044	OK		

Main Steel Used 36 DB 28 — DB 28

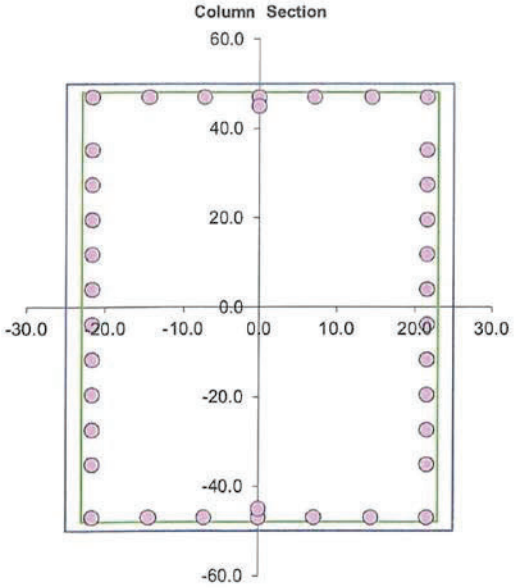
Stirrup DB 12 @ 0.400 — DB 12

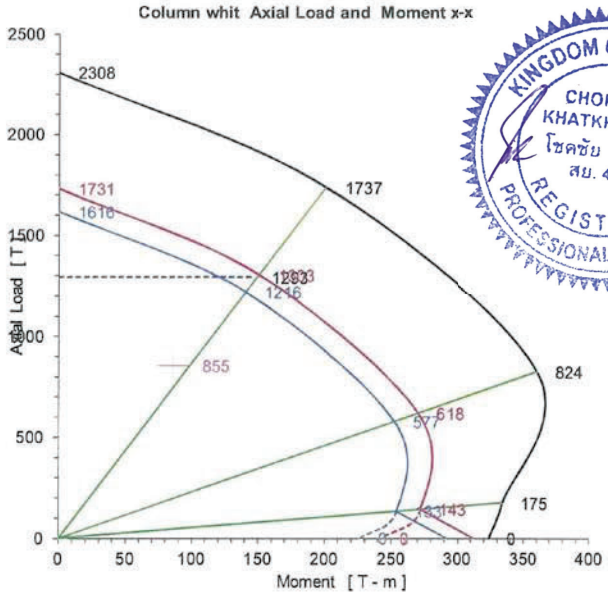
e b = 0.44 [cm]



Clumn (50 x 100)
Steel 36 DB 28
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-5 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-5 2nd-3rd

Project : อาคารทิศตะวันออก

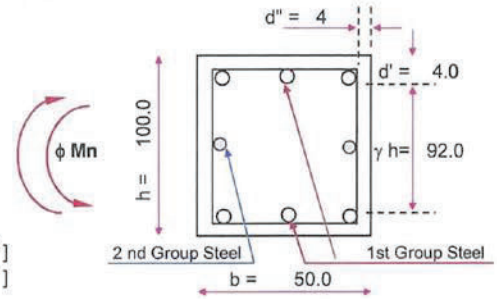
filename : COLUMN

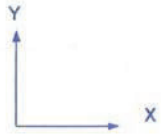
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	725	[T]		
Moment	ϕ Mn	=	72	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	98.5	[cm^2]
	2 nd.	=	16	As =	98.5	[cm^2]
Steel Reinforcement	No.	=	32			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.039	OK		

Main Steel Used 32 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

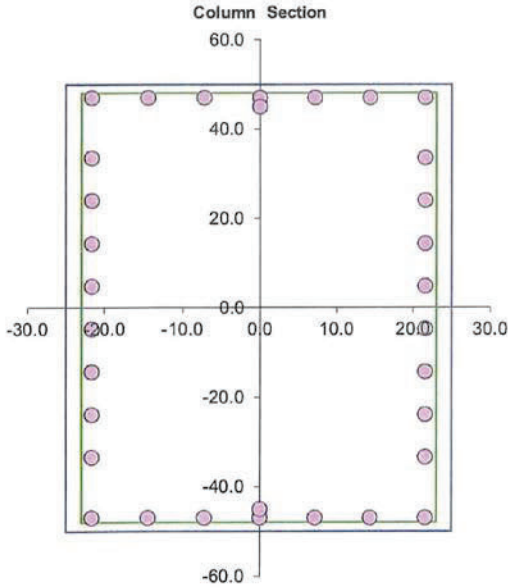
e b = 0.45 [cm]

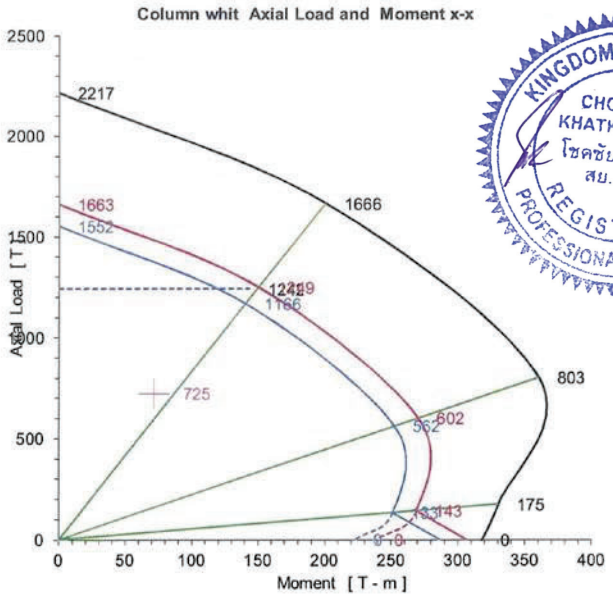




Clumn (50 x 100)
Steel 32 DB 28
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-5 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-5 4th-5th

Project : อาคารทิศตะวันออก

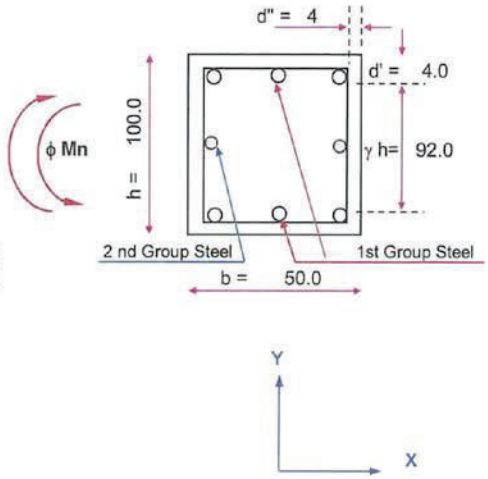
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	595	[T]		
Moment	ϕ Mn	=	60	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	78.5	[cm^2]
	2 nd.	=	16	As =	78.5	[cm^2]
Steel Reinforcement	No.	=	32			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.031	OK		

Main Steel Used 32 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

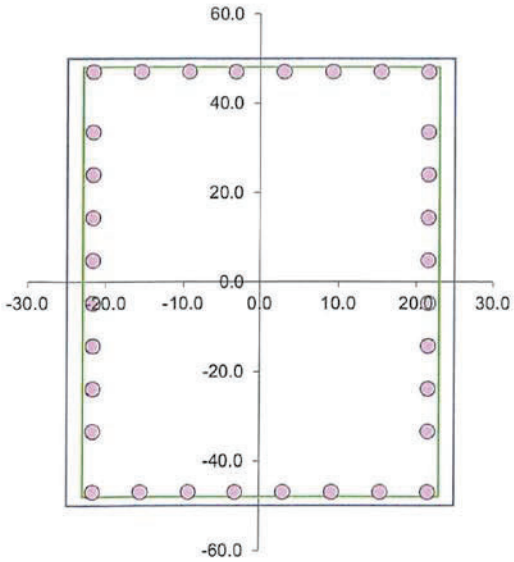
e b = 0.41 [cm]



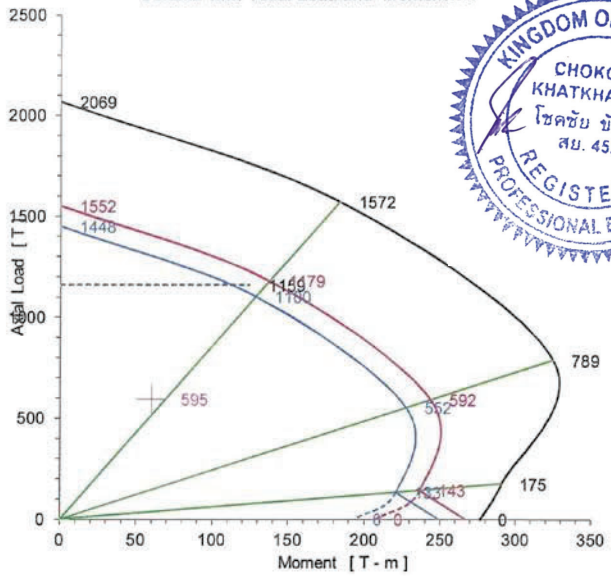
Clumn (50 x 100)
Steel 32 DB 25
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-5 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-5 6th-7th

Project : อาคารทิศตะวันออก

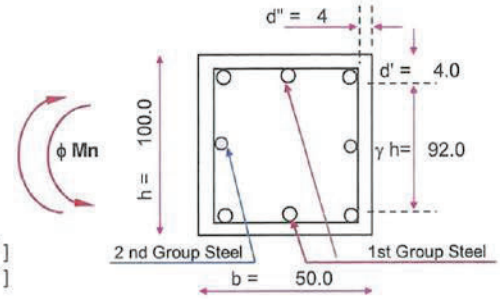
filename : COLUMN

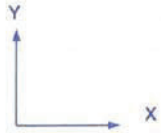
Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	465	[T]		
Moment	ϕ Mn	=	46	[T-m]		
Separate Steel 2 group	1 st.	=	16	As =	78.5	[cm²]
	2 nd.	=	8	As =	39.3	[cm²]
Steel Reinforcement	No.	=	24			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.024	OK		

Main Steel Used 24 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.43 [cm]





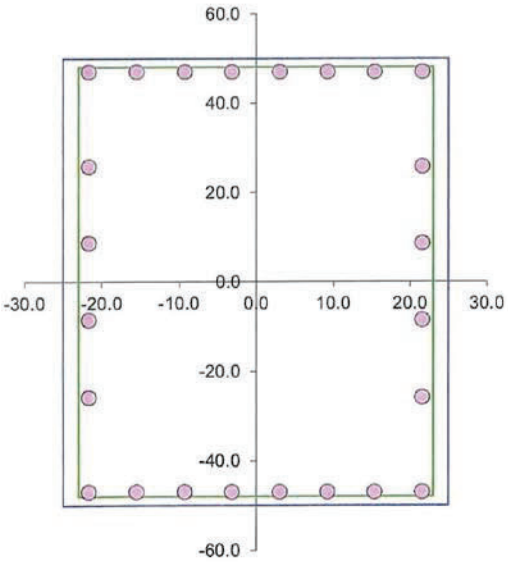
Clumn (50 x 100)

Steel 24 DB 25

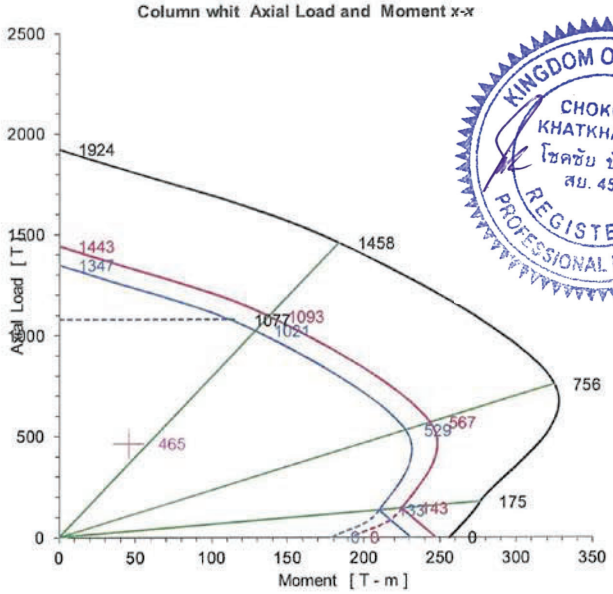
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-5 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-5 8th-Roof

Project : อาคารทิศตะวันออก

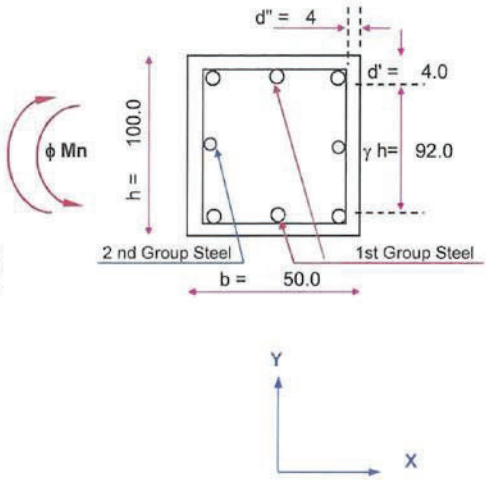
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	400	[T]		
Moment	ϕ Mn	=	40	[T-m]		
Separate Steel 2 group	1 st.	=	6	As =	29.5	[cm^2]
	2 nd.	=	10	As =	49.1	[cm^2]
Steel Reinforcement	No.	=	16			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.016	OK		

Main Steel Used 16 DB 25 — DB 25

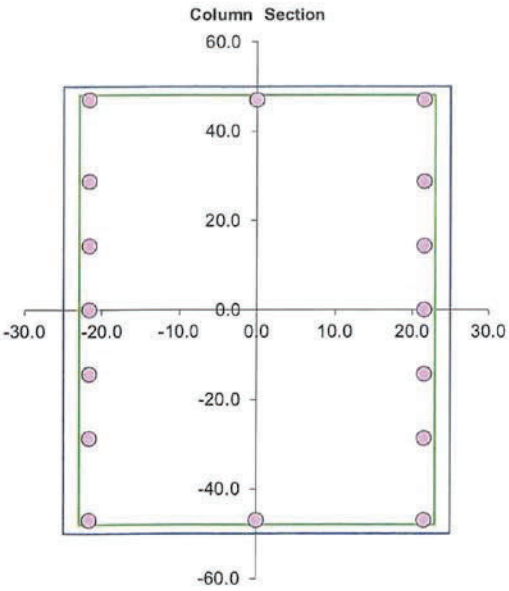
Stirrup RB 9 @ 0.400 — RB 9

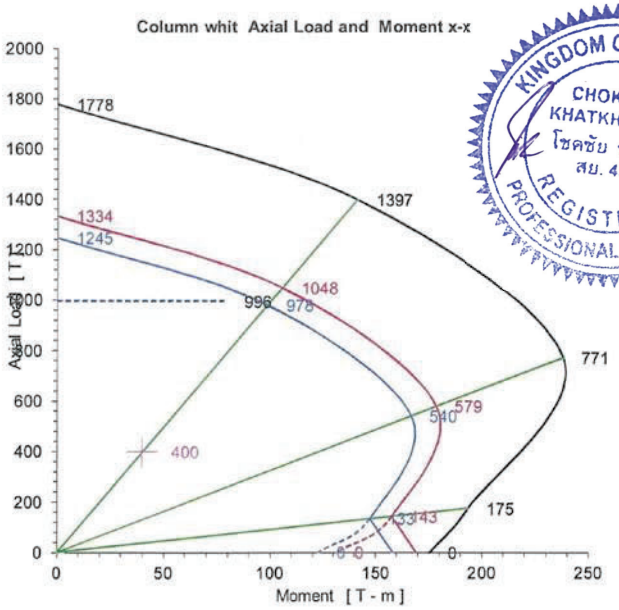
e b = 0.31 [cm]



Clumn (50 x 100)
Steel 16 DB 25
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-5 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-6 1st

Project : อาคารทิศตะวันออก

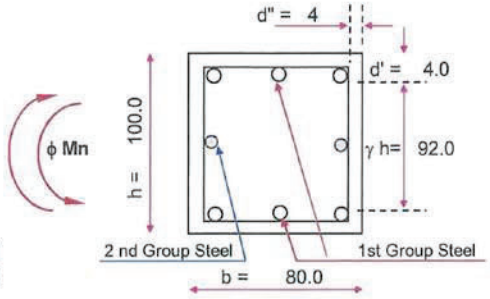
filename : COLUMN

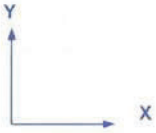
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	2225	[T]		
Moment	ϕ Mn	=	222	[T-m]		
Separate Steel 2 group	1 st.	=	30	As =	184.7	[cm^2]
	2 nd.	=	50	As =	307.9	[cm^2]
Steel Reinforcement	No.	=	80			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.062	OK		

Main Steel Used 80 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.44 [cm]





Clumn (80 x 100)

Steel 80 DB 28

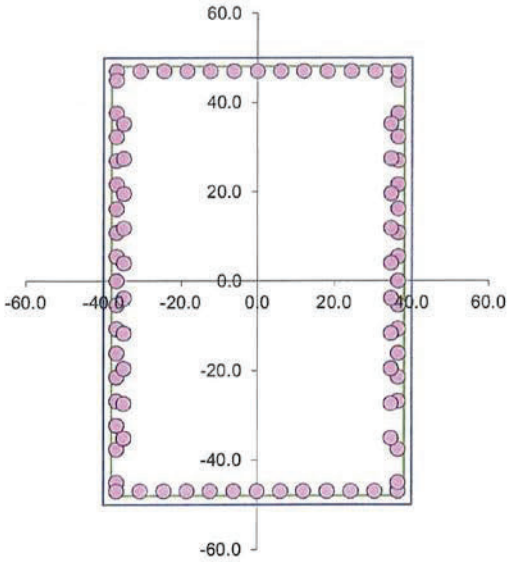
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column

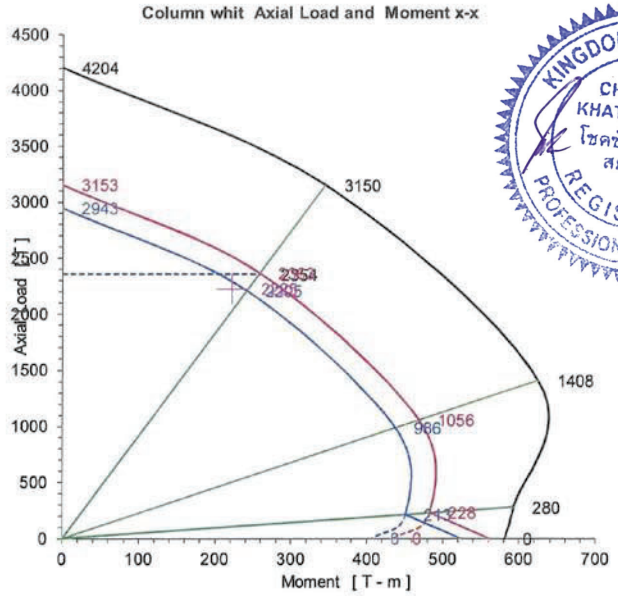
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-6 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-6 2nd-3rd

Project : อาคารทิศตะวันออก

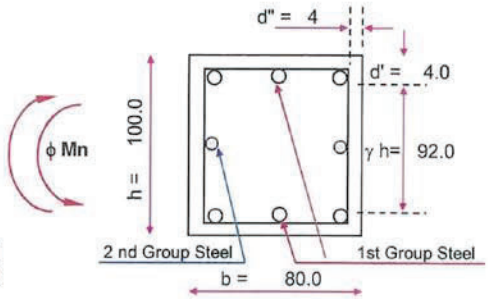
filename : COLUMN

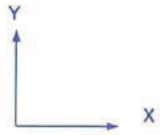
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1965	[T]		
Moment	ϕ Mn	=	196	[T-m]		
Separate Steel 2 group	1 st.	=	28	As =	172.4	[cm^2]
	2 nd.	=	46	As =	283.2	[cm^2]
Steel Reinforcement	No.	=	74			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.057	OK		

Main Steel Used 74 DB 28 — DB 28

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.43 [cm]

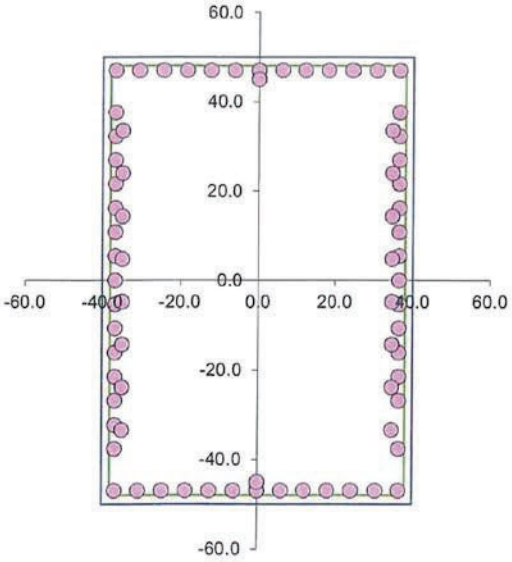




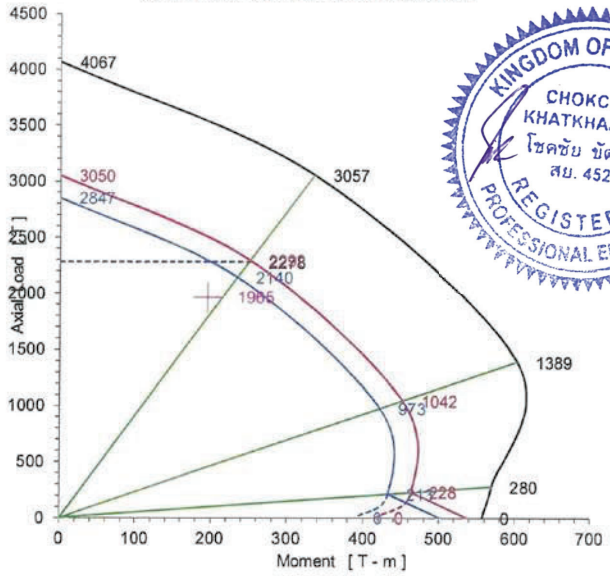
Clumn (80 x 100)
Steel 74 DB 28
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สบ. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-6 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-6 4th-5th

Project : อาคารทิศตะวันออก

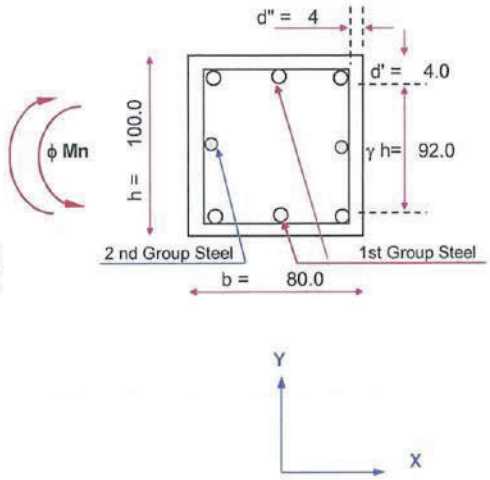
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1705	[T]		
Moment	ϕ Mn	=	170	[T-m]		
Separate Steel 2 group	1 st.	=	32	As =	157.1	[cm^2]
	2 nd.	=	28	As =	137.4	[cm^2]
Steel Reinforcement	No.	=	60			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.037	OK		

Main Steel Used 60 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.45 [cm]

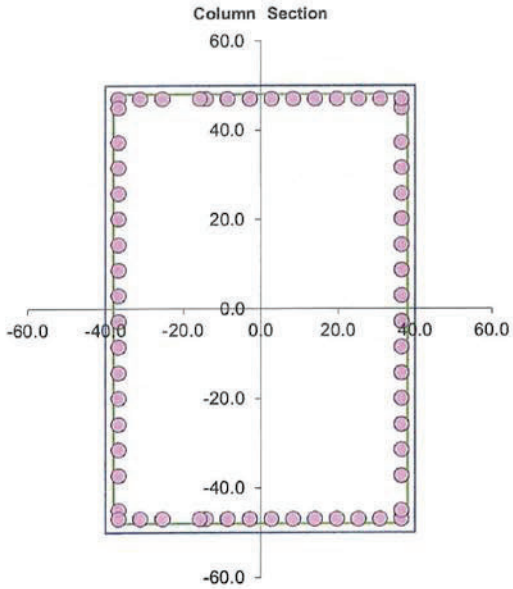


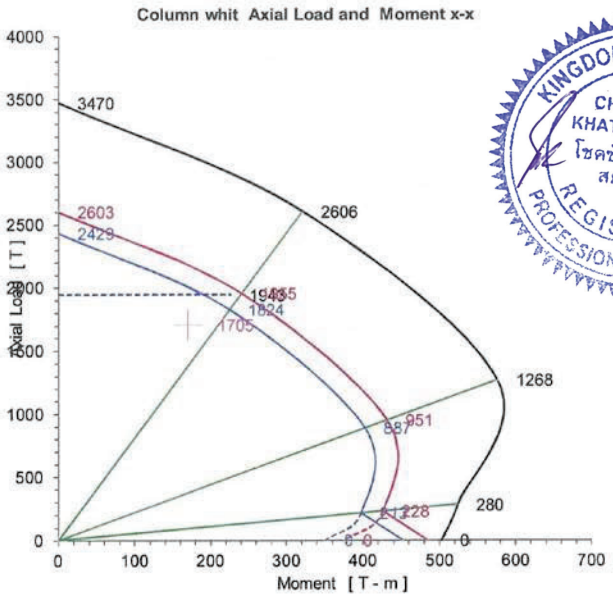
Clumn (80 x 100)

Steel 60 DB 25

Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-6 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-6 6th-7th

Project : อาคารทิศตะวันออก

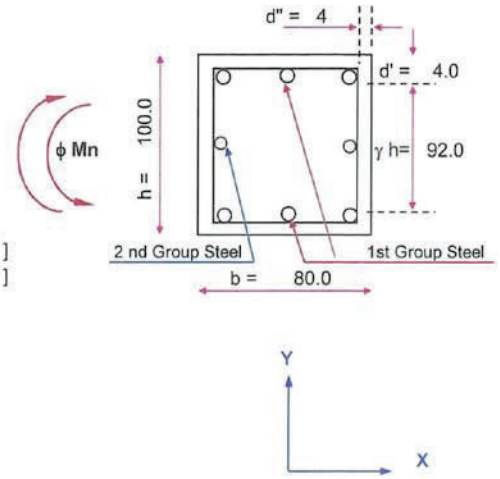
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	1445	[T]		
Moment	ϕ Mn	=	145	[T-m]		
Separate Steel 2 group	1 st.	=	30	As =	147.3	[cm^2]
	2 nd.	=	18	As =	88.4	[cm^2]
Steel Reinforcement	No.	=	48			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.029	OK		

Main Steel Used 48 DB 25 — DB 25

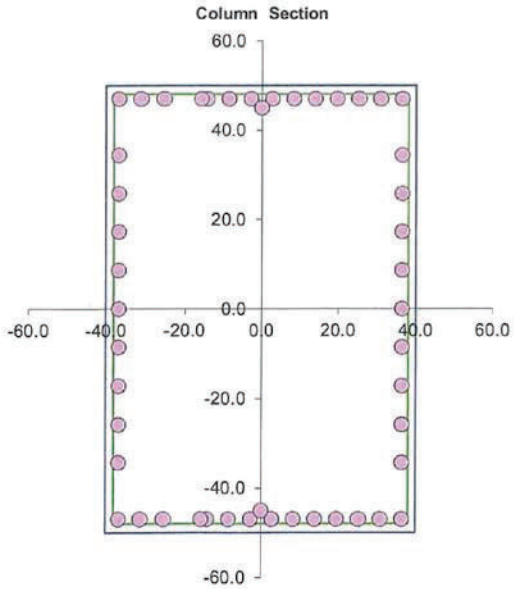
Stirrup RB 9 @ 0.400 — RB 9

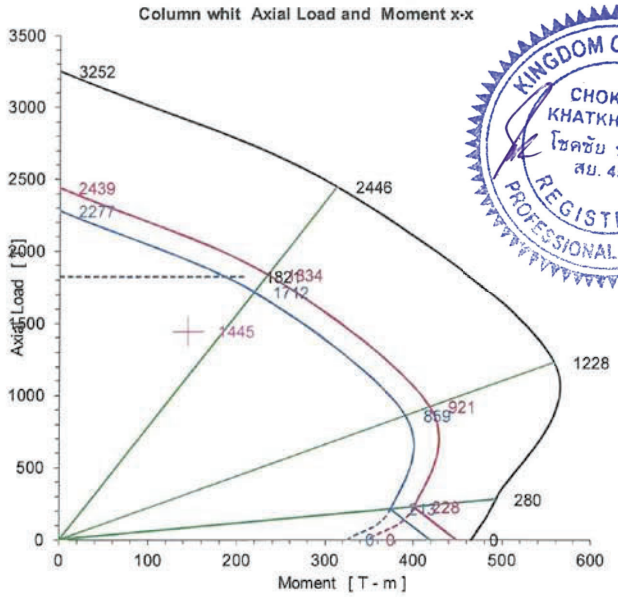
e b = 0.45 [cm]



Clumn (80 x 100)
Steel 48 DB 25
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-6 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-6 8-Roofth

Project : อาคารทิศตะวันออก

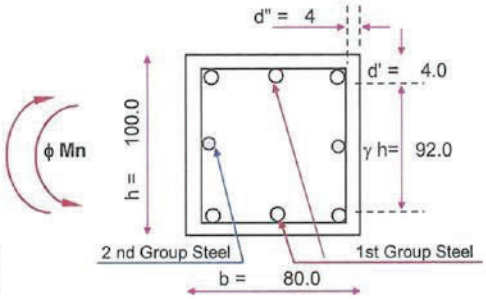
filename : COLUMN

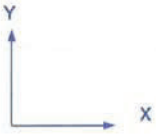
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	1185	[T]		
Moment	ϕ Mn	=	119	[T-m]		
Separate Steel 2 group	1 st.	=	18	As =	88.4	[cm^2]
	2 nd.	=	12	As =	58.9	[cm^2]
Steel Reinforcement	No.	=	30			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.018	OK		

Main Steel Used 30 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.37 [cm]





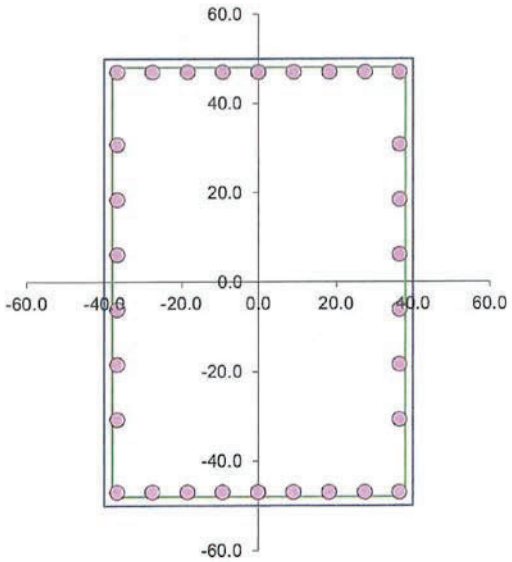
Clumn (80 x 100)

Steel 30 DB 25

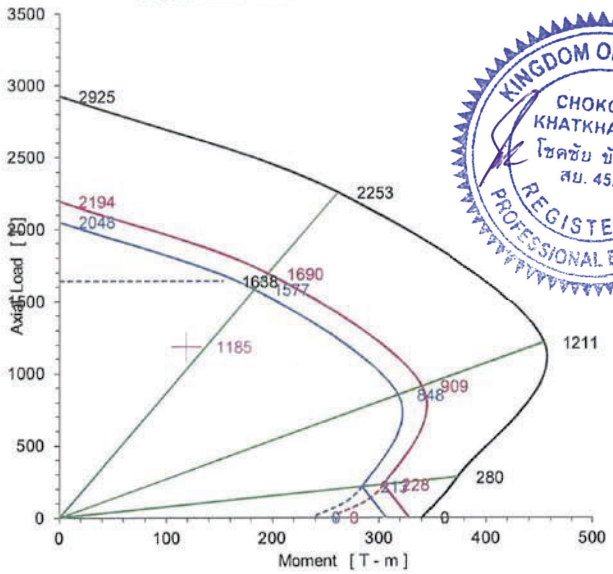
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
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สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-6 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-7 1st-4th

Project : อาคารทิศตะวันออก

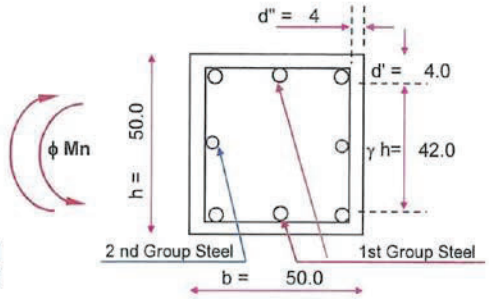
filename : COLUMN

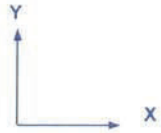
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	50	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	60	[T]		
Moment	ϕ Mn	=	6	[T-m]		
Separate Steel 2 group	1 st.	=	10	As =	31.4	[cm^2]
	2 nd.	=	6	As =	18.8	[cm^2]
Steel Reinforcement	No.	=	16			
	d	=	46	[cm]		
d (εu/(εy+εu))	Cb	=	27.818	[cm]		
	ρ of Steel	=	0.020	OK		

Main Steel Used 16 DB 20 — DB 20

Stirrup RB 9 @ 0.300 — RB 9

e b = 0.20 [cm]





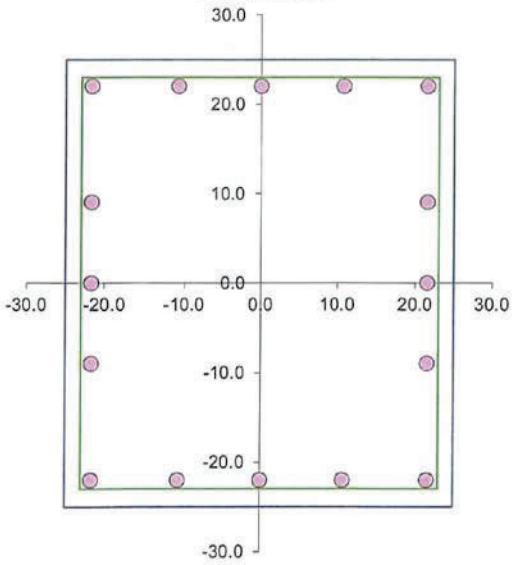
Clumn (50 x 50)

Steel 16 DB 20

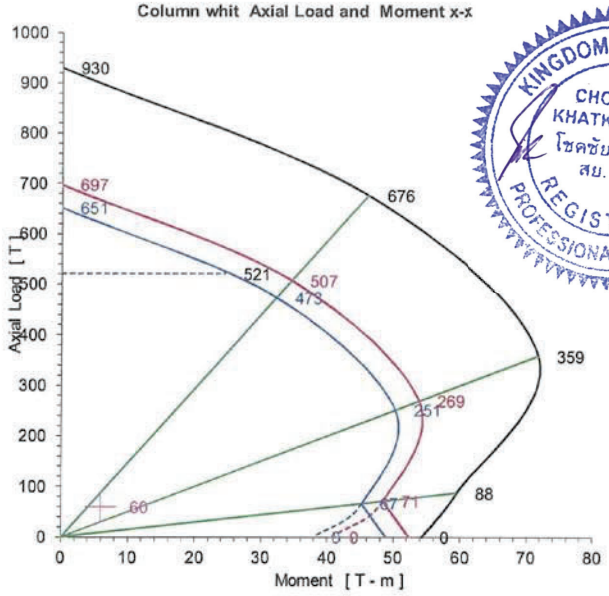
Stirrup RB 9 @ 0.300

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-7 (50 x 50)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-7A 1st-4th

Project : อาคารทิศตะวันออก

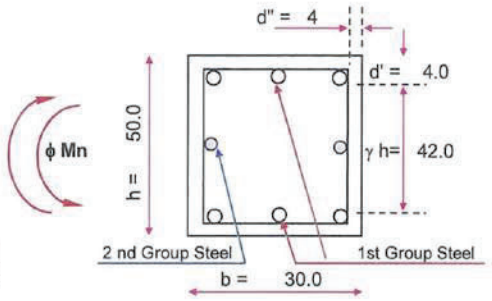
filename : COLUMN

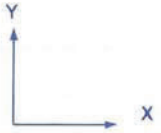
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	30	[cm]		
	h	=	50	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	30	[T]		
Moment	ϕ Mn	=	3	[T-m]		
Separate Steel 2 group	1 st.	=	6	As =	18.8	[cm^2]
	2 nd.	=	6	As =	18.8	[cm^2]
Steel Reinforcement	No.	=	12			
	d	=	46	[cm]		
d(εu/(εy+εu))	Cb	=	27.818	[cm]		
	ρ of Steel	=	0.025	OK		

Main Steel Used 12 DB 20 — DB 20

Stirrup RB 9 @ 0.250 — RB 9

e b = 0.20 [cm]





Clumn (30 x 50)

Steel 12 DB 20

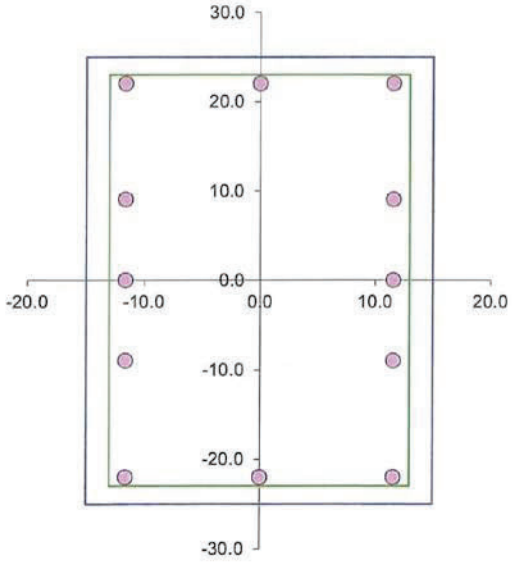
Stirrup RB 9 @ 0.250

Boundary of tie stirrup Column

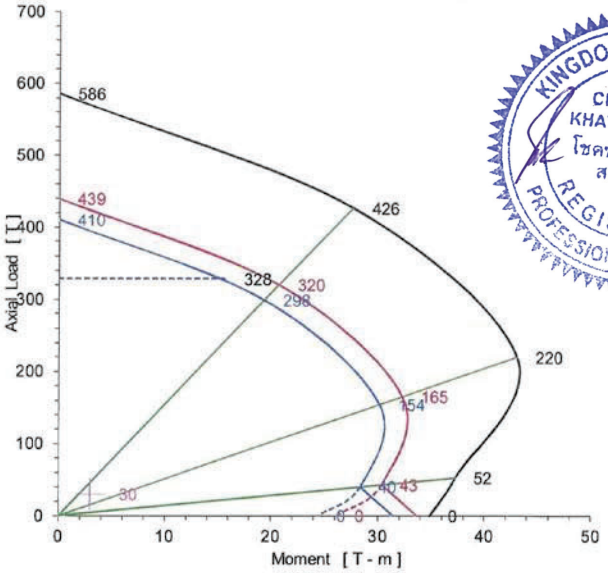
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัตขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-7A (30 x 50)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. C-9 1st

Project : อาคารทิศตะวันออก

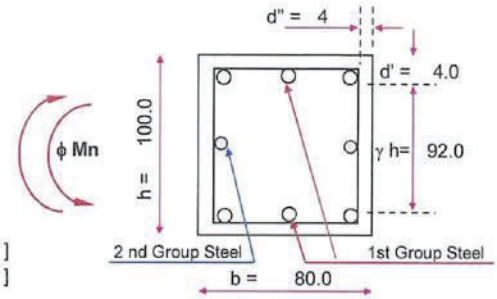
filename : COLUMN

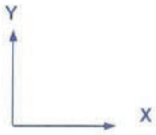
Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	975	[T]		
Moment	ϕ Mn	=	97	[T-m]		
Separate Steel 2 group	1 st.	=	10	As =	49.1	[cm²]
	2 nd.	=	10	As =	49.1	[cm²]
Steel Reinforcement	No.	=	20			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.012	OK		

Main Steel Used 20 DB 25 — DB 25

Stirrup DB 12 @ 0.400 — DB 12

e b = 0.32 [cm]





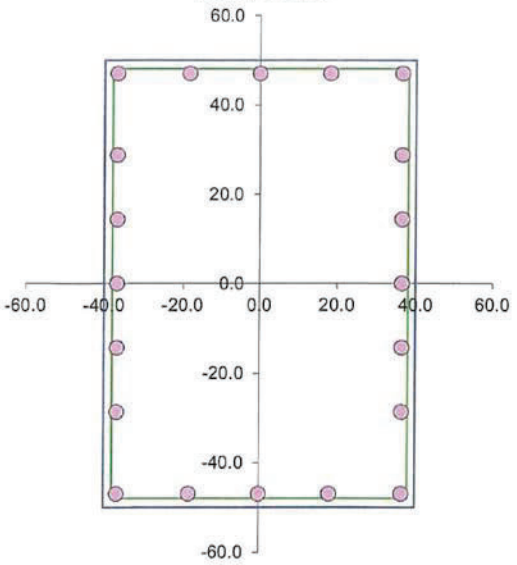
Clumn (80 x 100)

Steel 20 DB 25

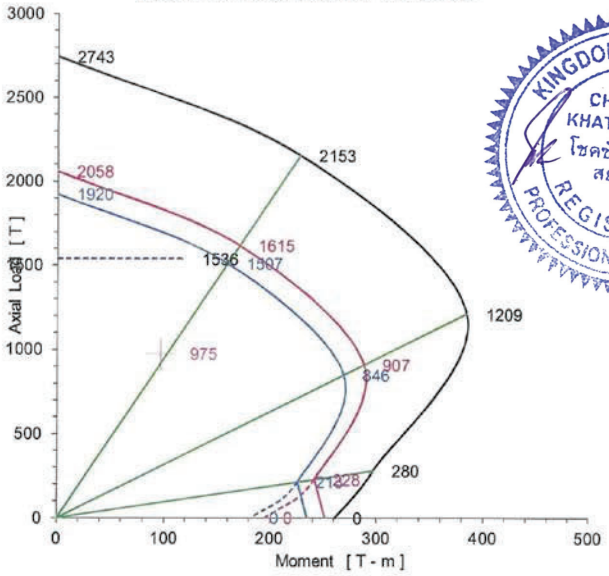
Stirrup DB 12 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-9 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-9 2nd-Roof

Project : อาคารทิศตะวันออก

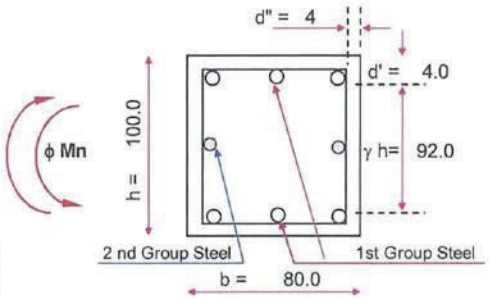
filename : COLUMN

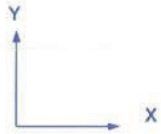
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	80	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	875	[T]		
Moment	ϕ Mn	=	88	[T-m]		
Separate Steel 2 group	1 st.	=	10	As =	49.1	[cm^2]
	2 nd.	=	10	As =	49.1	[cm^2]
Steel Reinforcement	No.	=	20			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.012	OK		

Main Steel Used 20 DB 25 — DB 25

Stirrup RB 9 @ 0.400 — RB 9

e b = 0.32 [cm]

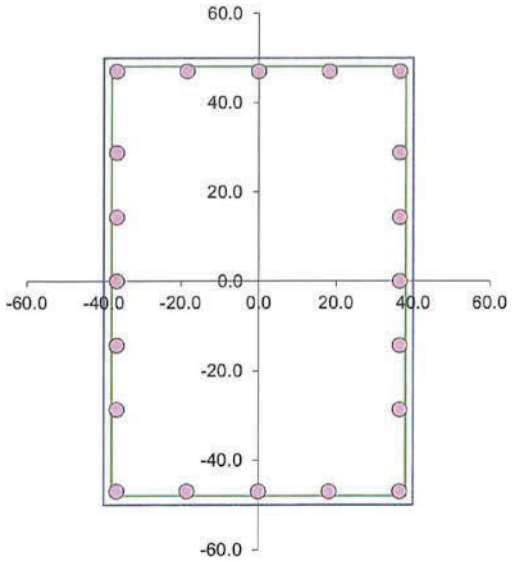




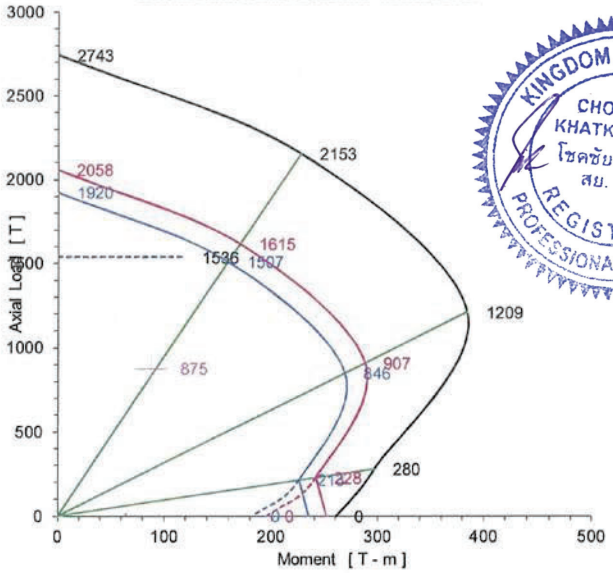
Clumn (80 x 100)
Steel 20 DB 25
Stirrup RB 9 @ 0.400

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สบ. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-9 (80 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-10 1st

Project : อาคารทิศตะวันออก

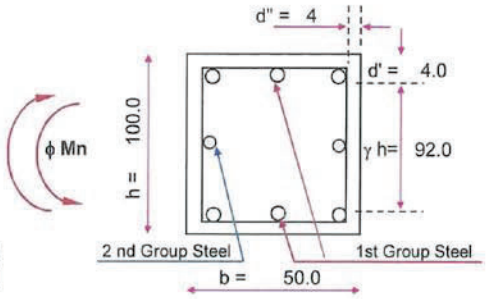
filename : COLUMN

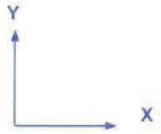
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d''	=	4	[cm]		
Load	ϕ Pn	=	615	[T]		
Moment	ϕ Mn	=	61	[T-m]		
Separate Steel 2 group	1 st.	=	6	As =	18.8	[cm^2]
	2 nd.	=	10	As =	31.4	[cm^2]
Steel Reinforcement	No.	=	16			
	d	=	96	[cm]		
d (εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.010	OK		

Main Steel Used 16 DB 20 — DB 20

Stirrup DB 12 @ 0.300 — DB 12

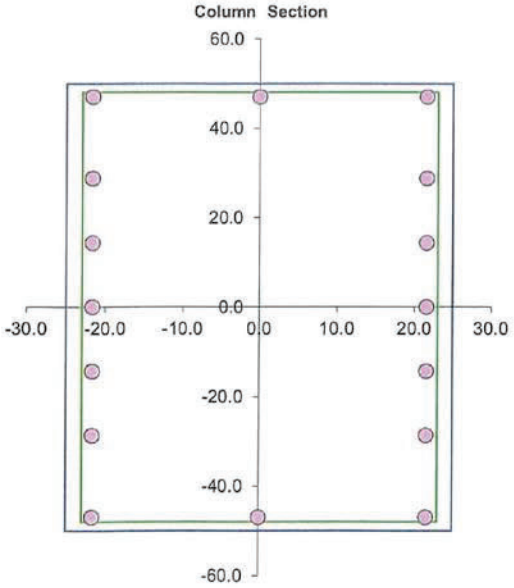
e b = 0.29 [cm]

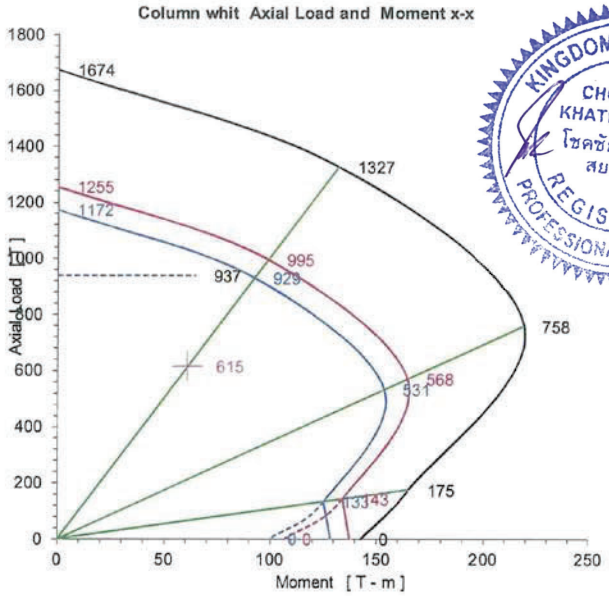




Clumn (50 x 100)
Steel 16 DB 20
Stirrup DB 12 @ 0.300

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





Column C-10 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318-89)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	5-Aug-20

Column No. C-10 2nd-Roof

Project : อาคารทิศตะวันออก

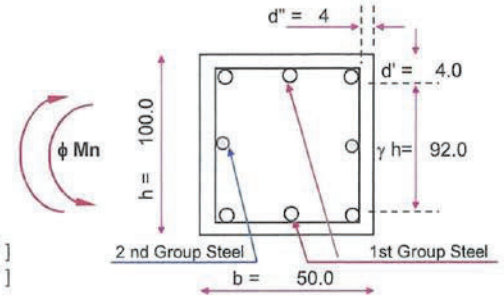
filename : COLUMN

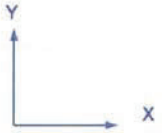
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	50	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	515	[T]		
Moment	ϕ Mn	=	51	[T-m]		
Separate Steel 2 group	1 st.	=	6	As =	18.8	[cm^2]
	2 nd.	=	10	As =	31.4	[cm^2]
Steel Reinforcement	No.	=	16			
	d	=	96	[cm]		
d (εu / (εy + εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.010	OK		

Main Steel Used 16 DB 20 — DB 20

Stirrup RB 9 @ 0.300 — RB 9

e b = 0.29 [cm]





Clumn (50 x 100)

Steel 16 DB 20

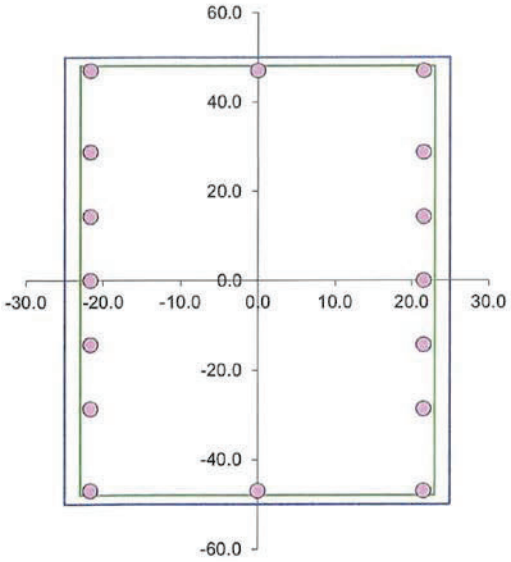
Stirrup RB 9 @ 0.300

Boundary of tie stirrup Column

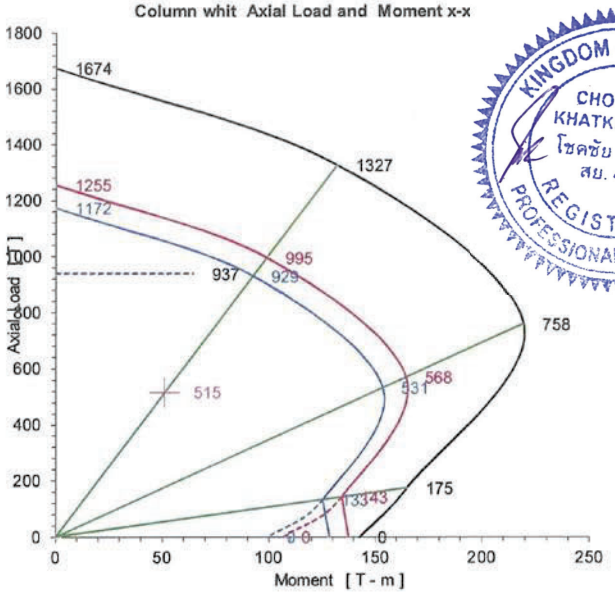
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สย. 4522
REGISTERED PROFESSIONAL ENGINEER

Column C-10 (50 x 100)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

Column Whit Axial Force and Moment X - X

(Ultimate Stress Design method in accordance with ACI 318)

Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. CC-1 Roof FL.

Project : อาคารทิศตะวันออก

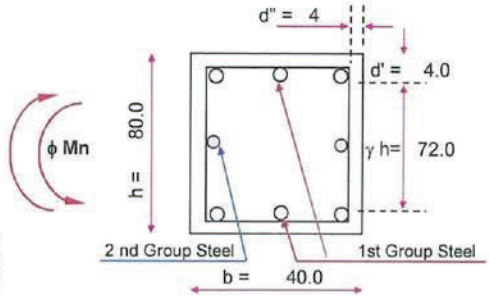
filename : COLUMN

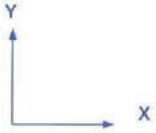
Concrete Strength	fc'	=	350	[kg/cm^2]		
	fy SD	=	4000	[kg/cm^2]		
	fy RD	=	2400	[kg/cm^2]		
Column Dimension	b	=	40	[cm]		
	h	=	80	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	7.5	[T]		
Moment	ϕ Mn	=	0.7	[T-m]		
Separate Steel 2 group	1 st.	=	8	As =	16.1	[cm^2]
	2 nd.	=	8	As =	16.1	[cm^2]
Steel Reinforcement	No.	=	16			
	d	=	76	[cm]		
d (εu/(εy+εu))	Cb	=	45.960	[cm]		
	ρ of Steel	=	0.010	OK		

Main Steel Used 16 DB 16 — DB 16

Stirrup RB 9 @ 0.250 — RB 9

e b = 0.25 [cm]





Clumn (40 x 80)

Steel 16 DB 16

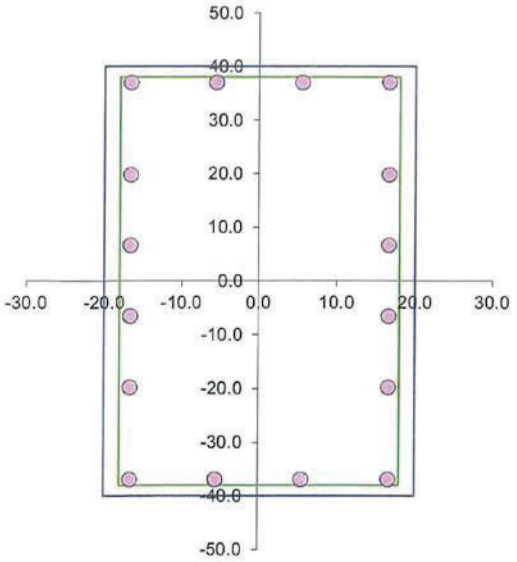
Stirrup RB 9 @ 0.250

Boundary of tie stirrup Column

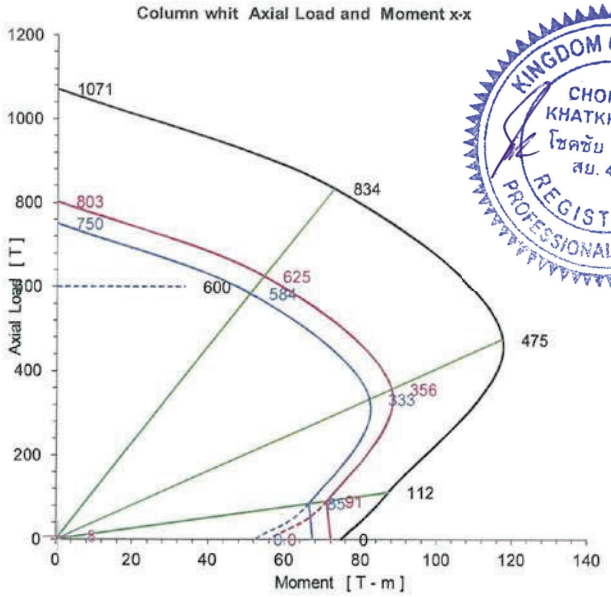
Boundary of sprial stirrup Column

Boundary of Ultimate Capacity

Column Section



Column whit Axial Load and Moment x-x



KINGDOM OF THAILAND
CHOKCHAI KHATKHAJORN
โชคชัย ขัดขจร
สบ. 4522
REGISTERED PROFESSIONAL ENGINEER

Column CC-1 (40 x 80)

DYNAMIC ENGINEERING CONSULTANT CO., LTD.

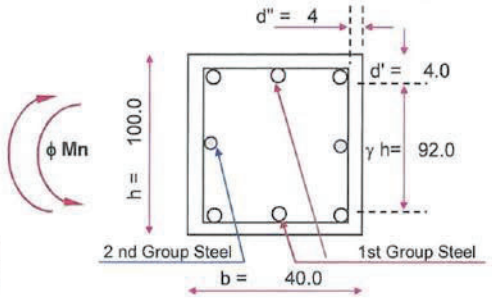
Column Whit Axial Force and Moment X - X
(Ultimate Stress Design method in accordance with ACI 318)

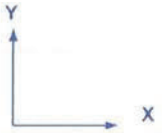
Job No.	:	193018
Rev.	:	0
Initial	:	CKJ
Date	:	12-Nov-20

Column No. CR-1 Roof FL.
Project : อาคารทิศตะวันออก
filename : COLUMN

Concrete Strength	fc'	=	350	[kg/cm²]		
	fy SD	=	4000	[kg/cm²]		
	fy RD	=	2400	[kg/cm²]		
Column Dimension	b	=	40	[cm]		
	h	=	100	[cm]		
	d'	=	4	[cm]		
	d"	=	4	[cm]		
Load	ϕ Pn	=	35	[T]		
Moment	ϕ Mn	=	3.5	[T-m]		
Separate Steel 2 group	1 st.	=	8	As =	25.1	[cm²]
	2 nd.	=	10	As =	31.4	[cm²]
Steel Reinforcement	No.	=	18			
	d	=	96	[cm]		
d(εu/(εy+εu))	Cb	=	58.055	[cm]		
	ρ of Steel	=	0.014	OK		

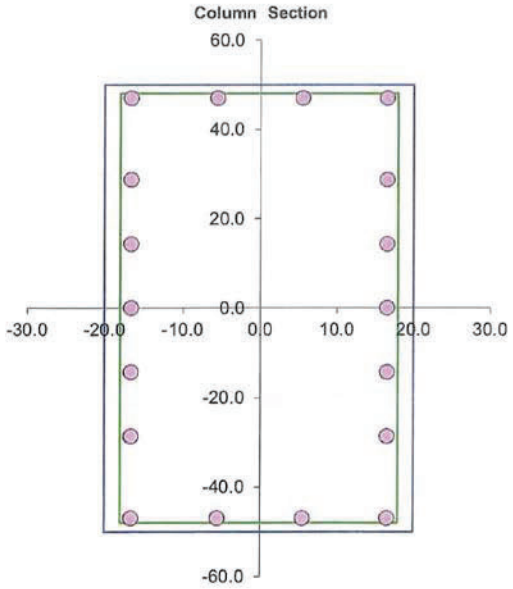
Main Steel Used 18 DB 20 — DB 20
Stirrup RB 9 @ 0.300 — RB 9
e b = 0.32 [cm]

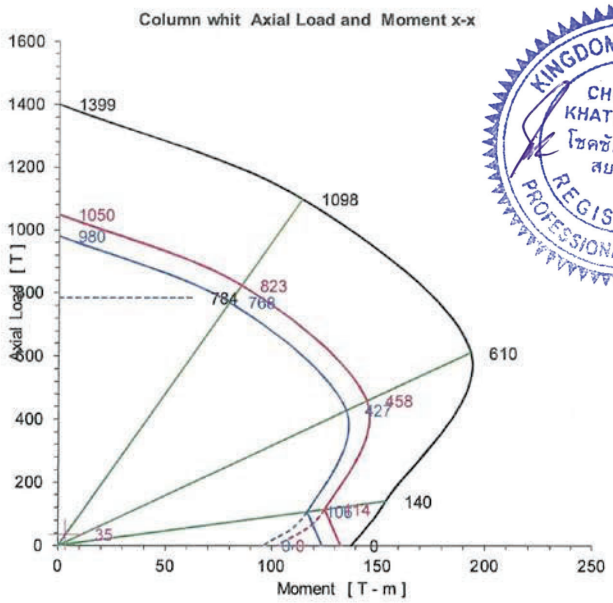




Clumn (40 x 100)
Steel 18 DB 20
Stirrup RB 9 @ 0.300

Boundary of tie stirrup Column
Boundary of sprial stirrup Column
Boundary of Ultimate Capacity





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Column CR-1 (40 x 100)