

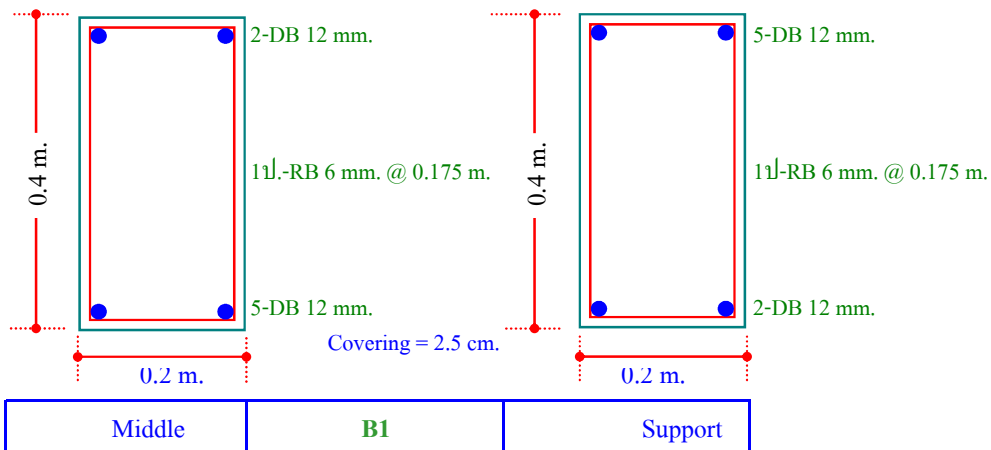
NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

DESIGN RC. BEAM

[I.Data For Design]		[III.Allowable Design Stress]	
1.1.Length of Beam	5.00 m.	3.1.M _{resistant}	2,524.43 kg.-m.
1.2.Bending Moment	2,850.00 kg.-m.	3.2. 0.29@Sqrt(fc')	3.81 kg./cm. ²
1.3.Torsion Moment	kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39 kg./cm. ²
1.4.Max. Shear	2,900.00 kg.	3.4. 1.32@Sqrt(fc')	17.36 kg./cm. ²
1.5.Use Beam Width	20.00 cm.	3.5. 1.65@Sqrt(fc')	21.70 kg./cm. ²
1.6 Req. Min. Depth.	39.84 cm.	3.6. V _{Total} (Safe)	3.87 kg./cm. ²
1.7.Use Beam Depth.	40.00 cm.	3.7.Develop Length	0.19 m.

[II.Required Reinforcement((As/bd) >= (14/Fy))			
[-- For Main Steel(Doubly Section) --]		For Continuous&Simple Beam	2
2.1.Req. Min. A _{st} ⁺	5.62 cm. ²	Top Bar DB Dia.	12 mm.
2.2.Req. Min. A _{sc} ⁻	0.89 cm. ²	Required Row 1	2.00 bars
2.3.Req. Min. A _{torsion}	cm. ² /Corn.	<u>2</u> Row 2	- bars
[-- For Stirrup Steel --]		bars Row 3	- bars
2.4.Use Diameter	6 mm.	Bott. Bar DB Dia.	12.00 mm.
2.5.Number of Loop	1 Loop	Required Row 1	5.00 bars
2.6.Req. min. Spacing	18.75 cm.	<u>5</u> Row 2	- bars
2.7.Use Spacing	17.50 cm. OK.!	bars Row 3	- bars



NEO RC. Design v4.50(WSD.)

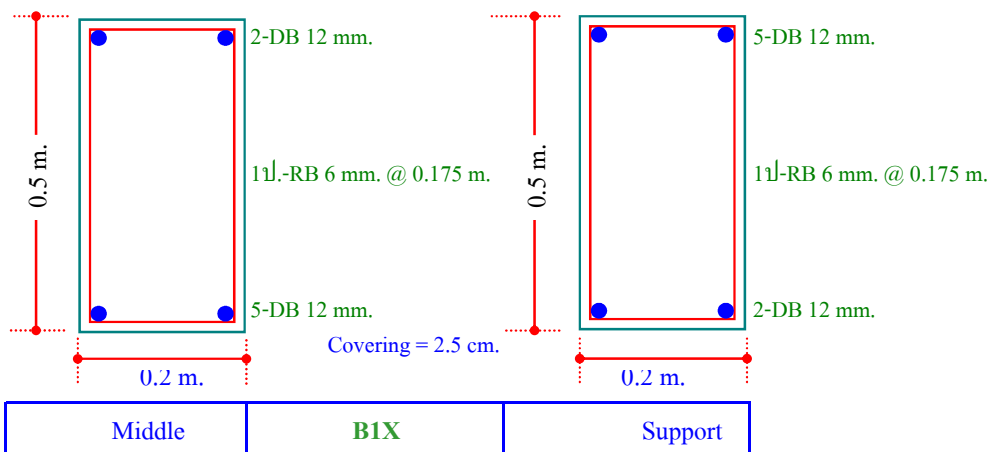
[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น [Owner]
[Building] [Engineer]
[Location] [Date]

DESIGN RC. BEAM

[I.Data For Design]		[III.Allowable Design Stress]		
1.1.Length of Beam	4.00 m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	3,000.00 kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment	kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	3,000.00 kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00 cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6 Req. Min. Depth.	40.88 cm.	3.6. V _{Total} (Safe)	3.16	kg./cm. ²
1.7.Use Beam Depth.	50.00 cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))

[-- For Main Steel(Singly Section) --]		For Continuous&Simple Beam		2
2.1.Req. Min. A _{st} ⁺	4.69 cm. ²	Top Bar DB Dia.	12	mm.
2.2.Req. Min. A _{sc} ⁻	cm. ²	Required Row 1	2.00	bars
2.3.Req. Min. A _{torsion}	cm. ² /Corn.	2 bars Row 2	-	bars
		bars Row 3	-	bars
	[-- For Stirrup Steel --]	Bott. Bar DB Dia.	12.00	mm.
2.4.Use Diameter	6 mm.	Required Row 1	5.00	bars
2.5.Number of Loop	1 Loop	5 bars Row 2	-	bars
2.6.Req. min. Spacing	18.85 cm.	bars Row 3	-	bars
2.7.Use Spacing	17.50 cm. OK.!			



NEO RC. Design v4.50(WSD.)

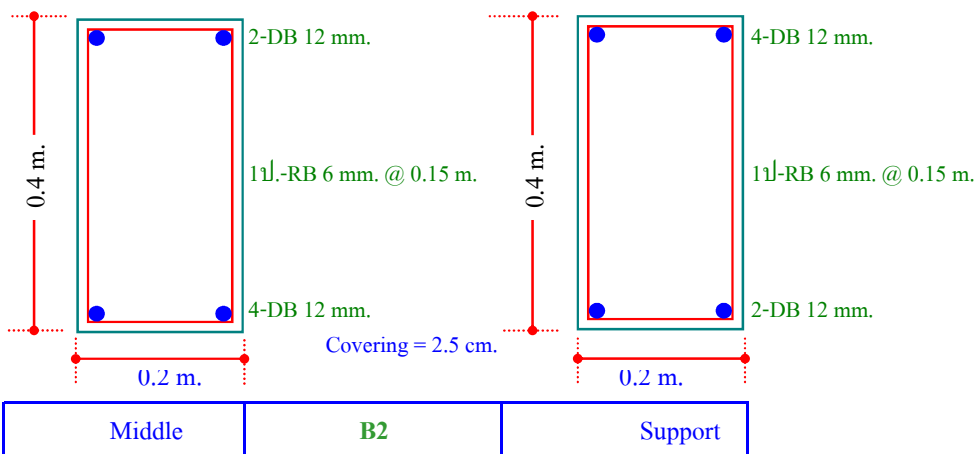
[Project] อาคารที่พักรออาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date] 3-Sep-2547

DESIGN RC. BEAM

[I.Data For Design]			[III.Allowable Design Stress]		
1.1.Length of Beam	4.00	m.	3.1. $M_{resistant}$	2,524.43	kg.-m.
1.2.Bending Moment	1,800.00	kg.-m.	3.2. $0.29@sqrt{fc'}$	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. $0.79@sqrt{fc'}$	10.39	kg./cm. ²
1.4.Max. Shear	1,800.00	kg.	3.4. $1.32@sqrt{fc'}$	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. $1.65@sqrt{fc'}$	21.70	kg./cm. ²
1.6.Req. Min. Depth.	31.67	cm.	3.6. V_{Total} (Safe)	2.40	kg./cm. ²
1.7.Use Beam Depth.	40.00	cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))]

[-- For Main Steel(Singly Section) --]			For Continuous&Simple Beam			2
2.1.Req. Min. A_{st}^+	3.57	cm. ²	Top Bar DB Dia.	12	mm.	
2.2.Req. Min. A_{sc}^-		cm. ²	Required Row 1	2.00	bars	
2.3.Req. Min. $A_{torsion}$		cm. ² /Corn.	<u>2</u> bars	Row 2	-	bars
			Row 3		-	bars
[-- For Stirrup Steel --]			Bott. Bar DB Dia.	12.00	mm.	
2.4.Use Diameter	6	mm.	Required Row 1	4.00	bars	
2.5.Number of Loop	1	Loop	<u>4</u> bars	Row 2	-	bars
2.6.Req. min. Spacing	18.75	cm.	Row 3		-	bars
2.7.Use Spacing	15.00	cm. OK.!				



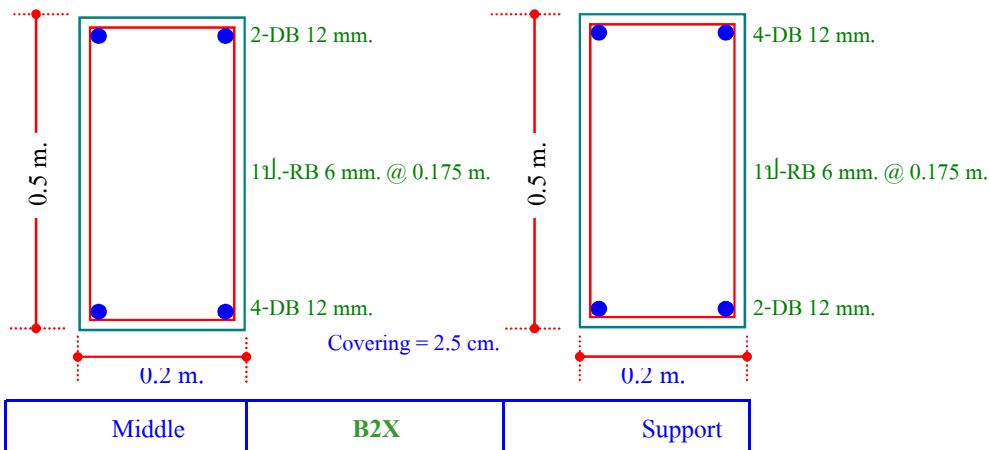
NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

DESIGN RC. BEAM

[I.Data For Design]		[III.Allowable Design Stress]	
1.1.Length of Beam	4.00 m.	3.1.M _{resistant}	4,050.31 kg.-m.
1.2.Bending Moment	1,800.00 kg.-m.	3.2. 0.29@Sqrt(fc')	3.81 kg./cm. ²
1.3.Torsion Moment	kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39 kg./cm. ²
1.4.Max. Shear	1,800.00 kg.	3.4. 1.32@Sqrt(fc')	17.36 kg./cm. ²
1.5.Use Beam Width	20.00 cm.	3.5. 1.65@Sqrt(fc')	21.70 kg./cm. ²
1.6 Req. Min. Depth.	31.67 cm.	3.6. V _{Total} (Safe)	1.89 kg./cm. ²
1.7.Use Beam Depth.	50.00 cm.	3.7.Develop Length	0.19 m.

[II.Required Reinforcement((As/bd) >= (14/Fy))			
[-- For Main Steel(Singly Section) --]		For Continuous&Simple Beam	2
2.1.Req. Min. A _{st} ⁺	4.43 cm. ²	Top Bar DB Dia.	12 mm.
2.2.Req. Min. A _{sc} ⁻	cm. ²	Required Row 1	2.00 bars
2.3.Req. Min. A _{torsion}	cm. ² /Corn.	<u>2</u> bars Row 2	- bars
[-- For Stirrup Steel --]		Row 3	- bars
2.4.Use Diameter	6 mm.	Bott. Bar DB Dia.	12.00 mm.
2.5.Number of Loop	1 Loop	Required Row 1	4.00 bars
2.6.Req. min. Spacing	18.85 cm.	<u>4</u> bars Row 2	- bars
2.7.Use Spacing	17.50 cm. OK.!	Row 3	- bars



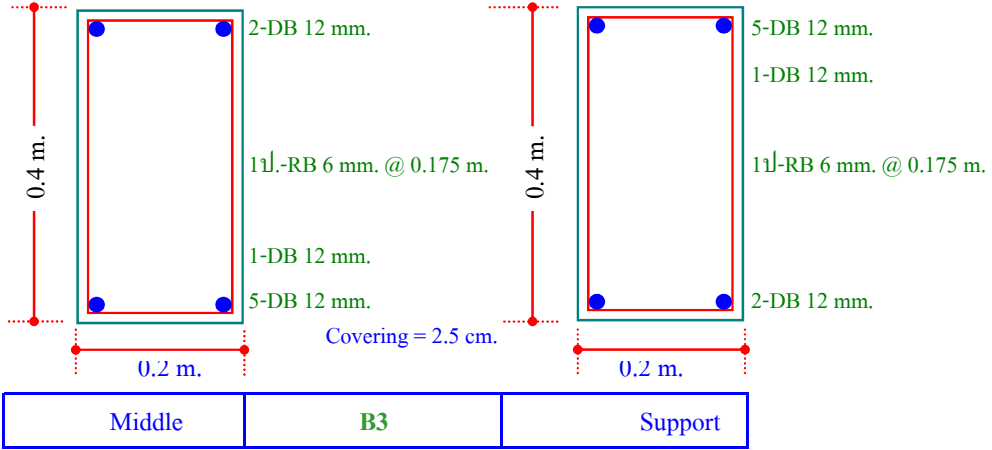
NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น **[Owner]**
[Building] **[Engineer]**
[Location] **[Date]**

DESIGN RC. BEAM

[I.Data For Design]		[III.Allowable Design Stress]	
1.1.Length of Beam	4.00 m.	3.1.M _{resistant}	2,524.43 kg.-m.
1.2.Bending Moment	3,200.00 kg.-m.	3.2. 0.29@Sqrt(fc')	3.81 kg./cm. ²
1.3.Torsion Moment	kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39 kg./cm. ²
1.4.Max. Shear	2,500.00 kg.	3.4. 1.32@Sqrt(fc')	17.36 kg./cm. ²
1.5.Use Beam Width	20.00 cm.	3.5. 1.65@Sqrt(fc')	21.70 kg./cm. ²
1.6 Req. Min. Depth.	42.22 cm.	3.6. V _{Total} (Safe)	3.33 kg./cm. ²
1.7.Use Beam Depth.	40.00 cm.	3.7.Develop Length	0.19 m.

[II.Required Reinforcement((As/bd) >= (14/Fy)]			
[-- For Main Steel(Doubly Section) --]		For Continuous&Simple Beam	2
2.1.Req. Min. A _{st} ⁺	6.29 cm. ²	Top Bar DB Dia.	12 mm.
2.2.Req. Min. A _{sc} ⁻	1.85 cm. ²	Required Row 1	2.00 bars
2.3.Req. Min. A _{torsion}	cm. ² /Corn.	<u>2</u> bars Row 2	- bars
		Row 3	- bars
[-- For Stirrup Steel --]		Bott. Bar DB Dia.	12.00 mm.
2.4.Use Diameter	6 mm.	Required Row 1	5.00 bars
2.5.Number of Loop	1 Loop	<u>6</u> bars Row 2	1.00 bars
2.6.Req. min. Spacing	18.75 cm.	Row 3	- bars
2.7.Use Spacing	17.50 cm. OK.!		



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

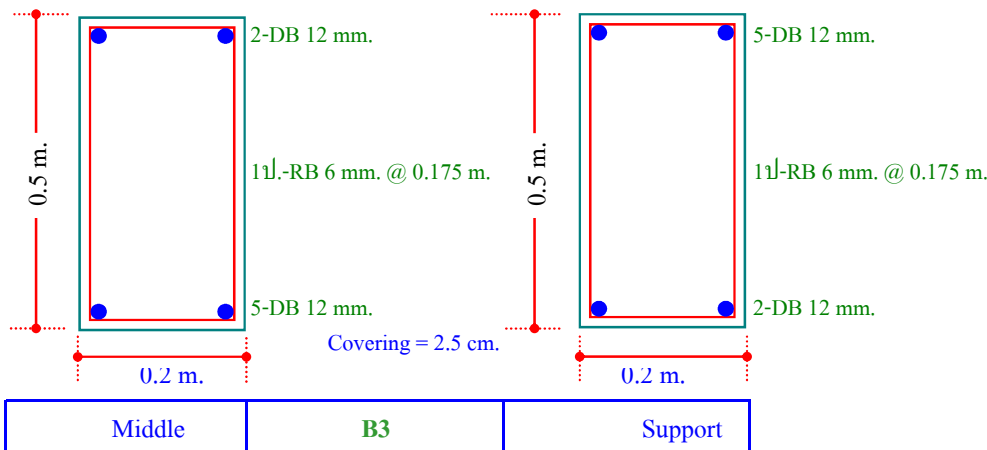
DESIGN RC. BEAM

[I.Data For Design]	[III.Allowable Design Stress]
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1.1.Length of Beam	4.00	m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	3,200.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	2,700.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6.Req. Min. Depth.	42.22	cm.	3.6. V _{Total} (Safe)	2.84	kg./cm. ²
1.7.Use Beam Depth.	50.00	cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))
--

[-- For Main Steel(Singly Section) --]	For Continuous&Simple Beam	2			
2.1.Req. Min. A _{st} ⁺	5.00	cm. ²	Top Bar DB Dia.	12	mm.
2.2.Req. Min. A _{sc} ⁻		cm. ²	Required Row 1	2.00	bars
2.3.Req. Min. A _{torsion}		cm. ² /Corn.	<u>2</u> Row 2	-	bars
			bars Row 3	-	bars
[-- For Stirrup Steel --]			Bott. Bar DB Dia.	12.00	mm.
2.4.Use Diameter	6	mm.	Required Row 1	5.00	bars
2.5.Number of Loop	1	Loop	<u>5</u> Row 2	-	bars
2.6.Req. min. Spacing	18.85	cm.	bars Row 3	-	bars
2.7.Use Spacing	17.50	cm. OK.!			



ออกแบบโครงสร้างคอนกรีตเสริมเหล็ก

ออกแบบคานสี่เหลี่ยม (RECTANGULAR BEAM)

เจ้าของโครงการ : _____
 สถานที่ก่อสร้าง : _____

Project : อาคารที่พักอาศัย คสล. 2 ชั้น Member : B3 Date : 11/05/55
 Engineer : _____

Property of Concrete and Steel

(1) กำลังของคอนกรีต (f_c')	=	173 ksc
(2) กำลังคลากของเหล็กเสริม (f_y)	=	3,000 ksc
(3) กำลังคลากของเหล็กปลอก (f_v)	=	2,400 ksc

$f_c(\text{all})$	=	64.88 ksc	k	=	0.307	R	=	8.945
$f_s(\text{all})$	=	1,500 ksc	j	=	0.898	n	=	10.25
$f_v(\text{all})$	=	1,200 ksc	Msection, $M'=Rbd^2$	=	4,037	kg-m		

Section Property

(1) เลือกใช้ความกว้าง (Width) (b)	=	20.00 cm.
(2) ความลึกหน้าตัดคาน (Depth) (t)	=	50.00 cm.
(3) ระยะหุ้มคอนกรีต (d')	=	2.50 cm.
(4) ความลึกประสิทธิภาพ (d)	=	47.50 cm.

CHECK ความเค้นเฉือน O.K.

Design of Stirrup bar

ออกแบบให้ใช้เหล็กปลอก RB 6 ∇ mm.

จำนวนขาเหล็กปลอก = 2 ∇ ขา

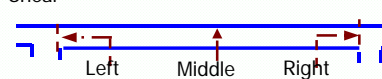
ระยะเรียงเหล็กสูงสุด (ว.ส.ท.) = 23.75 cm.

ระยะเรียงเหล็กสูงสุดที่ต้องการ = 18.85 cm.

ออกแบบให้ใช้ระยะ Spacing = 20. (∇) cm. O.K.

L. NEG. M. POS. R. NEG.

Moment and Shear



(1) โมเมนต์สูงสุด	6,825	3,598	6,825	kg-m
(2) แรงเฉือนสูงสุด	7,284		7,284	kg.
(3) V ที่ ระยะ d จาก support			7,284	kg.

L. NEG. M. POS. R. NEG.

$F_s=2nF_c(kd-d')/kd$	1,103	1,103	1,103	ksc
$As_1=MorM'/(F_sjd)$	6.31	6.31	6.31	cm ²
$As_2=(M-M')/(F_s(d-d'))$	4.13	0.00	4.13	cm ²
$As'=(M-M')/(F_s'(d-d'))$	5.62	0.00	5.62	cm ²
$As=As_1+As_2$	10.44	6.31	10.44	cm ²

L. NEG. M. POS. R. NEG.

Design Tention Steel

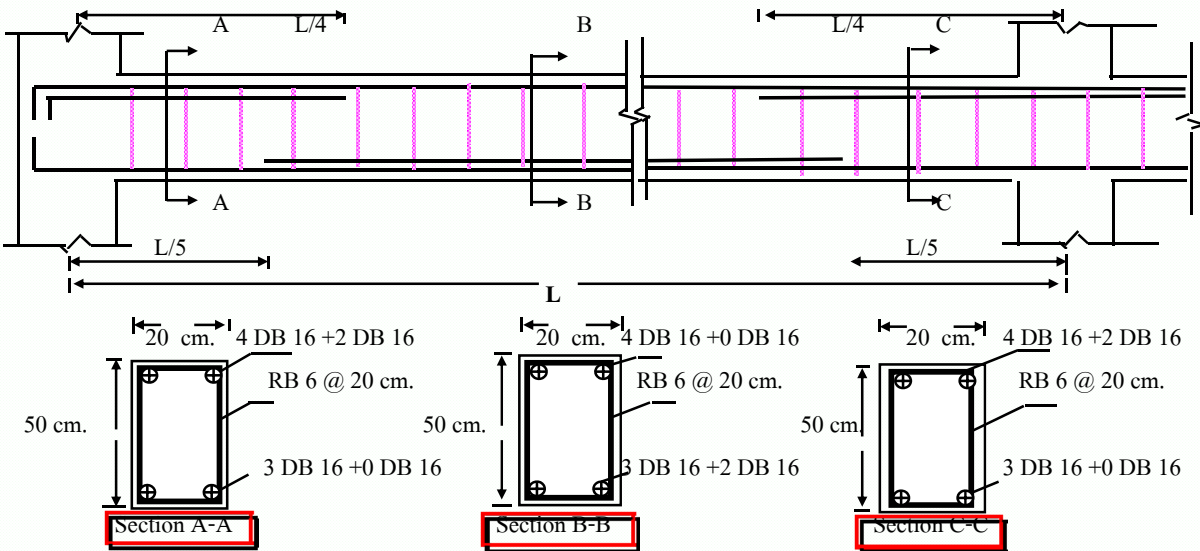
Main Steel	16 ∇	16	16	mm.
จำนวนเส้น	4 ∇	3	4	เส้น
Special Steel	16 ∇	16 ∇	16 ∇	mm.
จำนวนเส้น	2 ∇	2 ∇	2 ∇	เส้น
Area 1 (Main Steel)	8.04	6.03	8.04	cm ²
Area 2 (Special Ste)	4.02	4.02	4.02	cm ²
As (Design)	12.06	10.05	12.06	cm ²
As (Required)	10.44	6.31	10.44	cm ²

O.K. O.K. O.K.

Design Compression Steel

Main Steel	16 ∇	16	16	mm.
จำนวนเส้น	3 ∇	4	3	เส้น
Special Steel	16 ∇	16 ∇	16 ∇	mm.
จำนวนเส้น	0 ∇	0 ∇	0 ∇	เส้น
Area 1 (Main Steel)	6.03	8.04	6.03	cm ²
Area 2 (Special Steel)	0.00	0.00	0.00	cm ²
As' (Design)	6.03	8.04	6.03	cm ²
As' (Required)	5.62	0.00	5.62	cm ²

O.K. O.K. O.K.



NEO RC. Design v4.50(WSD.)

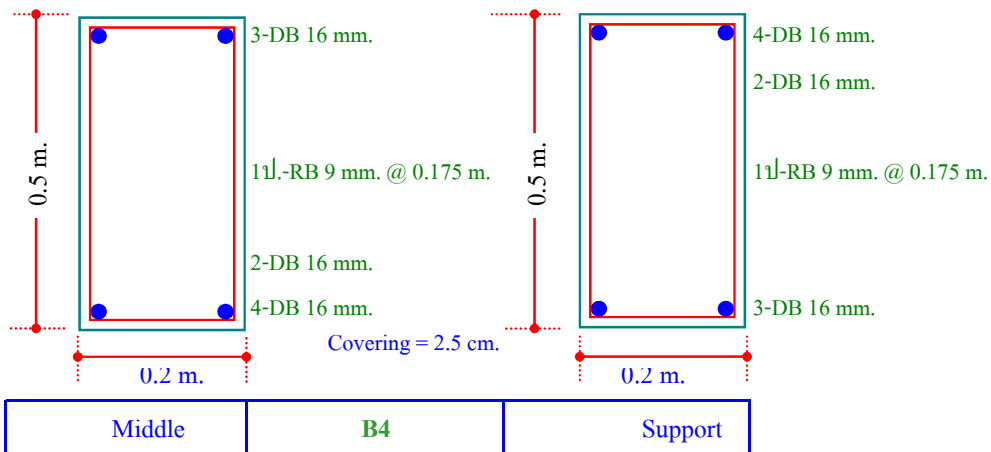
[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

DESIGN RC. BEAM

[I.Data For Design]			[III.Allowable Design Stress]		
1.1.Length of Beam	5.00	m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	6,850.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	7,350.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6 Req. Min. Depth.	61.77	cm.	3.6. V _{Total} (Safe)	7.74	kg./cm. ²
1.7.Use Beam Depth.	50.00	cm.	3.7.Develop Length	0.32	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))]

[-- For Main Steel(Doubly Section) --]		For Continuous&Simple Beam		2
2.1.Req. Min. A _{st} ⁺	10.48 cm. ²	Top Bar DB Dia.	16	mm.
2.2.Req. Min. A _{sc} ⁻	5.63 cm. ²	Required Row 1	3.00	bars
2.3.Req. Min. A _{torsion}	cm. ² /Corn.	<u>3</u> bars Row 2	-	bars
[-- For Stirrup Steel --]		Row 3	-	bars
2.4.Use Diameter	9	Bott. Bar DB Dia.	16.00	mm.
2.5.Number of Loop	1	Required Row 1	4.00	bars
2.6.Req. min. Spacing	19.46 cm.	<u>6</u> bars Row 2	2.00	bars
2.7.Use Spacing	17.50	Row 3	-	bars
	cm. OK.!			



ออกแบบโครงสร้างคอนกรีตเสริมเหล็ก
ออกแบบคานสี่เหลี่ยม (RECTANGULAR BEAM)

เจ้าของโครงการ : _____
 สถานที่ก่อสร้าง : _____

Project : อาคารที่พักอาศัย คสล. 2 ชั้น Member : B4 Date : 11/05/55
 Engineer : _____

Property of Concrete and Steel

(1) กำลังของคอนกรีต (f_c')	=	173 ksc
(2) กำลังคลากของเหล็กเสริม (f_y)	=	3,000 ksc
(3) กำลังคลากของเหล็กปลอก (f_v)	=	2,400 ksc

$f_c(\text{all})$	=	64.88 ksc	k	=	0.307	R	=	8.945
$f_s(\text{all})$	=	1,500 ksc	j	=	0.898	n	=	10.25
$f_v(\text{all})$	=	1,200 ksc	Msection, $M'=Rbd^2$	=	4,037	kg-m		

Section Property

(1) เลือกใช้ความกว้าง (Width) (b)	=	20.00 cm.
(2) ความลึกหน้าตัดคาน (Depth) (t)	=	50.00 cm.
(3) ระยะหุ้มคอนกรีต (d')	=	2.50 cm.
(4) ความลึกประสิทธิภาพ (d)	=	47.50 cm.

CHECK ความเค้นเฉือน **O.K.**

Design of Stirrup bar

ออกแบบให้ใช้เหล็กปลอก RB 6 ∇ mm.

จำนวนขาเหล็กปลอก = 2 ∇ ขา

ระยะเรียงเหล็กสูงสุด (ว.ส.ท.) = 23.75 cm.

ระยะเรียงเหล็กสูงสุดที่ต้องการ = 18.85 cm.

ออกแบบให้ใช้ระยะ Spacing = 20.0 ∇ cm. **O.K.**

L. NEG. M. POS. R. NEG.

Moment and Shear

(1) โมเมนต์สูงสุด	2,776	2,222	2,776	kg-m
(2) แรงเฉือนสูงสุด	3,788		3,788	kg.
(3) V ที่ ระยะ d จาก support			3,788	kg.

L. NEG. M. POS. R. NEG.

$F_s=2nF_c(kd-d')/kd$	1,103	1,103	1,103	ksc
$As_1=MorM'/(F_sjd)$	6.31	6.31	6.31	cm ²
$As_2=(M-M')/(F_s(d-d'))$	0.00	0.00	0.00	cm ²
$As'=(M-M')/(F_s'(d-d'))$	0.00	0.00	0.00	cm ²
$As=As_1+As_2$	6.31	6.31	6.31	cm ²

L. NEG. M. POS. R. NEG.

Design Tention Steel

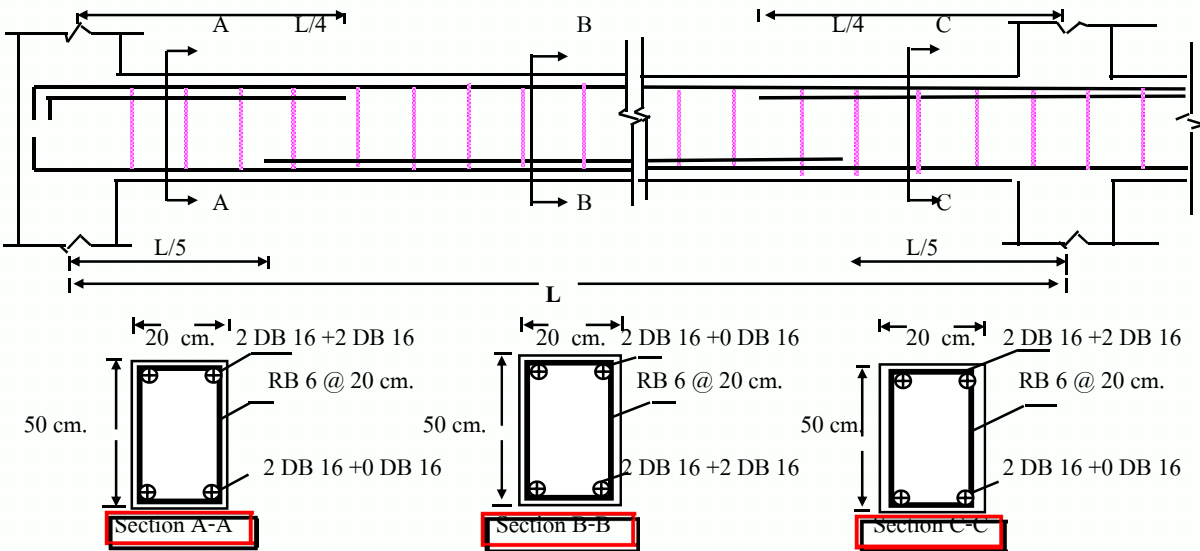
Main Steel	16 ∇	16	16	mm.
จำนวนเส้น	2 ∇	2	2	เส้น
Special Steel	16 ∇	16 ∇	16 ∇	mm.
จำนวนเส้น	2 ∇	2 ∇	2 ∇	เส้น
Area 1 (Main Steel)	4.02	4.02	4.02	cm ²
Area 2 (Special Ste)	4.02	4.02	4.02	cm ²
As (Design)	8.04	8.04	8.04	cm ²
As (Required)	6.31	6.31	6.31	cm ²

O.K. O.K. O.K.

Design Compression Steel

Main Steel	16 ∇	16	16	mm.
จำนวนเส้น	2 ∇	2	2	เส้น
Special Steel	16 ∇	16 ∇	16 ∇	mm.
จำนวนเส้น	0 ∇	0 ∇	0 ∇	เส้น
Area 1 (Main Steel)	4.02	4.02	4.02	cm ²
Area 2 (Special Steel)	0.00	0.00	0.00	cm ²
As' (Design)	4.02	4.02	4.02	cm ²
As' (Required)	0.00	0.00	0.00	cm ²

O.K. O.K. O.K.



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น [Owner]
 [Building] [Engineer]
 [Location] [Date]

DESIGN RC. BEAM

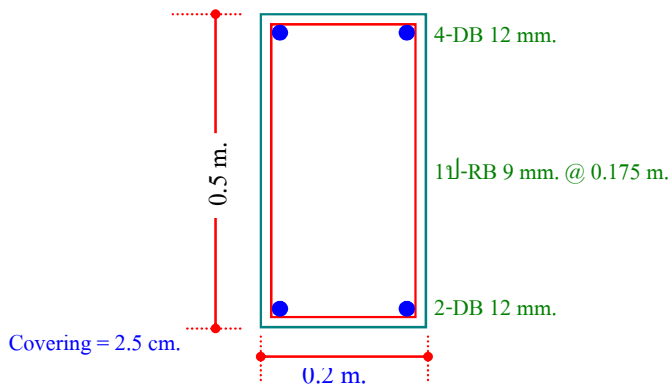
[I.Data For Design]

[III.Allowable Design Stress]

1.1.Length of Beam	1.20	m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	1,200.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	1,200.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6 Req. Min. Depth.	25.85	cm.	3.6. V _{Total} (Safe)	1.26	kg./cm. ²
1.7.Use Beam Depth.	50.00	cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))

[--- For Main Steel(Singly Section) ---]			For Cantilever Beam		1
2.1.Req. Min. A _{st} ⁺	4.43	cm. ²	Top Bar DB Dai.	12	mm.
2.2.Req. Min. A _{sc} ⁻		cm. ²	Required Row 1	4.00	bars
2.3.Req. Min. A _{torsion}		cm. ² /Corn.	4 bars Row 2	-	bars
[--- For Stirrup Steel ---]			Row 3	-	bars
2.4.Use Diameter	9	mm.	Bott. Bar DB Dia.	12.00	mm.
2.5.Number of Loop	1	Loop	Required Row 1	2.00	bars
2.6.Req. min. Spacing	23.75	cm.	2 bars Row 2	-	bars
2.7.Use Spacing	17.50	cm. OK.!	bars Row 3	-	bars



See --->

B5

Support

: ระยะตั้งเหล็ก 0.19 m.

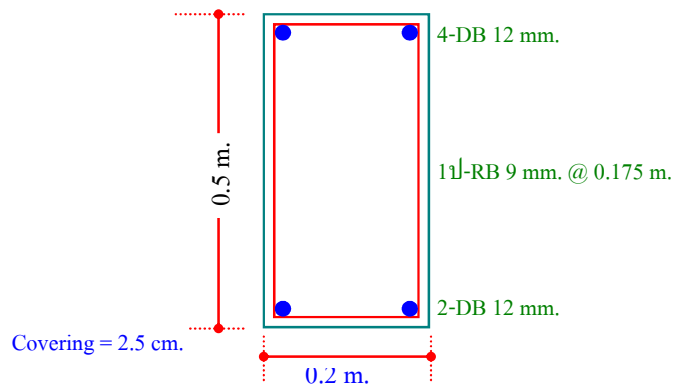
NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.อ. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

DESIGN RC. BEAM

[I.Data For Design]			[III.Allowable Design Stress]		
1.1.Length of Beam	5.00	m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	1,200.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	1,200.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6.Req. Min. Depth.	25.85	cm.	3.6. V _{Total} (Safe)	1.26	kg./cm. ²
1.7.Use Beam Depth.	50.00	cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))					
[--- For Main Steel(Singly Section) ---]			For Cantilever Beam		1
2.1.Req. Min. A _{st} ⁺	4.43	cm. ²	Top Bar DB Dai.	12	mm.
2.2.Req. Min. A _{sc} ⁻		cm. ²	Required Row 1	4.00	bars
2.3.Req. Min. A _{torsion}		cm. ² /Corn.	<u>4</u> Row 2	-	bars
			bars Row 3	-	bars
			Bott. Bar DB Dia.	12.00	mm.
			Required Row 1	2.00	bars
			<u>2</u> Row 2	-	bars
			bars Row 3	-	bars
[--- For Stirrup Steel ---]					
2.4.Use Diameter	9	mm.			
2.5.Number of Loop	1	Loop			
2.6.Req. min. Spacing	23.75	cm.			
2.7.Use Spacing	17.50	cm. OK.!			



See --->	B5	Support : ระยะตั้งเหล็ก 0.19 m.
----------	-----------	---------------------------------

NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น	[Owner]
[Building]	[Engineer]
[Location]	[Date]

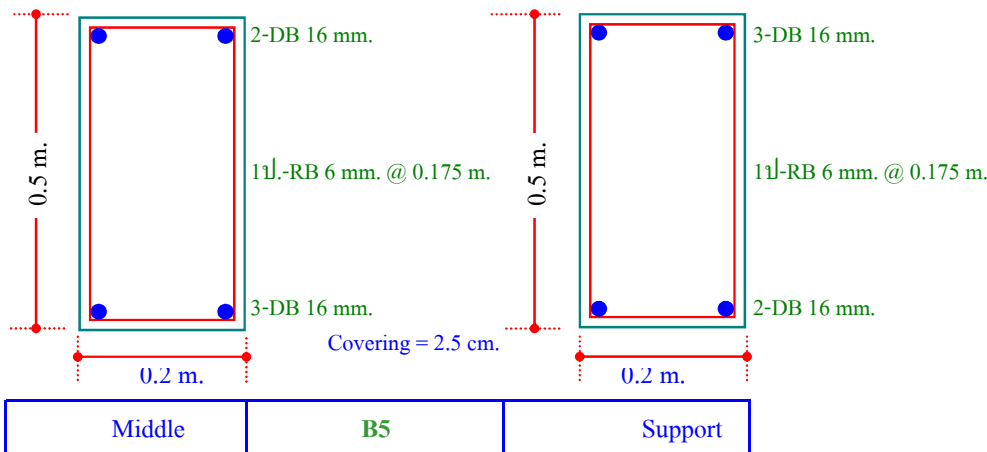
DESIGN RC. BEAM

[I.Data For Design]	[III.Allowable Design Stress]
-----------------------	---------------------------------

1.1.Length of Beam	4.00	m.	3.1.M _{resistant}	4,050.31	kg.-m.
1.2.Bending Moment	1,500.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	1,480.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6.Req. Min. Depth.	28.91	cm.	3.6. V _{Total} (Safe)	1.56	kg./cm. ²
1.7.Use Beam Depth.	50.00	cm.	3.7.Develop Length	0.32	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))
--

[-- For Main Steel(Singly Section) --]	For Continuous&Simple Beam	2			
2.1.Req. Min. A _{st} ⁺	4.43	cm. ²	Top Bar DB Dia.	16	mm.
2.2.Req. Min. A _{sc} ⁻		cm. ²	Required	Row 1	2.00 bars
2.3.Req. Min. A _{torsion}		cm. ² /Corn.	<u>2</u>	Row 2	- bars
			bars	Row 3	- bars
[-- For Stirrup Steel --]			Bott. Bar DB Dia.	16.00	mm.
2.4.Use Diameter	6	mm.	Required	Row 1	3.00 bars
2.5.Number of Loop	1	Loop	<u>3</u>	Row 2	- bars
2.6.Req. min. Spacing	18.85	cm.	bars	Row 3	- bars
2.7.Use Spacing	17.50	cm. OK.!			



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

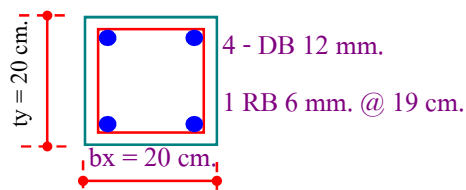
[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.643	kh/r =53.3	2.2.Value of I_{x-x}	18,302	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	18,302	cm. ⁴
1.3.High of Column	3.20	m.	2.4.Value of cx	10.00	cm.
1.4.Req. bx	≥	21.33 cm.	2.5.Value of cy	10.00	cm.
1.5.Req. ty	≥	21.33 cm.	2.6.Value of fa	62.18	kg./cm. ²
1.6.Design Wide(bx)	20.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	20.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	72.40	kg./cm. ²
1.9.Vertical Load(P_z)	16,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	19,321	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	8,750	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	8,750	kg.
1.13.Design Ratio(p_g)	1.13	% OK.!	2.14.Value of Po	28,959	kg.
	4	- DB 12 mm.	2.15.Value of $M_{b_{x-x}}$	497	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	497	kg.-m.
	1	- RB 6 mm. @ 19 cm.	2.17.Value of $M_{o_{x-x}}$	244	kg.-m.
		----[e<ea:Compression zone 1]----	2.18.Value of $M_{o_{y-y}}$	244	kg.-m.

Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.86 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.643	kh/r =53.3	2.2.Value of I_{x-x}	18,302	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	18,302	cm. ⁴
1.3.High of Column	3.20	m.	2.4.Value of cx	10.00	cm.
1.4.Req. bx \geq	21.33	cm.	2.5.Value of cy	10.00	cm.
1.5.Req. ty \geq	21.33	cm.	2.6.Value of fa	69.95	kg./cm. ²
1.6.Design Wide(bx)	20.00	cm.	2.7.Value of fbx	kg./cm. ²	
1.7.Design Depth(ty)	20.00	cm.	2.8.Value of fby	kg./cm. ²	
1.8.Dia. of drain Pipe	cm. OK.!		2.9.Value of Fa	72.40	kg./cm. ²
1.9.Vertical Load(P_z)	18,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)	kg.		2.11.Value of Pa	19,321	kg.
1.11.Moment(M_{x-x})	kg.-m.		2.12.Value of Pbx	8,750	kg.
1.12.Moment(M_{y-y})	kg.-m.		2.13.Value of Pby	8,750	kg.
1.13.Design Ratio(p_g)	1.13	% OK.!	2.14.Value of Po	28,959	kg.
4 - DB 12 mm.			2.15.Value of $M_{b_{x-x}}$	497	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	497	kg.-m.
1 - RB 6 mm. @ 19 cm.			2.17.Value of $M_{o_{x-x}}$	244	kg.-m.
----[e<ea:Compression zone 1]----			2.18.Value of $M_{o_{y-y}}$	244	kg.-m.

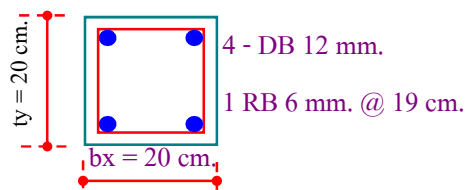
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.97 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-1 ชั้นสอง ถึง หลังคา



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Short Column		2.1.Value of m	20.40	
1.1.Reduction Factor	1.000	kh/r =5.6	2.2.Value of I_{x-x}	81,302	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	81,302	cm. ⁴
1.3.High of Column	0.50	m.	2.4.Value of cx	15.00	cm.
1.4.Req. bx ≥	15.00	cm.	2.5.Value of cy	15.00	cm.
1.5.Req. ty ≥	15.00	cm.	2.6.Value of fa	22.22	kg./cm. ²
1.6.Design Wide(bx)	30.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	30.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	64.85	kg./cm. ²
1.9.Vertical Load(P_z)	20,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	37,702	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	20,725	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	20,725	kg.
1.13.Design Ratio(p_g)	0.50	% OK.!	2.14.Value of Po	58,369	kg.
	4	- DB 12 mm.	2.15.Value of $M_{b_{x-x}}$	1,361	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	1,361	kg.-m.
	1	- RB 6 mm. @ 19 cm.	2.17.Value of $M_{o_{x-x}}$	407	kg.-m.
		----[e<ea:Compression zone 1]----	2.18.Value of $M_{o_{y-y}}$	407	kg.-m.

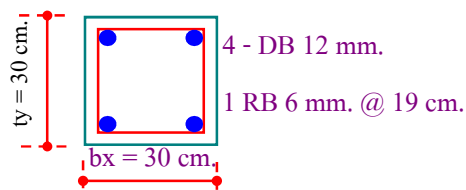
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.34 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-1 ตอม่อ



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.409	kh/r =82.7	2.2.Value of I_{x-x}	48,256	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	48,256	cm. ⁴
1.3.High of Column	6.20	m.	2.4.Value of cx	12.50	cm.
1.4.Req. bx	≥ 41.33	cm.	2.5.Value of cy	12.50	cm.
1.5.Req. ty	≥ 41.33	cm.	2.6.Value of fa	70.47	kg./cm. ²
1.6.Design Wide(bx)	25.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	25.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	74.27	kg./cm. ²
1.9.Vertical Load(P_z)	18,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	31,183	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	13,634	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	13,634	kg.
1.13.Design Ratio(p_g)	1.29	% OK.!	2.14.Value of Po	46,417	kg.
	4 - DB 16	mm.	2.15.Value of $M_{b_{x-x}}$	1,061	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	1,061	kg.-m.
	1 - RB 6 mm. @ 25 cm.		2.17.Value of $M_{o_{x-x}}$	579	kg.-m.
----[e<ea:Compression zone 1]----			2.18.Value of $M_{o_{y-y}}$	579	kg.-m.

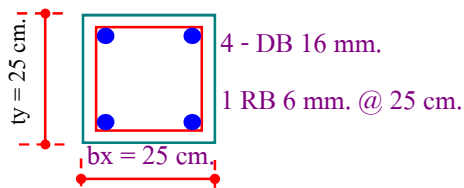
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.95 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-2 ชั้น 1 - ชั้นสอง



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.729	kh/r =42.7	2.2.Value of I_{x-x}	41,385	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	41,385	cm. ⁴
1.3.High of Column	3.20	m.	2.4.Value of cx	12.50	cm.
1.4.Req. bx \geq	21.33	cm.	2.5.Value of cy	12.50	cm.
1.5.Req. ty \geq	21.33	cm.	2.6.Value of fa	39.52	kg./cm. ²
1.6.Design Wide(bx)	25.00	cm.	2.7.Value of fbx	kg./cm. ²	
1.7.Design Depth(ty)	25.00	cm.	2.8.Value of fby	kg./cm. ²	
1.8.Dia. of drain Pipe	cm. OK.!		2.9.Value of Fa	67.51	kg./cm. ²
1.9.Vertical Load(P_z)	18,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)	kg.		2.11.Value of Pa	27,593	kg.
1.11.Moment(M_{x-x})	kg.-m.		2.12.Value of Pbx	14,152	kg.
1.12.Moment(M_{y-y})	kg.-m.		2.13.Value of Pby	14,152	kg.
1.13.Design Ratio(p_g)	0.72	% OK.!	2.14.Value of Po	42,193	kg.
4 - DB 12 mm.			2.15.Value of $M_{b_{x-x}}$	856	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	856	kg.-m.
1 - RB 6 mm. @ 19 cm.			2.17.Value of $M_{o_{x-x}}$	326	kg.-m.
----[e<ea:Compression zone 1]----			2.18.Value of $M_{o_{y-y}}$	326	kg.-m.

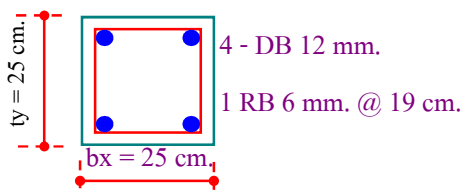
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.59 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

2 ชั้นลอย - หลัง



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.409	kh/r =82.7	2.2.Value of I_{x-x}	48,256	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	48,256	cm. ⁴
1.3.High of Column	6.20	m.	2.4.Value of cx	12.50	cm.
1.4.Req. bx	≥	41.33 cm.	2.5.Value of cy	12.50	cm.
1.5.Req. ty	≥	41.33 cm.	2.6.Value of fa	70.47	kg./cm. ²
1.6.Design Wide(bx)	25.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	25.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	74.27	kg./cm. ²
1.9.Vertical Load(P_z)	18,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	31,183	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	13,634	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	13,634	kg.
1.13.Design Ratio(p_g)	1.29	% OK.!	2.14.Value of Po	46,417	kg.
	4	- DB 16 mm.	2.15.Value of $M_{b_{x-x}}$	1,061	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	1,061	kg.-m.
	1	- RB 6 mm. @ 25 cm.	2.17.Value of $M_{o_{x-x}}$	579	kg.-m.
		----[e<ea:Compression zone 1]----	2.18.Value of $M_{o_{y-y}}$	579	kg.-m.

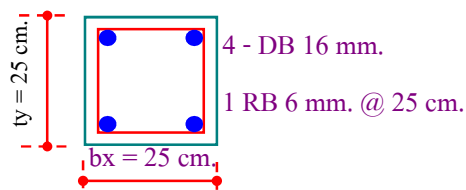
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.95 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-2



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Long Column		2.1.Value of m	20.40	
1.1.Reduction Factor	0.643	kh/r =53.3	2.2.Value of I_{x-x}	18,302	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	18,302	cm. ⁴
1.3.High of Column	3.20	m.	2.4.Value of cx	10.00	cm.
1.4.Req. bx ≥	21.33	cm.	2.5.Value of cy	10.00	cm.
1.5.Req. ty ≥	21.33	cm.	2.6.Value of fa	69.95	kg./cm. ²
1.6.Design Wide(bx)	20.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	20.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	72.40	kg./cm. ²
1.9.Vertical Load(P_z)	18,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	19,321	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	8,750	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	8,750	kg.
1.13.Design Ratio(p_g)	1.13	% OK.!	2.14.Value of Po	28,959	kg.
	4	- DB 12 mm.	2.15.Value of $M_{b_{x-x}}$	497	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	497	kg.-m.
	1	- RB 6 mm. @ 19 cm.	2.17.Value of $M_{o_{x-x}}$	244	kg.-m.
		----[e<ea:Compression zone 1]----	2.18.Value of $M_{o_{y-y}}$	244	kg.-m.

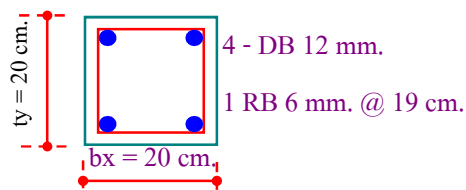
Status of Design Section & Reinf.

$$(fa/Fa)+(fbx/Fb)+(fby/Fb) = 0.97 \leq 1.00 \text{ OK.!$$

$$(Mx/Mox)+(My/Moy) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-2 ชั้นสอง -หลังคา



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Short Column		2.1.Value of m	20.40	
1.1.Reduction Factor	1.000	kh/r =5.6	2.2.Value of I_{x-x}	92,037	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	92,037	cm. ⁴
1.3.High of Column	0.50	m.	2.4.Value of cx	15.00	cm.
1.4.Req. bx \geq	15.00	cm.	2.5.Value of cy	15.00	cm.
1.5.Req. ty \geq	15.00	cm.	2.6.Value of fa	22.22	kg./cm. ²
1.6.Design Wide(bx)	30.00	cm.	2.7.Value of fbx	kg./cm. ²	
1.7.Design Depth(ty)	30.00	cm.	2.8.Value of fby	kg./cm. ²	
1.8.Dia. of drain Pipe	cm. OK.!		2.9.Value of Fa	69.55	kg./cm. ²
1.9.Vertical Load(P_z)	20,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)	kg.		2.11.Value of Pa	41,293	kg.
1.11.Moment(M_{x-x})	kg.-m.		2.12.Value of Pbx	20,153	kg.
1.12.Moment(M_{y-y})	kg.-m.		2.13.Value of Pby	20,153	kg.
1.13.Design Ratio(p_g)	0.89	% OK.!	2.14.Value of Po	62,593	kg.
4 - DB 16 mm.			2.15.Value of $M_{b_{x-x}}$	1,619	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	1,619	kg.-m.
1 - RB 6 mm. @ 26 cm.			2.17.Value of $M_{o_{x-x}}$	724	kg.-m.
---[e<ea:Compression zone 1]---			2.18.Value of $M_{o_{y-y}}$	724	kg.-m.

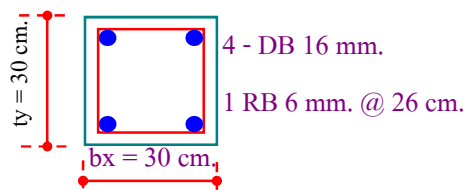
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.32 \leq 1.00 \text{ OK.!$$

$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-2 ตอม่อ



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. COLUMN

[I.Data For Design]			[II.Results of Design Section&Reinf.]		
Type of Column	Short Column		2.1.Value of m	20.40	
1.1.Reduction Factor	1.000	kh/r =5.6	2.2.Value of I_{x-x}	88,203	cm. ⁴
1.2.Shape of Column	1	จตุรัส	2.3.Value of I_{y-y}	88,203	cm. ⁴
1.3.High of Column	0.50	m.	2.4.Value of cx	15.00	cm.
1.4.Req. bx ≥	15.00	cm.	2.5.Value of cy	15.00	cm.
1.5.Req. ty ≥	15.00	cm.	2.6.Value of fa	22.22	kg./cm. ²
1.6.Design Wide(bx)	30.00	cm.	2.7.Value of fbx		kg./cm. ²
1.7.Design Depth(ty)	30.00	cm.	2.8.Value of fby		kg./cm. ²
1.8.Dia. of drain Pipe		cm. OK.!	2.9.Value of Fa	67.87	kg./cm. ²
1.9.Vertical Load(P_z)	20,000	kg.	2.10.Value of Fb	77.85	kg./cm. ²
1.10.Horiz. Load(P_y)		kg.	2.11.Value of Pa	40,011	kg.
1.11.Moment(M_{x-x})		kg.-m.	2.12.Value of Pbx	20,332	kg.
1.12.Moment(M_{y-y})		kg.-m.	2.13.Value of Pby	20,332	kg.
1.13.Design Ratio(p_g)	0.75	% OK.!	2.14.Value of Po	61,084	kg.
	6 - DB	12 mm.	2.15.Value of $M_{b_{x-x}}$	1,527	kg.-m.
1.14.Design Stirrup Dia	6	mm.	2.16.Value of $M_{b_{y-y}}$	1,527	kg.-m.
	1 - RB 6 mm. @	19 cm.	2.17.Value of $M_{o_{x-x}}$	611	kg.-m.
----[e<ea:Compression zone 1]----			2.18.Value of $M_{o_{y-y}}$	611	kg.-m.

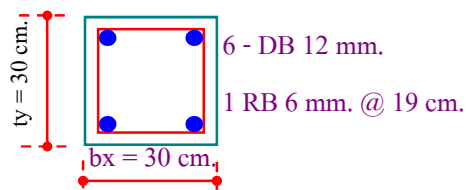
Status of Design Section & Reinf.

$$(f_a/F_a)+(f_{bx}/F_b)+(f_{by}/F_b) = 0.33 \leq 1.00 \text{ OK.!$$

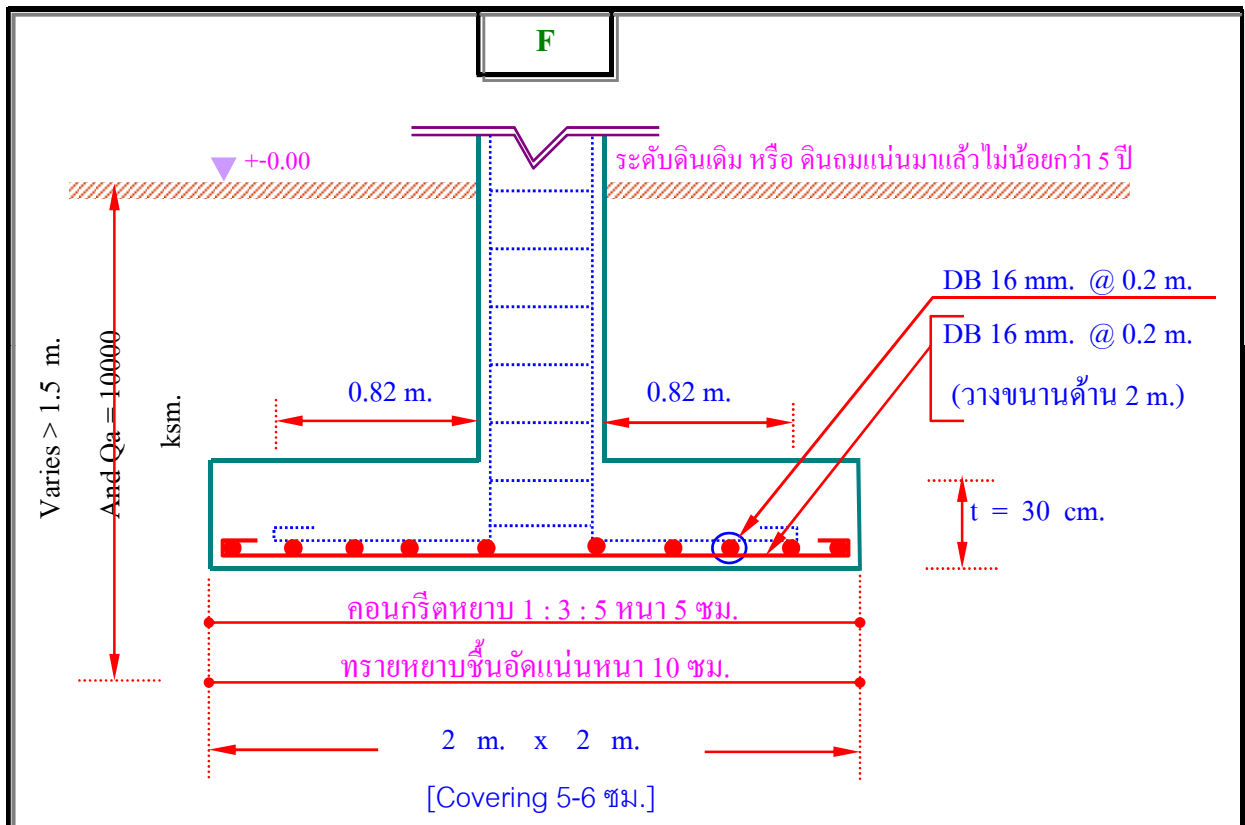
$$(M_x/M_{ox})+(M_y/M_{oy}) = \leq 1.00 \text{ OK.!$$

This Design Section Is Safty

C-2 ตอม่อ



F



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ศ.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

7-Feb-2551

DESIGN SPREAD FOOTING

[I.Data For Design]

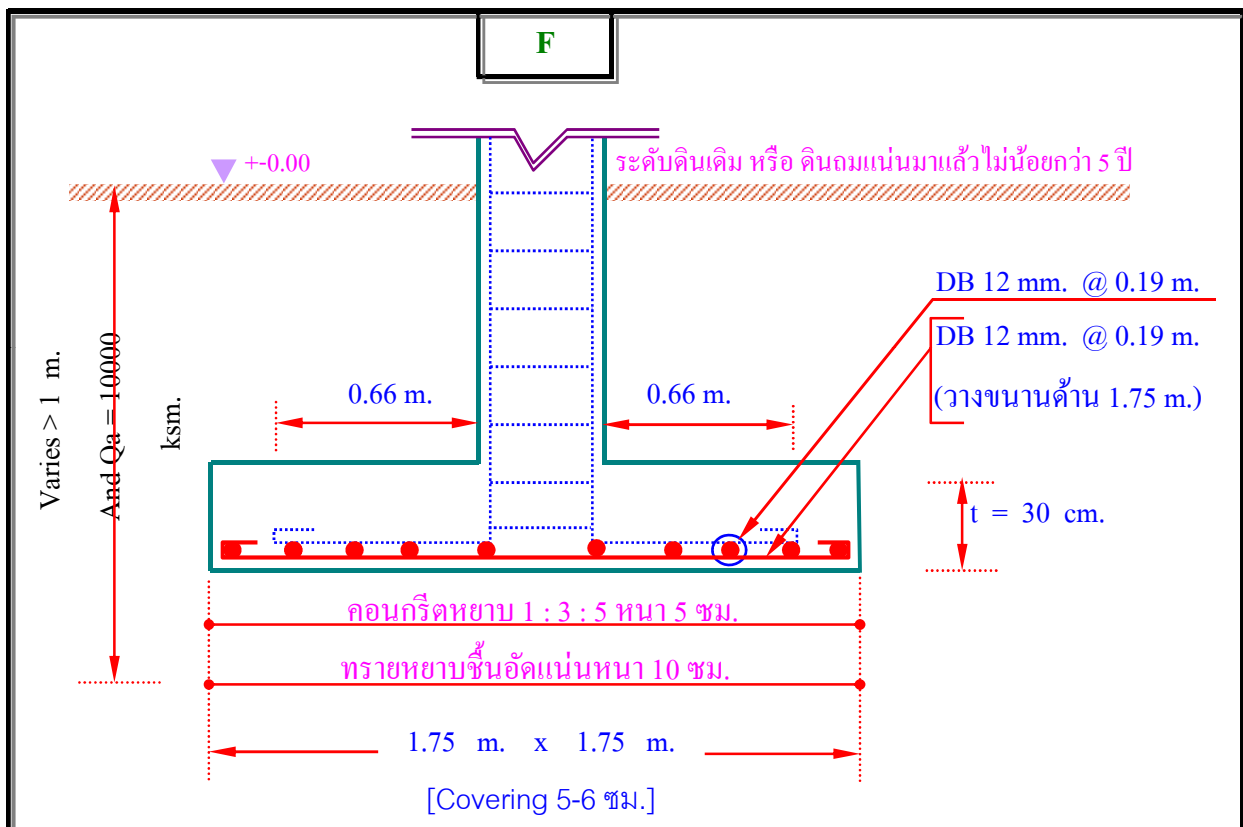
[II.Results of Design]

Design For Footing No. :	F	2.1.Factor of Shape	1.00	[]
1.1.Shape of Found.	1 จตุรัส	2.2.Contact Factor	34.03	(A_F/A_P)
1.2.Shape of Pillar	1 เสาเหลี่ยม	2.3.All.Contact Stress	205.87	kg./cm. ²
1.3.Pillar Wide(bx)	30.00 cm.	2.4.Col.Contact Stress	24.44	kg./cm. ²
1.4.Pillar Long(ty)	30.00 cm.	2.5.Kern Limit(e_x)	$e \leq Bx/6$	OK.!
1.5.Depth of Found.	1.00 m.	2.6.Kern Limit(e_y)	$e \leq Ly/6$	OK.!
1.6.Vertical Load(P_z)	22,000 kg.	2.7.Recheck $A_{req.}$	----	[OK.!]----
1.7.Horiz. Load(P_x)	kg.	2.8.Weight of Found.	2,205.00	kg./ A_F
1.8.Horiz. Load(P_y)	kg.	2.9.Recheck q_a	7,903.67	kg./m. ²
1.9.Moment(M_{x-x})	kg.-m.	2.10. $P_{min.}$ Long Direct.	7,903.67	kg./m. ²
1.10.Moment(M_{y-y})	kg.-m.	2.11. $P_{max.}$ Long Direct.	7,903.67	kg./m. ²
1.11.All. Soil Bearing	10,000 kg./m. ²	2.12. P_{max} At $\frac{(Ly + ty)}{2}$	7,903.67	kg./m. ²
1.12 Req. Min. Area	2.42 m. ²	2.13. P_{max} At $\frac{d}{2}$	7,903.67	kg./m. ²
1.13.Design Long(L_y)	1.75 m. OK.!	2.14. P_{max} At d	7,903.67	kg./m. ²
1.14.Design Short(B_x)	1.75 m. OK.!	2.15. M_{max} At $\frac{(Ly + ty)}{2}$	3,635.07	kg.-m.
1.15 Req. Min. Thick.	20.21 cm.	2.16. V_{max} At $\frac{(Ly + ty)}{2}$	10,027.79	kg.
1.16.Design Thickness	30.00 cm.	2.17. v_a At $\frac{d}{2}$	3.31	kg./cm. ²
1.17.Ratio of $[Bx/Ly] \geq$	0.75 I: 1 OK.!	2.18. v_a At d	1.25	kg./cm. ²

[III.Design Reinforcement]

3.1.Required Min. A_{sa} of Dowels For Anchor to Column	4.50	cm. ² (Min=0.005* A_p)
3.2.Required Min. Embedment Length L_d For Compression Bars	66.00	cm.
3.3.Design Dowel Bars(Min. 4 - DB 12 mm.)	4 - DB 12	mm. OK.!
3.4 Req. Main Steel	9.36	cm. ² /B _x :
3.5 Req. Second Steel	9.36	cm. ² /L _y
3.6.Design Main Steel(Bott. Steel)	DB 12 mm @ 0.19	m. OK.!
3.7.Design Main Steel(Top Steel)	DB 12 mm @ 0.19	m. OK.!

F



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น [Owner]
 [Building] [Engineer]
 [Location] [Date]

DESIGN STRAP FOOTING

[I.Data For Design]	[II.Results of Design]
-----------------------	--------------------------

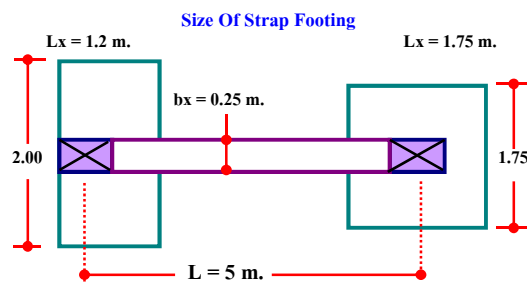
1.1.Spacing Of Col.	5.00	m.	2.1.Total Load	39,600.00	kg.
1.2.Width Of Ext. Col.	0.25	m.(Ly)	2.2.All. Soil Bearing	10,000	kg./m. ²
1.3.Long Of Ext. Col.	0.25	m.(Lx)	2.3.Centroid Of Load	2.63	m. (3.13)
1.4.Load On Ext. Clo.	18,000	kg.	2.4.Req. Total Area	3.96	m. ²
1.5.Width Of Int. Col.	0.25	m.(Ly)	2.5.Req. Min. A _{ext.}	1.98	m. ²
1.6.Long Of Int. Col.	0.25	m.(Lx)	2.6.Req. Min. A _{int.}	1.98	m. ²
1.7.Load On Int. Clo.	18,000	kg.	2.7.Req. Strap Beam	0.25	m.(Wide)

[III.Design Dimention]

Size Of Exterior Footing(Areq.= 1.98)			2.8.Reaction R _{ext.}	21,878.45	kg.
			2.9.Shear V _{ext.}	7,611.90	kg.
3.1.Use L _{x_{ext.}}	1.20	m. OK.!	2.10.Moment M _{ext.}	3,330.21	kg.-m.
3.2.Use L _{y_{ext.}}	2.00	m. OK.!	2.11.Reaction R _{int.}	17,721.55	kg.
3.3.Use Thick.(0.23m.	0.35	m. OK.!	2.12.Shear V _{int.}	9,514.87	kg.
Size Of Interior Footing(Areq.= 1.98)			2.13.Moment M _{int.}	3,568.08	kg.-m.
3.4.Use L _{x_{int.}}	1.75	m. OK.!	2.14.Soil Pressure	7,249.43	ksm.
3.5.Use L _{y_{int.}}	1.75	m. OK.!	2.15.M _{max.} Occur At	0.99	m.
3.6.Use Thick.(0.21m.	0.25	m. OK.!	2.16.Max. Moment	-6,635.45	kg.-m.

Size Of Strap Beam(Singly Section)

3.7.Use Wide	0.25	m.
3.8.Req. Depth(treq.)	0.60	m.
3.9.Use Depth(t)	0.50	Fail!
3.10.Recheck Beam	L/b <= 30	OK.!



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น [Owner]
 [Building] [Engineer]
 [Location] [Date] 15-Sep-2002

DESIGN STRAP FOOTING

[I.Data For Design]	[II.Results of Design]
1.1.Spacing Of Col. 4.00 m.	2.1.Total Load 44,000.00 kg.
1.2.Width Of Ext. Col. 0.30 m.(Ly)	2.2.All. Soil Bearing 8,000 kg./m. ²
1.3.Long Of Ext. Col. 0.30 m.(Lx)	2.3.Centroid Of Load 2.15 m. (2.7)
1.4.Load On Ext. Clo. 20,000 kg.	2.4.Req. Total Area 5.50 m. ²
1.5.Width Of Int. Col. 0.25 m.(Ly)	2.5.Req. Min. A _{ext.} 2.75 m. ²
1.6.Long Of Int. Col. 0.25 m.(Lx)	2.6.Req. Min. A _{int.} 2.75 m. ²
1.7.Load On Int. Clo. 20,000 kg.	2.7.Req. Strap Beam 0.25 m.(Wide)
[III.Design Dimention]	
Size Of Exterior Footing(Areq.= 2.75)	
2.8.Reaction R _{ext.} 24,788.73 kg.	2.9.Shear V _{ext.} 7,415.01 kg.
3.1.Use L _{x_{ext.}} 1.20 Fail!	2.10.Moment M _{ext.} 2,687.94 kg.-m.
3.2.Use L _{y_{ext.}} 1.75 Fail!	2.11.Reaction R _{int.} 19,211.27 kg.
3.3.Use Thick.(0.21m. 0.35 m. OK.!	2.12.Shear V _{int.} 11,186.44 kg.
Size Of Interior Footing(Areq.= 2.75)	
2.13.Moment M _{int.} 4,194.92 kg.-m.	2.14.Soil Pressure 8,523.00 Fail!
3.4.Use L _{x_{int.}} 1.75 m. OK.!	2.15.M _{max.} Occur At 0.97 m.
3.5.Use L _{y_{int.}} 1.75 m. OK.!	2.16.Max. Moment -6,681.82 kg.-m.
3.6.Use Thick.(0.22m. 0.25 m. OK.!	
Size Of Strap Beam(Singly Section)	
3.7.Use Wide 0.25 m.	<p style="text-align: center;">Size Of Strap Footing</p>
3.8.Req. Depth(treq.) 0.60 m.	
3.9.Use Depth(t) 0.60 m. OK.!	
3.10.Recheck Beam L/b <= 30 OK.!	

[IV.Design Reinforcement]

[For Strap Beam]

- 1.Req. Tension Steel $9.02 \text{ cm.}^2 \implies$ Select Steel Dia. **12 mm.**(Top)
- 2.Req. Comp. Steel $\text{cm.}^2 \implies$ Select Steel Dia. **12 mm.**(Bott.)
- Use Top Steel For M^+ **8-DB 12 mm.** Use Bott. Steel For M^- **2-DB 12 mm.**
- 3.For Stirrup Select Steel Dia. **6 mm.** Use Stirrup **1-RB 6 mm. @ 0.15 m**

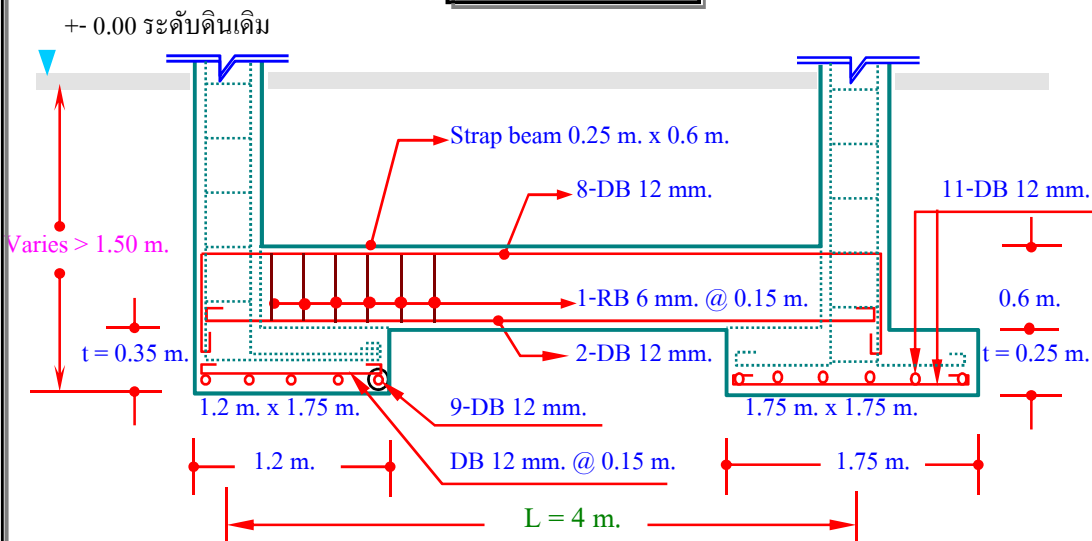
[For Footing]

[1.Exterior Footing]

[2.Interior Footing]

- 1.1.Req. Main Steel 9.22 cm.^2 Select Steel Dia. **12 mm.**(Bott.) Use Bottom Steel **9-DB 12 mm.**
- 1.2.Req. Sub Steel $7.00 \text{ cm.}^2/\text{m}$ Select Steel Dia. **12 mm.**(Top) Use Top Steel **DB 12 mm. @ 0.15 m**
- 2.1.Req. Main Steel 11.47 cm.^2 Select Steel Dia. **12 mm.**(Bott.) Use Bottom Steel **11-DB 12 mm.**
- 2.2.Req. Main Steel 11.47 cm.^2 Select Steel Dia. **12 mm.**(Top) Use Top Steel **11-DB 12 mm.**

FS



[IV.Design Reinforcement]

[For Strap Beam]

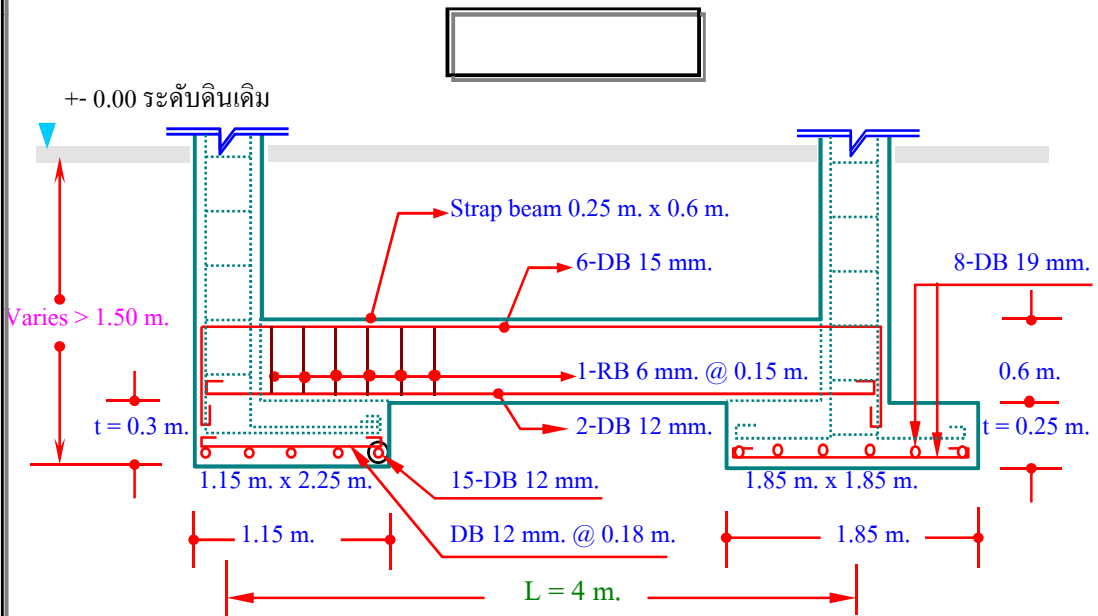
- 1.Req. Tension Steel $9.16 \text{ cm.}^2 \implies$ Select Steel Dia. **15 mm.**(Top)
- 2.Req. Comp. Steel $\text{cm.}^2 \implies$ Select Steel Dia. **12 mm.**(Bott.)
- Use Top Steel For M^+ **6-DB 15 mm.** Use Bott. Steel For M^- **2-DB 12 mm.**
- 3.For Stirrup Select Steel Dia. **6 mm.** Use Stirrup **1-RB 6 mm. @ 0.15 m**

[For Footing]

[1.Exterior Footing]

[2.Interior Footing]

- | | | | | | |
|---------------------|---------------------------|--------------------------|---------------------|--------------------|----------------|
| 1.1.Req. Main Steel | 16.37 | cm.^2 | 2.1.Req. Main Steel | 19.41 | cm.^2 |
| Select Steel Dia. | 12 mm. | (Bott.) | Select Steel Dia. | 19 mm. | (Bott.) |
| Use Bottom Steel | 15-DB 12 mm. | | Use Bottom Steel | 8-DB 19 mm. | |
| 1.2.Req. Sub Steel | 6.00 | $\text{cm.}^2/\text{m.}$ | 2.2.Req. Main Steel | 19.41 | cm.^2 |
| Select Steel Dia. | 12 mm. | (Top) | Select Steel Dia. | 19 mm. | (Top) |
| Use Top Steel | DB 12 mm. @ 0.18 m | | Use Top Steel | 8-DB 19 mm. | |



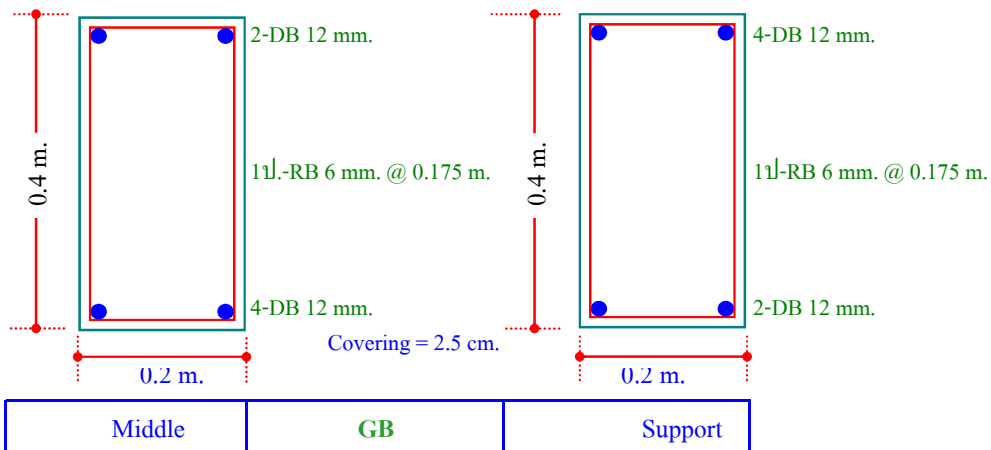
NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ก.ส.ล. สูง 2 ชั้น [Owner]
 [Building] [Engineer]
 [Location] [Date]

DESIGN RC. BEAM

[I.Data For Design]		[III.Allowable Design Stress]			
1.1.Length of Beam	5.00	m.	3.1.M _{resistant}	2,524.43	kg.-m.
1.2.Bending Moment	2,000.00	kg.-m.	3.2. 0.29@Sqrt(fc')	3.81	kg./cm. ²
1.3.Torsion Moment		kg.-m./m.	3.3. 0.79@Sqrt(fc')	10.39	kg./cm. ²
1.4.Max. Shear	2,000.00	kg.	3.4. 1.32@Sqrt(fc')	17.36	kg./cm. ²
1.5.Use Beam Width	20.00	cm.	3.5. 1.65@Sqrt(fc')	21.70	kg./cm. ²
1.6 Req. Min. Depth.	33.38	cm.	3.6. V _{Total} (Safe)	2.67	kg./cm. ²
1.7.Use Beam Depth.	40.00	cm.	3.7.Develop Length	0.19	m.

[II.Required Reinforcement((As/bd) >= (14/Fy))					
[-- For Main Steel(Singly Section) --]			For Continuous&Simple Beam		2
2.1.Req. Min. A _{st} ⁺	3.96	cm. ²	Top Bar DB Dia.	12	mm.
2.2.Req. Min. A _{sc} ⁻		cm. ²	Required Row 1	2.00	bars
2.3.Req. Min. A _{torsion}		cm. ² /Corn.	<u>2</u> Row 2	-	bars
[-- For Stirrup Steel --]			bars Row 3	-	bars
2.4.Use Diameter	6	mm.	Bott. Bar DB Dia.	12.00	mm.
2.5.Number of Loop	1	Loop	Required Row 1	4.00	bars
2.6.Req. min. Spacing	18.75	cm.	<u>4</u> Row 2	-	bars
2.7.Use Spacing	17.50	cm. OK.!	bars Row 3	-	bars



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. SLAB ON GRADE

[I.Data For Design]

1.1.Short Span(S.)	4.00	m. OK!
1.2.Long Span(L.)	5.00	m. OK!
1.3.Live Load(LL.)	200.00	kg./m. ²
1.4.Type of Subgrade	1	Comp.Sand
1.5.K of Subgrade	5.55	kg./cm. ³
1.6 Req. Thickness(t.)	8.00	cm.
1.7.Design Thickness	10.00	cm. OK!

[II.Stress Due to Design Thickness]

2.1.Radius of Relative	41.81	cm.
2.2.Check Thickness	7.47	cm.
2.3.Inter.Loading(ft1)	14.23	ksc. OK!
2.4.Edge Loading(ft2)	21.00	ksc. OK!

[III.Required Min. Temp. Steel]

3.1.Short Span(As _s)	0.60	cm. ² /m.
3.2.Long Span(As _l)	0.75	cm. ² /m.

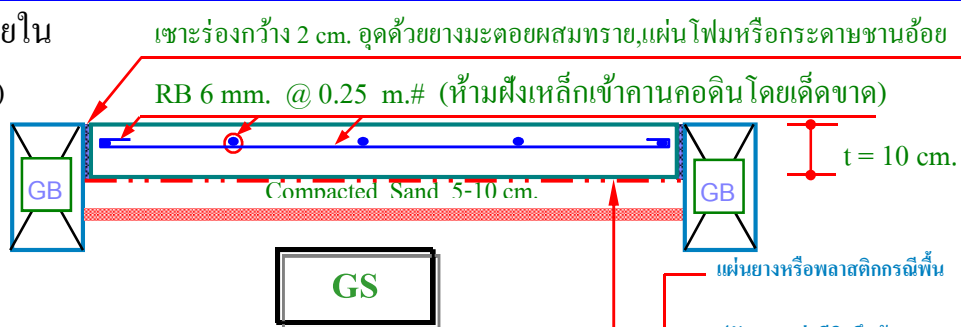
Table of Reinforcement For Selection

Side of Slab	Bar Size (mm.)	Area/Bar (cm. ²)	Required (bars/m.)	Design (bars/m.)	Spacing @(m.)
Short(S)	6	0.28	2.65	4	0.250
	9	0.64	1.18	4	0.250
& Long(L)	12	1.13	0.66	4	0.250
	16	2.01	0.37	4	0.250
	20	3.14	0.24	4	0.250

-----[Selection 6 mm. @ 0.25 m.]-----

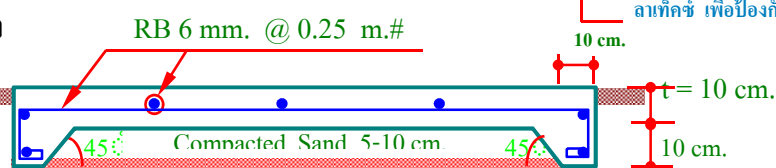
[I.] ใ้้นภายใน

(ด้านสั้น)



[II.] ใ้้นภายนอก

(ด้านสั้น)



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ถ. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

21-Jul-2547

[WIRE MESH DESIGN]

When : As_1 = Require Area Of Wire Mesh($\text{cm.}^2/\text{m.}$)

As_2 = Require Area Of Reinforcedment($\text{cm.}^2/\text{m.}$)

Fs_1 = Allowable Tensile Strength Of Wire Mesh(kg./cm.^2)

Fs_2 = Allowable Tensile Strength Of Reinforcedment(kg./cm.^2)

When Design By Use Reinf.

RB 6 mm. @ 0.250 m.#

$As_2 = 1.130 \text{ cm.}^2/\text{m.}$

When : $Fy_1 = 5,500.00 \text{ ksc.}$

$Fs_1 = 2,750.00 \text{ ksc.}$

$Fy_2 = 2,400.00 \text{ ksc.}$

$Fs_2 = 1,200.00 \text{ ksc.}$

From : $As_1 = As_2 \times [Fs_2/Fs_1]$

So Require $As_1 = 0.490 \text{ cm.}^2/\text{m.}$

From Calculate : Select To Use Wire Mesh

For : Dia. 4 mm. @ 0.260 m.#

สรุป : เลือกใช้ตะแกรงเหล็กเพื่อการทำงานดังนี้ได้

Set 1 : Dia. 4 mm. @ 0.200 m.#

Set 2 : Dia. 4 mm. @ 0.250 m.#

[IV.Design Reinforcement]

[For Strap Beam]

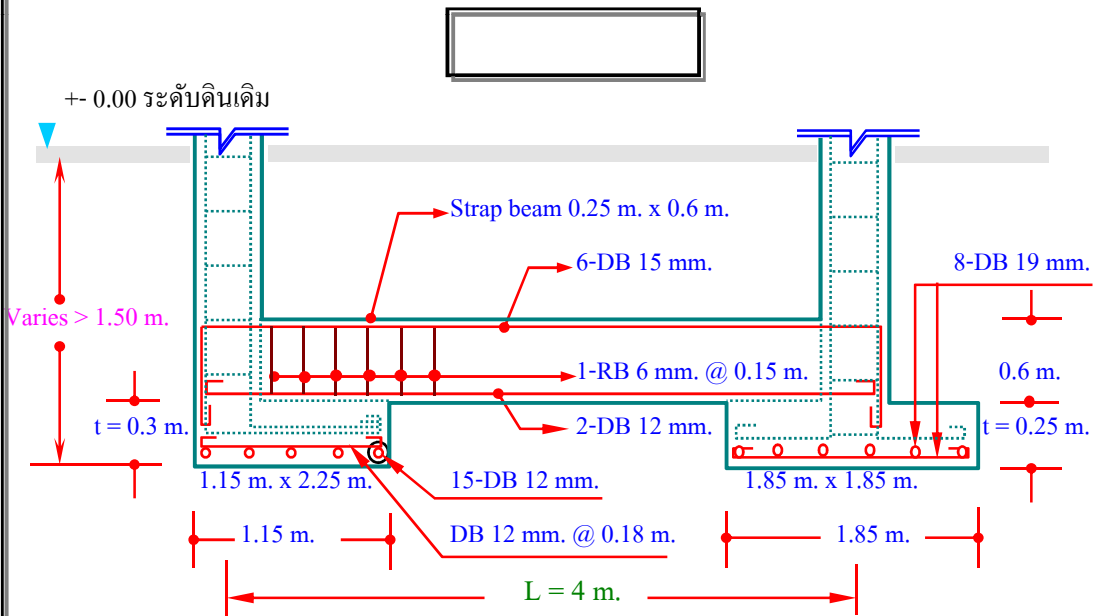
- 1.Req. Tension Steel $9.16 \text{ cm.}^2 \implies$ Select Steel Dia. **15 mm.**(Top)
- 2.Req. Comp. Steel $\text{cm.}^2 \implies$ Select Steel Dia. **12 mm.**(Bott.)
- Use Top Steel For M^+ **6-DB 15 mm.** Use Bott. Steel For M^- **2-DB 12 mm.**
- 3.For Stirrup Select Steel Dia. **6 mm.** Use Stirrup **1-RB 6 mm. @ 0.15 m**

[For Footing]

[1.Exterior Footing]

[2.Interior Footing]

- 1.1.Req. Main Steel 16.37 cm.^2 Select Steel Dia. **12 mm.**(Bott.) Use Bottom Steel **15-DB 12 mm.**
- 1.2.Req. Sub Steel $6.00 \text{ cm.}^2/\text{m}$ Select Steel Dia. **12 mm.**(Top) Use Top Steel **DB 12 mm. @ 0.18 m**
- 2.1.Req. Main Steel 19.41 cm.^2 Select Steel Dia. **19 mm.**(Bott.) Use Bottom Steel **8-DB 19 mm.**
- 2.2.Req. Main Steel 19.41 cm.^2 Select Steel Dia. **19 mm.**(Top) Use Top Steel **8-DB 19 mm.**



NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ล. สูง 2 ชั้น

[Owner]

[Building]

[Engineer]

[Location]

[Date]

DESIGN RC. SLAB

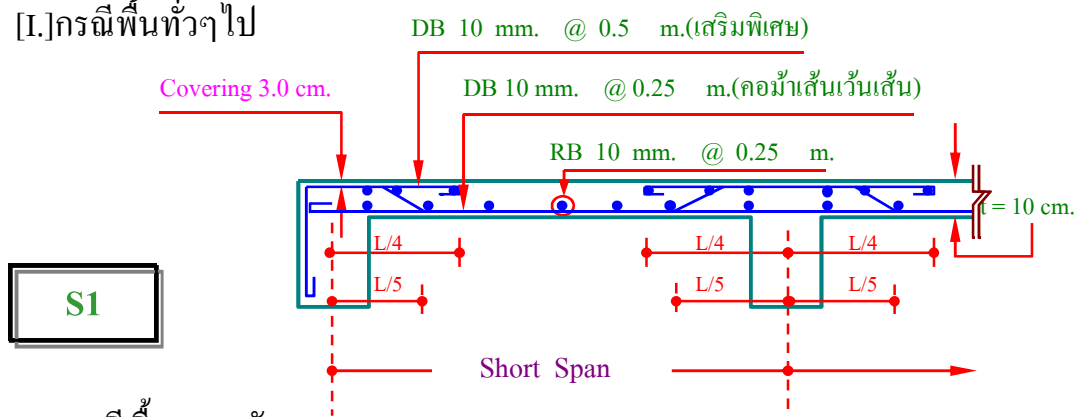
[I.Data For Design]		[II.Moment,Shear&Reinforcement]	
1.1.No. of Span	Span	2.1.Moment(Ms-)	157.50 kg.-m.
1.2.Shape of Slab	1 รูปสี่เหลี่ยม	2.2.Moment(MI-)	118.13 kg.-m.
1.3.No. of Supp.Beam	4 Side	2.3.Moment(Ms+)	***** kg.-m.
1.4.Short Span(S.)	1.50 m.	2.4.Moment(MI+)	***** kg.-m.
1.5.Long Span(L.)	3.00 m.	2.5.Max. Shear(V.)	380.80 kg.
1.6.Ratio of S/L(m)	0.50 One-way	2.6.R. On Short Beam	280.00 kg./m.
1.7.Live Load(LL.)	200.00 kg./m. ² /m.	2.7.R. On Long Beam	420.00 kg./m.
1.8.Finishing (FL.)	120.00 kg./m. ² /m.	2.8.Check Thickness	8.00 cm.
1.9.Check Status Ratio of LL./DL.	OK.!	2.9.Req. Main Reinf.	2.50 cm. ² /m.
1.10.Req. Thickness	8.00 cm.	2.10.Req. Temp. Reinf.	2.50 cm. ² /m.
1.11.Design Thick.	10.00 cm. OK.!	-----[LL/DL Ratio < 3 OK.!]-----	

Reinforcement For Selection

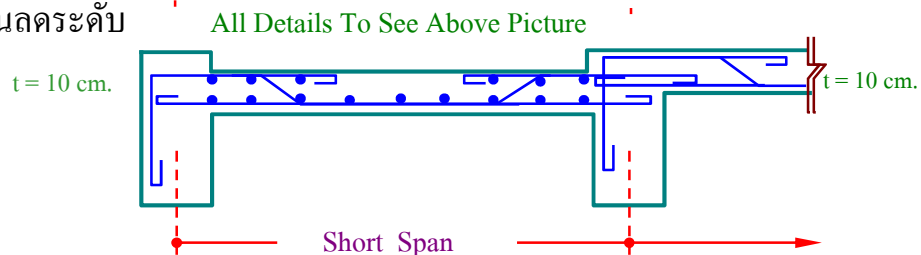
เหล็กล่าง(ขนานด้านสั้น) DB 10 mm. @ 0.25 m.

เหล็กบน(ขนานด้านยาว) RB 10 mm. @ 0.25 m.

[I.]กรณีพื้นที่ทั่วไป



[II.]กรณีพื้นลดระดับ



NEO RC. Design v4.50(WSD.)

*Project อาคารที่พักอาศัย ค.ส.ถ. สูง 2 ชั้น

*Owner

*Building

*Engineer

*Location

*Date

DESIGN RC. STAIR

[I.Data For Design]

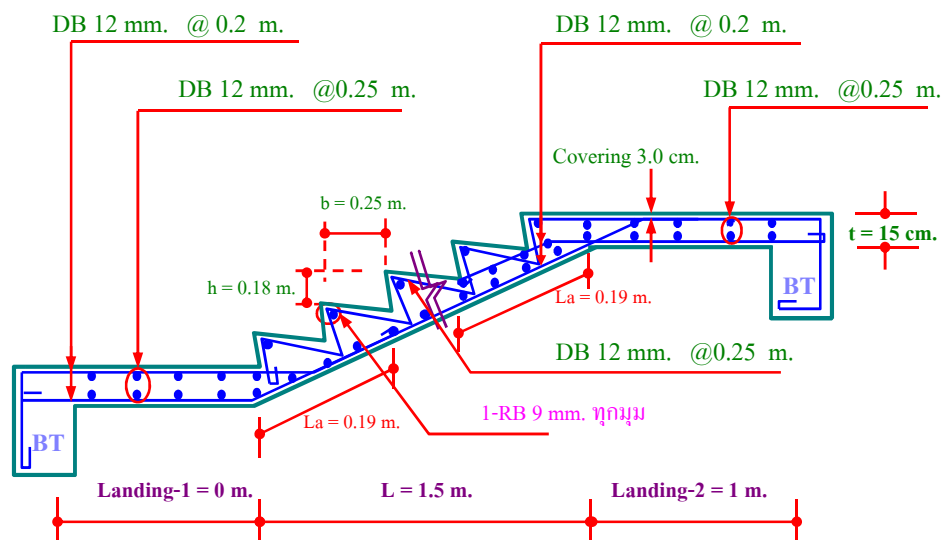
[II.Moment,Shear&Reinforcement]

1.1.Type of Stair	1	ห้องแบบ	2.1.Max.Moment	783.74	kg.-m.
1.2.No. of Span	1	Span	2.2.Max. Shear(V.)	1,141.86	kg.
1.3.Horizontal Length	2.50	m.(Total)	2.3.R. On Left Supp.	1,262.01	kg./m.
1.4.Landing-1. Length		m.	2.4.R. On Right Supp.	1,262.01	kg./m.
1.5.Landing-2. Length	1.00	m.	2.5.Check Thickness	12.40	cm.
1.6.High of Rise(h.)	0.18	m. OK.!	2.6 Req. Main Reinf.	4.89	cm. ² /m.
1.7.Going Wide(b.)	0.25	m. OK.!	2.7 Req. Temp. Reinf.	3.00	cm. ² /m.
1.8.Live Load(LL.)	300.00	kg./m. ²	[III.Stress , Bond & Anchorage]		
1.9.Finishing (FL.)	50.00	kg./m. ²			
1.10 Req. Thickness	10.00	cm.	3.1.Shear Stress(v.)	0.96	ksc. OK.!
1.11.Design Thick.(t.)	15.00	cm. OK.!	3.2.Bond Stress(u.)	6.27	ksc. OK.!
			3.3.Anchorage Length	0.19	m.

Reinforcement For Selection

เหล็กล่าง(Main Reinf.) DB 12 mm. @ 0.2 m.

เหล็กบน(Temp. Reinf.) DB 12 mm. @ 0.25 m.



ST

Neo Timber and Steel Design(ASD.) v4.20

Project : อาคารที่พักอาศัย ค.ศ.ด. 2 ชั้น	Engineer :
Location : .	Date :
Owner :	Time : 11:38:59 AM

Design For Flexible Members : ข้อเหล็ก

[I.Datas For Design]			[II.Properties Of Steel For Design]		
1.1.End Moment(M ₁)		kg.-m.	2.1.Use Steel Grade	Fe-24	
1.2.Middle Moment	590.00	kg.-m.	2.2.Modulus Of Elastic.	2,100,000	ksc.
1.3.End Moment(M ₂)		kg.-m.	2.3.Yield Strength	2,400	ksc.
1.4.Max. Shear(V.)	1,000.00	kg.	2.4.Ultimate Strength	4,100	ksc.
1.5.Deflection(Δ)		kg.-m. ³	2.5.All. Bend. Stress	1,440	ksc.
1.6.Max. Length(L.)	4.00	m.	2.6.All. Shear Stress	960	ksc.
1.7.Lateral Support(L _p)		m.	[IV.Check Laterally Supported]		
1.8.Coefficient of C _b	1.00		4.1.Use Laterally Sup.	*****	m.
[III.Result Of Calculate]			4.2. $L_c = \frac{637.2 * b_f}{\sqrt{F_y}}$	1.30	m.(min.)
3.1.Required (S _{x-x})	40.97	cm. ³	4.3. $L_u = \frac{1406000 * A_f}{d * \sqrt{F_y}}$	3.75	m.(max.)
3.2.Type Of Section	2	Lip. Chan. C	<<-----< ***** >----->>		
3.3.Trial Section No.	4	2 Double	[V.Allowable Bending Stress(Fb)]		
3.4.Size Of Section	100*50*20	mm.	5.1.Laterally Supported Is Sufficiently		
3.5.Thick. Web(t , t _w)	3.20	mm.	$\frac{b_f}{2 * t_f} = *****$		
3.6.Thick. Flange(t _f)	3.20	mm.	$\frac{4 * 3 * 7.7}{\sqrt{F_y}} = *****$		
3.7.Section Area(A _s)	7.01	cm. ²	$\frac{7 * 9 * 6.5}{\sqrt{F_y}} = *****$		
3.8.Weight Of Section	5.50	kg./m.	All.Bending Stress(Fb)	*****	ksc.
3.9.Sect. Modulus(S _{x-x})	21.30	cm. ³	<<-----< ***** >----->>		
3.10.M. Of In.(I _{x-x})	107.00	cm. ⁴	5.2.Laterally Supported Is Non-Sufficiently		
3.11.Rad. Of Gyr.(r _{min.})	1.87	cm.	$\frac{L}{r_t} =$		
			$\sqrt{\frac{717 * 10^4 * C_b}{F_y}} = 54.66$		
			$\sqrt{\frac{3585 * 10^4 * C_b}{F_y}} = 122.22$		
[Recheck Allowable Stress On Section]			All.Bending Stress(Fb)	1,440.00	ksc.
1.Actual Bending Stress	1,385	ksc. OK.!	[VI.Allowable Deflection(Δ all.)]		
2.Actual Shear Stress	358.37	ksc. OK.!	6.1.Max. Allowable	1.33	cm.
3.Actual Deflection	Non.Check	cm. OK.!(L/300)			

Select To Use Section : 2C - 100*50*20*3.2 mm.(น้ำหนัก = 5.5 kg./m.)

Neo Timber and Steel Design(ASD.) v4.20

Project : อาคารที่พักอาศัย ค.ศ.ด. 2 ชั้น	Engineer :
Location : .	Date :
Owner :	Time : 12:18:15 PM

Design For Flexible Members : จันทัน

[I.Datas For Design]			[II.Properties Of Steel For Design]						
1.1.End Moment(M ₁)		kg.-m.	2.1.Use Steel Grade	Fe-24					
1.2.Middle Moment	300.00	kg.-m.	2.2.Modulus Of Elastic.	2,100,000	ksc.				
1.3.End Moment(M ₂)		kg.-m.	2.3.Yield Strength	2,400	ksc.				
1.4.Max. Shear(V.)	300.00	kg.	2.4.Ultimate Strength	4,100	ksc.				
1.5.Deflection(Δ)		kg.-m. ³	2.5.All. Bend. Stress	1,440	ksc.				
1.6.Max. Length(L.)	4.00	m.	2.6.All. Shear Stress	960	ksc.				
1.7.Lateral Support(L _p)		m.	[IV.Check Laterally Supported]						
1.8.Coefficient of C _b	1.00		4.1.Use Laterally Sup.	*****	m.				
[III.Result Of Calculate]			4.2. $L_c = \frac{637.2 * b_f}{\sqrt{F_y}}$	0.65	m.(min.)				
3.1.Required (S _{x-x})	20.83	cm. ³	4.3. $L_u = \frac{140600 * A_f}{d * \sqrt{F_y}}$	0.94	m.(max.)				
3.2.Type Of Section	2	<table border="1"> <tr> <td>Lip. Chan.</td> <td>C</td> </tr> <tr> <td>1</td> <td>Single</td> </tr> </table>	Lip. Chan.	C	1	Single	<<-----< ***** >----->>		
Lip. Chan.	C								
1	Single								
3.3.Trial Section No.	4		[V.Allowable Bending Stress(Fb)]						
3.4.Size Of Section	100*50*20	mm.	5.1.Laterally Supported Is Sufficiently						
3.5.Thick. Web(t , t _w)	3.20	mm.	$\frac{b_f}{2 * t_f} = *****$						
3.6.Thick. Flange(t _f)	3.20	mm.	$\frac{4 * 3 * 7.7}{\sqrt{F_y}} = *****$						
3.7.Section Area(A _s)	7.01	cm. ²	$\frac{7 * 9 * 6.5}{\sqrt{F_y}} = *****$						
3.8.Weight Of Section	5.50	kg./m.	All.Bending Stress(Fb)	*****	ksc.				
3.9.Sect. Modulus(S _{x-x})	21.30	cm. ³	<<-----< ***** >----->>						
3.10.M. Of In.(I _{x-x})	107.00	cm. ⁴	5.2.Laterally Supported Is Non-Sufficiently						
3.11.Rad. Of Gyr.(r _{min.})	1.87	cm.	$\frac{L}{r_t} =$						
	1C - 100*50*20*3.2 mm.(น้ำหนัก = 5.5 kg./m.)		$\sqrt{\frac{717 * 10^4 * C_b}{F_y}} = 54.66$						
[Recheck Allowable Stress On Section]			$\sqrt{\frac{3585 * 10^4 * C_b}{F_y}} = 122.22$						
1.Actual Bending Stress	1,408	ksc. OK.!	All.Bending Stress(Fb)	1,440.00	ksc.				
2.Actual Shear Stress	100.16	ksc. OK.!	[VI.Allowable Deflection(Δ all.)]						
3.Actual Deflection	Non.Check	cm. OK.!(L/300)	6.1.Max. Allowable	1.33	cm.				

Select To Use Section : 1C - 100*50*20*3.2 mm.(น้ำหนัก = 5.5 kg./m.)

Neo Timber and Steel Design(ASD.) v4.20

Project : อาคารที่พักอาศัย ค.ศ.ล. 2 ชั้น	Engineer :
Location : .	Date : 28-มิ.ย.-2550
Owner :	Time : 12:23:58 PM

Design For Beam - Column Members : ดิ่งเหล็ก

[I.Datas For Design]	[II.Properties Of Steel For Design]
1.1.Point Load(P _c) 1,800 kg.	2.1.Use Steel Grade Fe-24
1.2.Moment(M _{x-x}) kg.-m.	2.2.Modulus Of Elastic. 2,100,000 ksc.
1.3.Moment(M _{y-y}) kg.-m.	2.3.Yield Strength 2,400 ksc.
1.4.Max. Length 1.50 m.	2.4.Ultimate Strength 4,100 ksc.
1.5.Min. Value Of k 0.65 [fixed-fixed]	2.5.All. Comp. Stress 1,440 ksc.
1.6.Use Value Of k 1.00	2.6.All. Weld. Stress 960 ksc.
[III.Result Of Calculate]	[IV.Select Type & Section Of Steel]
3.1.Req. Min. Area 1.25 cm. ²	4.1.Type Of Section 2 Lip. Chan.
3.2.Value Of (λ) _c 131.42 ****	4.2.Trial Section No. 3 C
3.3.Value Of (λ) _(kL/r) 78.13 OK.!	4.3.Size Of Section 100*50*20 mm.
3.5.Allowable Compressive Stress : F _a	4.4.Thick. Web(t, t _w) 2.30 mm.
1.)Inelastic Range : λ _(kL/r) < λ _c	4.5.Thick. Flange(t _f) 2.30 mm.
F _{ai} = 1,060.44 ksc.	4.6.Section Area(A _s) 5.17 cm. ²
2.)Elastic Range : λ _(kL/r) > λ _c	4.7.Weight Of Section 4.06 kg./m.
F _{ac} = 0.00 ksc.	4.8.Sect. Modulus(S _{x-x}) 16.10 cm. ³
<<--- Member Will To Fail By Yield --->>	4.9.Moment Of In.(I _{x-x}) 80.70 cm. ⁴
C - 100*50*20*2.3 mm.(น้ำหนัก = 4.06 kg./m.)	4.10.Rad. Of Gyr.(r _{min.}) 1.92 cm.
[V.Recheck Design Section]	
5.1.Status Of Sect. Area : This Section OK.!	5.3.Interaction Stress 0.33 ksc. OK.!
5.2.Load Resist By Sect. 5,485 kg. OK.!	5.4.Slenderness Ratio 78.13 < 200 OK.!
f_a/F_a + fb_x/Fb_x + fb_y/Fb_y = 0.33 < 1.00	C - 100*50*20*2.3 mm.(น้ำหนัก = 4.06 kg./m.)

Select To Use Section : C - 100*50*20*2.3 mm.(น้ำหนัก = 4.06 kg./m.)

Neo Timber and Steel Design(ASD.) v4.20

Project : อาคารที่พักอาศัย ค.ส.ล. 2 ชั้น	Engineer :
Location : .	Date :
Owner :	Time : 11:19:04 AM

Design For Flexible Members [Purlin] : แป

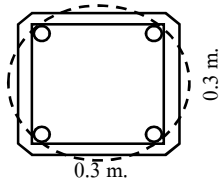
[I.Data For Design]		[II.Properties Of Steel For Design]	
1.1.Type Of Sag Rod	1	2.1.Use Steel Grade	Fe-24
1.2.Not To Use Sag Rod For This Member		2.2.Modulus Of Elastic.	2,100,000 ksc.
1.3.Span Length(L.)	1.70 m.	2.3.Yield Strength	2,400 ksc.
1.4.Range Of Purlin(@)	1.40 m.	2.4.Ultimate Strength	4,100 ksc.
1.5.Slope Of Roof(θ)	25.00 degree	2.5.All. Bend. Stress	1,440 ksc.
1.6.Weight Of Tiles	50.00 kg./m. ²	2.6.All. Shear Stress	960 ksc.
1.7.Live Load(LL.)	50.00 kg./m. ²	[IV.Select Type & Section Of Steel]	
1.8.Wind Load(WL.)	50.00 kg./m. ²	4.1.Required S_{max} .	3.50 cm. ³
1.9.Use Self Weight	10.00 kg./m.	4.2.Type Of Section	2 Lip. Chan.
[III.Result Of Calculate]		4.3.Trial Section No.	2 C
3.1.Load On Purlin(W_p)	150.00 kg./m.	4.4.Size Of Section	75*45*15 mm.
3.2.Unif. Load Of W_x	63.39 kg./m.	4.5.Thick. Web(t, t_w)	2.30 mm.
3.3.Unif. Load Of W_y	139.61 kg./m.	4.6.Thick. Flange(t_f)	2.30 mm.
3.4.Moment Of M_x	50.43 kg.-m.	4.7.Section Area(A_s)	4.14 cm. ²
3.5.Moment Of M_y	22.90 kg.-m.	4.8.Weight Of Section	3.25 kg./m.
3.6.Deflexion(Δ / IE)	1.52E+09 kg.-cm. ³	4.9.Sect. Modulus(S_{x-x})	9.90 cm. ³
3.7.Req. Sect. Modulus	3.50 cm. ³	4.10.M. Of In.(I_{x-x})	37.10 cm. ⁴
[Recheck Allowable Stress On Section]		4.11.Rad. Of Gyr.(r_{min})	1.69 cm.
1.Actual Bending Stress	1,049.54 OK.!	C - 75*45*15*2.3 mm.(น้ำหนัก = 3.25 kg./m.)	
2.Actual Deflexion	0.19 cm. OK.!(L/300)	Minimum Size Of Sag Rod(AISC.)	
3.Actual Self Weight	3.25 kg./m. OK.!	1.Required r_{min} .	***** cm.
4.Actual Sect. Modulus	9.90 OK.!	2.Req. Minimum(ϕ)	***** mm.
[Reaction Transfer To Support]			
1.Min. Reaction(R_y)	188.67 kg.		

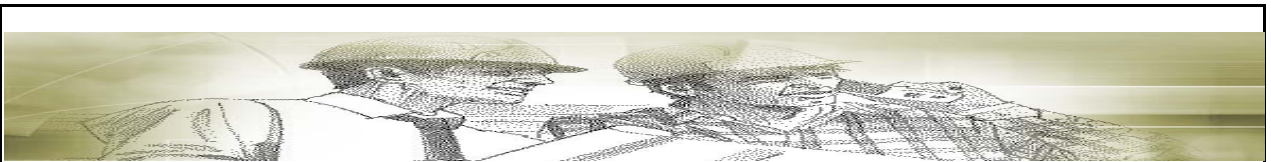
Select To Use Section : C - 75*45*15*2.3 mm.(น้ำหนัก = 3.25 kg./m.)

NEO RC. Design v4.50(WSD.)

[Project] อาคารที่พักอาศัย ค.ส.ถ. สูง 2 ชั้น [Owner]
 [Building] [Engineer]
 [Location] [Date]

DESIGN CRITERIAS

[I. Dead Loads]		[II. Live Loads (Minimum)]	
1.1. Normal Concrete	2,323.00 kg./m. ³	2.1. Roof (General)	30.00 kg./m. ²
1.2. Reinf. Concrete	2,400.00 kg./m. ³	2.2. R.C. Roof	100.00 kg./m. ²
1.3. Prest. Concrete	2,450.00 kg./m. ³	2.3. General	200.00 kg./m. ²
1.4. Steel (General)	7,850.00 kg./m. ³	2.4. Hall, Stair, Corrid.	300.00 kg./m. ²
1.5. Wood (General)	700.00 kg./m. ³	2.5. housing	200.00 kg./m. ²
1.6. Water (General)	1,000.00 kg./m. ³	2.6. Commercial	200.00 kg./m. ²
1.7. Soil (General)	2,000.00 kg./m. ³	2.7. Machine Room	400.00 kg./m. ²
1.8. Roof Tiles	50.00 kg./m. ²	[Wind Load (Minimum)]	
1.9. Finishing	50.00 kg./m. ²	When H < 0 - 10 m.	50.00 kg./m. ²
1.10. Light Partitions	50.00 kg./m. ²	When H = 10 - 20 m.	80.00 kg./m. ²
1.11. Wall (General)	120.00 kg./m. ²	When H = 20 - 40 m.	120.00 kg./m. ²
[III. Strength & Stress]		When H > 40 m.	160.00 kg./m. ²
3.1. Use f_c' (Cylinder)	173.00 kg./cm. ²	[IV. Parameters & Constants]	
3.2. Use f_c (Bending)	65.00 kg./cm. ²	4.1. E_s (Steel): Reinf.	2,040,000 kg./cm. ²
3.3. Use f_c (Bearing)	43.25 kg./cm. ²	4.2. E_c (Concrete)	198,850 kg./cm. ²
3.4. Use Steel Grade	SD-30 TIS.	4.3. n :	SD-30 10.259 (n > 6)
3.5. Use f_y (Yield)	3,000.00 kg./cm. ²	4.4. k :	SD-30 0.308 (0.3 - 0.45)
3.6. Use f_{st} (Tensile)	1,500.00 kg./cm. ²	4.5. j :	SD-30 0.897
3.7. Use f_{sc} (Comp.)	1,200.00 kg./cm. ²	4.6. R :	SD-30 8.976 kg./cm. ²
[V. Soil Property]			
5.1. All. Soil Bearing	8,000.00 kg./m. ² (Estimate)		
5.2. Pile Size (b*d*L)	0.30 x 0.30 x L m.		
5.2. All. Pile Capacity	43,500.00 kg. {From Self Property Only}		
[VI. Mixed Design (When $f_c' > 173$ ksc.)]			
6.1. Ratio Of W / C	≤ 0.65	[Don't have Mixed Design When $f_c \leq 65$]	



รายการคำนวณโครงสร้าง

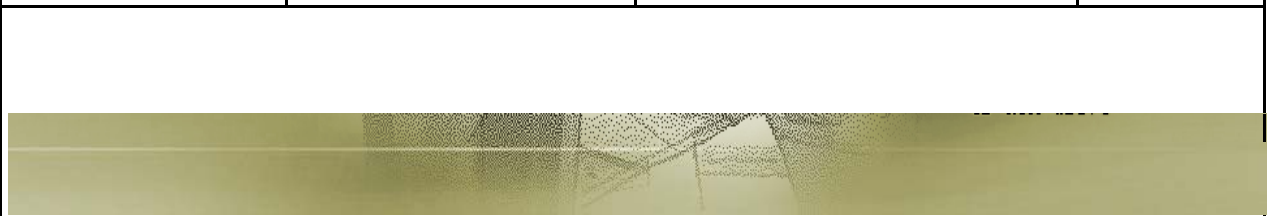
อาคารที่พักอาศัย คสล. 2 สองชั้น

สถานที่ก่อสร้าง :			
เจ้าของโครงการ :			
ที่อยู่ เลขที่ :		ตรอก / ซอย :	
ถนน :		ตำบล / แขวง :	
เขต / อำเภอ :		จังหวัด :	มหาสารคาม
รหัสไปรษณีย์ :			



เฉพาะรายการคำนวณโครงสร้างเท่านั้น

ออกแบบโดย		ประกอบอาชีพวิศวกรรมควบคุม ระดับ	ภาคีวิศวกร
สาขาวิชา	วิศวกรรมโยธา	เลขทะเบียน	ภย.



Neo Timber and Steel Design(ASD.) v4.20

Project : อาคารที่พักอาศัย ค.ศ.ล. 2 ชั้น	Engineer :
Location : .	Date :
Owner :	Time : 11:58:38 AM

Design For Flexible Members : อะเสเหล็ก

[I.Datas For Design]			[II.Properties Of Steel For Design]		
1.1.End Moment(M ₁)		kg.-m.	2.1.Use Steel Grade	Fe-24	
1.2.Middle Moment	590.00	kg.-m.	2.2.Modulus Of Elastic.	2,100,000	ksc.
1.3.End Moment(M ₂)		kg.-m.	2.3.Yield Strength	2,400	ksc.
1.4.Max. Shear(V.)	1,000.00	kg.	2.4.Ultimate Strength	4,100	ksc.
1.5.Deflection(Δ)		kg.-m. ³	2.5.All. Bend. Stress	1,440	ksc.
1.6.Max. Length(L.)	5.00	m.	2.6.All. Shear Stress	960	ksc.
1.7.Lateral Support(L _p)		m.	[IV.Check Laterally Supported]		
1.8.Coefficient of C _b	1.00		4.1.Use Laterally Sup.	*****	m.
[III.Result Of Calculate]			4.2. $L_c = \frac{637.2 * b_f}{\sqrt{F_y}}$	1.30	m.(min.)
3.1.Required (S _{x-x})	40.97	cm. ³	4.3. $L_u = \frac{1406000 * A_f}{d * \sqrt{F_y}}$	1.80	m.(max.)
3.2.Type Of Section	2	Lip. Chan. C	<<-----< ***** >----->>		
3.3.Trial Section No.	7	2 Double	[V.Allowable Bending Stress(Fb)]		
3.4.Size Of Section	150*50*20	mm.	5.1.Laterally Supported Is Sufficiently		
3.5.Thick. Web(t , t _w)	2.30	mm.	$\frac{b_f}{2 * t_f} = *****$		
3.6.Thick. Flange(t _f)	2.30	mm.	$\frac{4 * 3 * 7 * 7}{\sqrt{F_y}} = *****$		
3.7.Section Area(A _s)	6.32	cm. ²	$\frac{7 * 9 * 6 * 5}{\sqrt{F_y}} = *****$		
3.8.Weight Of Section	4.96	kg./m.	All.Bending Stress(Fb)	*****	ksc.
3.9.Sect. Modulus(S _{x-x})	28.00	cm. ³	<<-----< ***** >----->>		
3.10.M. Of In.(I _{x-x})	210.00	cm. ⁴	5.2.Laterally Supported Is Non-Sufficiently		
3.11.Rad. Of Gyr.(r _{min.})	1.86	cm.	$\frac{L}{r_t} =$		
			$\sqrt{\frac{717 * 10^4 * C_b}{F_y}} = 54.66$		
			$\sqrt{\frac{3585 * 10^4 * C_b}{F_y}} = 122.22$		
[Recheck Allowable Stress On Section]			All.Bending Stress(Fb)	1,440.00	ksc.
1.Actual Bending Stress	1,054	ksc. OK.!	[VI.Allowable Deflection(Δ all)]		
2.Actual Shear Stress	308.79	ksc. OK.!	6.1.Max. Allowable	1.67	cm.
3.Actual Deflection	Non.Check	cm. OK.!(L/300)			

Select To Use Section : 2C - 150*50*20*2.3 mm.(น้ำหนัก = 4.96 kg./m.)