

รายการคำนวณแก้ไขฐานรากถัง
Waste water tank

ACI 318-99
Concrete Frame Design Report

Prepared by
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29 January 2013

Design Preferences

Consider Minimum Eccentricity = Yes
Number of Interaction Curves = 24
Number of Interaction Points = 11
 Pattern Live Load Factor = 0.750
 Utilization Factor Limit = 0.950
 Phi (Bending/Tension) = 0.900
 Phi (Compression Tied) = 0.700
 Phi (Compression Spiral) = 0.750
 Phi (Shear) = 0.850

Load Combinations

Load Combinations

Combination Name	Combination Definition
COMB2	1.400*D + 1.700*L + 1.400*SD

Material Property Data - General

Material Property Data - General

Name	Type	Dir/Plane	Modulus of Elasticity	Poisson's Ratio	Thermal Coefficient	Shear Modulus
CONC	Iso	All	200000.000	0.2000	9.9000E-06	83333.333

Material Property Data - Mass & Weight

Material Property Data - Mass & Weight

Name	Mass per Unit Volume	Weight per Unit Volume
CONC	2.4480E-06	2.4030E-03

Material Property Data - Concrete Design

Material Property Data - Concrete Design

Name	Lightweight Concrete	Concrete f_c	Rebar f_y	Rebar f_{ys}	Lightweight Reduc. Factor
CONC	No	240.000	4000.000	4000.000	N/A

Frame Section Property Data - Concrete Columns

Frame Section Property Data - Concrete Columns

Frame Section Name	Material Name	Column Depth	Column Width	Rebar Pattern	Concrete Cover	Bar Size	Corner Bar Size
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Frame Section Property Data - Concrete Beams Part 1 of 2

Frame Section Property Data - Concrete Beams Part 1 of 2

Frame Section Name	Material Name	Beam Depth	Beam Width	Top Cover	Bottom Cover
SLAB100X40	CONC	40.000	100.000	5.000	7.500

Frame Section Property Data - Concrete Beams Part 2 of 2

Frame Section Property Data - Concrete Beams Part 2 of 2

Frame Section Name	Rebar AT-1	Rebar AT-2	Rebar AB-1	Rebar AB-2
SLAB100X40	CONC	40.000	100.000	5.000

Concrete Beam Design - Element Information

Concrete Beam Design - Element Information

Story	Beam	Section	Frame	RLLF	L_Ratio	L_Ratio
Level	Bay	Name	Type	Factor	Major	Minor
1	B628	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B629	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B631	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B632	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B633	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B634	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B635	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B636	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B637	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B638	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B639	SLAB100X40	NONSWAY	1.000	1.000	1.000
1	B640	SLAB100X40	NONSWAY	1.000	1.000	1.000

Concrete Beam Design - Flexural & Shear Design Rebar Areas

Concrete Beam Design - Flexural & Shear Design Rebar Areas

Story Level	Beam Bay	Section Name	Location	Top Rebar Area	Bottom Rebar Area	Shear Rebar Area
1	B628	SLAB100X40	End-I	3.389	1.819	0.000
1	B628	SLAB100X40	Middle	5.400	1.619	0.000
1	B628	SLAB100X40	End-J	6.069	3.250	0.000
1	B629	SLAB100X40	End-I	6.069	3.250	0.000
1	B629	SLAB100X40	Middle	5.400	1.619	0.000
1	B629	SLAB100X40	End-J	3.389	1.819	0.000
1	B631	SLAB100X40	End-I	0.000	0.000	0.000
1	B631	SLAB100X40	Middle	-10000.000	-10000.000	-100.000
1	B631	SLAB100X40	End-J	0.000	2.208	0.000
1	B632	SLAB100X40	End-I	0.000	2.208	0.000
1	B632	SLAB100X40	Middle	1.151	0.908	0.000
1	B632	SLAB100X40	End-J	3.389	1.819	0.000
1	B633	SLAB100X40	End-I	3.389	1.819	0.000
1	B633	SLAB100X40	Middle	1.151	0.908	0.000
1	B633	SLAB100X40	End-J	0.000	2.208	0.000
1	B634	SLAB100X40	End-I	0.000	2.208	0.000
1	B634	SLAB100X40	Middle	-10000.000	-10000.000	-100.000
1	B634	SLAB100X40	End-J	0.000	0.000	0.000
1	B635	SLAB100X40	End-I	0.431	0.232	0.000
1	B635	SLAB100X40	Middle	0.803	0.537	0.000
1	B635	SLAB100X40	End-J	2.001	1.075	0.000
1	B636	SLAB100X40	End-I	2.001	1.075	0.000
1	B636	SLAB100X40	Middle	0.803	0.537	0.000
1	B636	SLAB100X40	End-J	0.431	0.232	0.000
1	B637	SLAB100X40	End-I	0.000	0.000	0.000
1	B637	SLAB100X40	Middle	-10000.000	-10000.000	-100.000
1	B637	SLAB100X40	End-J	0.000	3.311	0.000
1	B638	SLAB100X40	End-I	0.000	3.311	0.000
1	B638	SLAB100X40	Middle	0.764	1.682	0.000
1	B638	SLAB100X40	End-J	0.431	0.232	0.000
1	B639	SLAB100X40	End-I	0.431	0.232	0.000
1	B639	SLAB100X40	Middle	0.764	1.682	0.000
1	B639	SLAB100X40	End-J	0.000	3.311	0.000
1	B640	SLAB100X40	End-I	0.000	3.311	0.000
1	B640	SLAB100X40	Middle	-10000.000	-10000.000	-100.000
1	B640	SLAB100X40	End-J	0.000	0.000	0.000

Concrete Beam Design - Torsion Design Rebar Areas

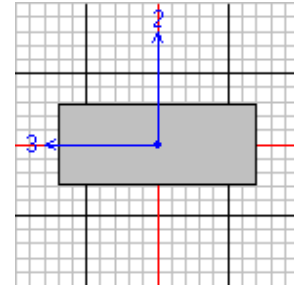
Concrete Beam Design - Torsion Design Rebar Areas

Story Level	Beam Bay	Section Name	Torsion-Shear Rebar Area	Torsion-Long. Rebar Area
1	B628	SLAB100X40	0.000	0.000
1	B629	SLAB100X40	0.000	0.000
1	B631	SLAB100X40	0.000	0.000
1	B632	SLAB100X40	0.000	0.000
1	B633	SLAB100X40	0.000	0.000

Concrete Beam Design - Torsion Design Rebar Areas

Story	Beam	Section	Torsion-Shear	Torsion-Long.
Level	Bay	Name	Rebar Area	Rebar Area
1	B634	SLAB100X40	0.000	0.000
1	B635	SLAB100X40	0.000	0.000
1	B636	SLAB100X40	0.000	0.000
1	B637	SLAB100X40	0.000	0.000
1	B638	SLAB100X40	0.000	0.000
1	B639	SLAB100X40	0.000	0.000
1	B640	SLAB100X40	0.000	0.000

Story Level: 1
Element: B628
Section Name: SLAB100X40
Frame Type: Non Sway



L=105.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
3.389	0.085	5.400	0.135	6.069	0.152	Top (+2 Axis)
0.000	0.000	0.000	0.000	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-317997.683	0.000	-504472.421	70.000	-566209.160	105.000	Top (+2 Axis)
0.000	0.000	0.000	70.000	0.000	105.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

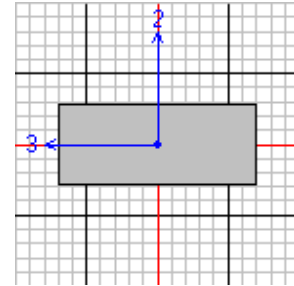
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----	
Rebar Av/s		Rebar Av/s		Rebar Av/s	
0.000		0.000		0.000	
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc	
3263.937	0.000	2663.925	35.000	1463.901	105.000
Controlling Combo		Controlling Combo		Controlling Combo	
COMB2		COMB2		COMB2	

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----	
Rebar At/s		Rebar Al	
0.000		0.000	
Design Tu Station Loc		Design Tu Station Loc	
0.000	105.000	0.000	105.000
Controlling Combo		Controlling Combo	
COMB2		COMB2	

Story Level: 1
Element: B629
Section Name: SLAB100X40
Frame Type: Non Sway



L=105.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
6.069	0.152	5.400	0.135	3.389	0.085	Top (+2 Axis)
0.000	0.000	0.000	0.000	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-566209.160	0.000	-504472.421	35.000	-317997.683	105.000	Top (+2 Axis)
0.000	0.000	0.000	70.000	0.000	105.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

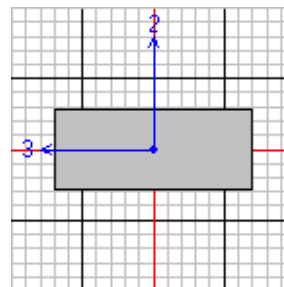
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----	
Rebar Av/s		Rebar Av/s		Rebar Av/s	
0.000		0.000		0.000	
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc	
1463.901	0.000	2663.925	70.000	3263.937	105.000
Controlling Combo		Controlling Combo		Controlling Combo	
COMB2		COMB2		COMB2	

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----	
Rebar At/s		Rebar Al	
0.000		0.000	
Design Tu Station Loc		Design Tu Station Loc	
0.000	105.000	0.000	105.000
Controlling Combo		Controlling Combo	
COMB2		COMB2	

Story Level: 1
Element: B631
Section Name: SLAB100X40
Frame Type: Non Sway



L=45.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000			0.000	0.000	Top (+2 Axis)
0.000	0.000			2.208	0.055	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000			0.000	45.000	Top (+2 Axis)
0.000	0.000			192813.590	45.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		Top (+2 Axis)
				COMB2		Bot (-2 Axis)

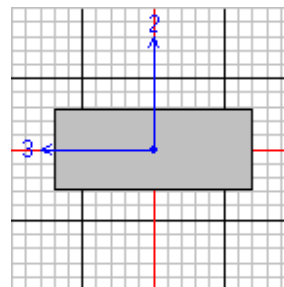
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----	
Rebar Av/s		Rebar Av/s		Rebar Av/s	
0.000				0.000	
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc	
4527.361	0.000			645.805	45.000
Controlling Combo		Controlling Combo		Controlling Combo	
COMB2				COMB2	

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----	
Rebar At/s		Rebar Al	
0.000		0.000	
Design Tu Station Loc		Design Tu Station Loc	
0.000	45.000	0.000	45.000
Controlling Combo		Controlling Combo	
COMB2		COMB2	

Story Level: 1
Element: B632
Section Name: SLAB100X40
Frame Type: Non Sway



L=60.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000	1.151	0.029	3.389	0.085	Top (+2 Axis)
2.208	0.055	0.000	0.000	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000	-108515.159	30.000	-317997.683	60.000	Top (+2 Axis)
192813.590	0.000	0.000	30.000	0.000	60.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

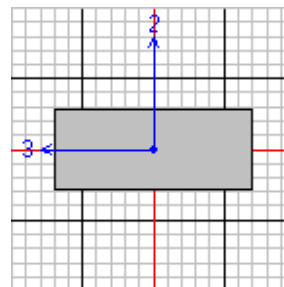
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000		0.000		0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
7754.195	0.000	7239.899	30.000	6725.603	60.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	60.000	0.000	60.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B633
Section Name: SLAB100X40
Frame Type: Non Sway



L=60.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
3.389	0.085	1.151	0.029	0.000	0.000	Top (+2 Axis)
0.000	0.000	0.000	0.000	2.208	0.055	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-317997.683	0.000	-108515.159	30.000	0.000	60.000	Top (+2 Axis)
0.000	0.000	0.000	30.000	192813.590	60.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

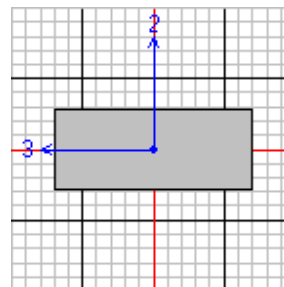
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----	
Rebar Av/s		Rebar Av/s		Rebar Av/s	
0.000		0.000		0.000	
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc	
6725.603	0.000	7239.899	30.000	7754.195	60.000
Controlling Combo		Controlling Combo		Controlling Combo	
COMB2		COMB2		COMB2	

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----	
Rebar At/s		Rebar Al	
0.000		0.000	
Design Tu Station Loc		Design Tu Station Loc	
0.000	60.000	0.000	60.000
Controlling Combo		Controlling Combo	
COMB2		COMB2	

Story Level: 1
Element: B634
Section Name: SLAB100X40
Frame Type: Non Sway



L=45.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000			0.000	0.000	Top (+2 Axis)
2.208	0.055			0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000			0.000	45.000	Top (+2 Axis)
192813.590	0.000			0.000	45.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		Top (+2 Axis)
				COMB2		Bot (-2 Axis)

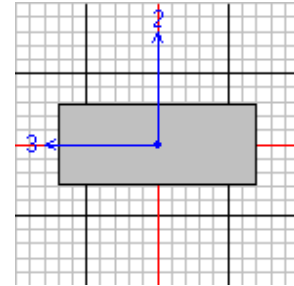
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000				0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
645.805	0.000			4527.361	45.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	45.000	0.000	45.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B635
Section Name: SLAB100X40
Frame Type: Non Sway



L=105.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.431	0.011	0.803	0.020	2.001	0.050	Top (+2 Axis)
0.000	0.000	0.000	0.000	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-40736.621	0.000	-75765.092	70.000	-188290.572	105.000	Top (+2 Axis)
0.000	0.000	0.000	70.000	0.000	105.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

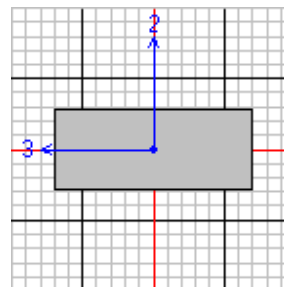
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000		0.000		0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
1309.331	0.000	2310.145	70.000	4119.883	105.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar A1		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	105.000	0.000	105.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B636
Section Name: SLAB100X40
Frame Type: Non Sway



L=105.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
2.001	0.050	0.803	0.020	0.431	0.011	Top (+2 Axis)
0.000	0.000	0.000	0.000	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-188290.572	0.000	-75765.092	35.000	-40736.621	105.000	Top (+2 Axis)
0.000	0.000	0.000	70.000	0.000	105.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

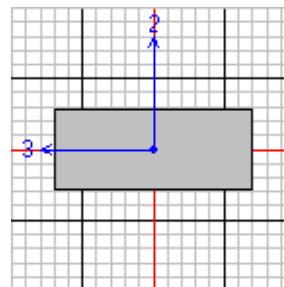
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000		0.000		0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
4119.883	0.000	2310.145	35.000	1309.331	105.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	105.000	0.000	105.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B637
Section Name: SLAB100X40
Frame Type: Non Sway



L=45.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000			0.000	0.000	Top (+2 Axis)
0.000	0.000			3.311	0.083	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000			0.000	45.000	Top (+2 Axis)
0.000	0.000			288335.271	45.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		Top (+2 Axis)
				COMB2		Bot (-2 Axis)

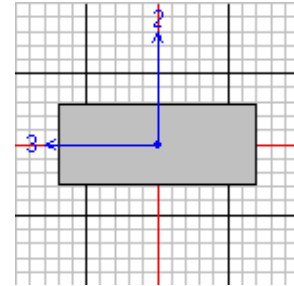
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000				0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
8348.228	0.000			4466.672	45.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	45.000	0.000	45.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B638
Section Name: SLAB100X40
Frame Type: Non Sway



L=60.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000	0.000	0.000	0.431	0.011	Top (+2 Axis)
3.311	0.083	1.682	0.042	0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000	0.000	30.000	-40736.621	60.000	Top (+2 Axis)
288335.271	0.000	147067.385	30.000	0.000	60.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

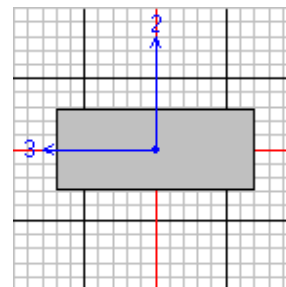
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000		0.000		0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
3933.328	0.000	5484.532	30.000	7035.736	60.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar A1		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	60.000	0.000	60.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B639
Section Name: SLAB100X40
Frame Type: Non Sway



L=60.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.431	0.011	0.000	0.000	0.000	0.000	Top (+2 Axis)
0.000	0.000	1.682	0.042	3.311	0.083	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
-40736.621	0.000	0.000	30.000	0.000	60.000	Top (+2 Axis)
0.000	0.000	147067.385	30.000	288335.271	60.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		Top (+2 Axis)
COMB2		COMB2		COMB2		Bot (-2 Axis)

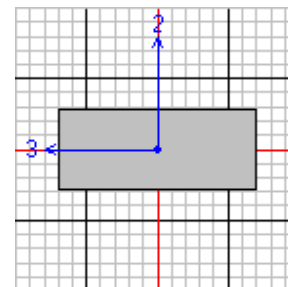
Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000		0.000		0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
7035.736	0.000	5484.532	30.000	3933.328	60.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2		COMB2		COMB2		

Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	60.000	0.000	60.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

Story Level: 1
Element: B640
Section Name: SLAB100X40
Frame Type: Non Sway



L=45.000
D=40.000 B=100.000 bf=100.000
ds=0.000 dct=5.000 dcb=7.500
E=200000.000 fc=240.000 Lt.Wt. Fac.=1.000
fy=4000.000 fys=4000.000

Flexural Reinforcement for Major Axis Moment

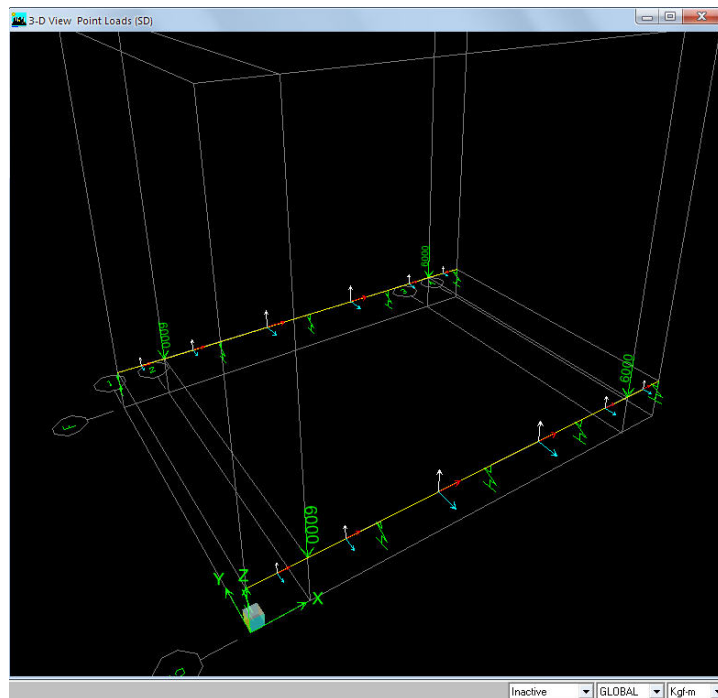
----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Area	Rebar %	Rebar Area	Rebar %	Rebar Area	Rebar %	
0.000	0.000			0.000	0.000	Top (+2 Axis)
3.311	0.083			0.000	0.000	Bot (-2 Axis)
Design Mu Station Loc		Design Mu Station Loc		Design Mu Station Loc		
0.000	0.000			0.000	45.000	Top (+2 Axis)
288335.271	0.000			0.000	45.000	Bot (-2 Axis)
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		Top (+2 Axis)
				COMB2		Bot (-2 Axis)

Shear Reinforcement for Major Shear (V2)

----- End-I -----		----- Middle -----		----- End-J -----		
Rebar Av/s		Rebar Av/s		Rebar Av/s		
0.000				0.000		
Design Vu Station Loc		Design Vu Station Loc		Design Vu Station Loc		
4466.672	0.000			8348.228	45.000	
Controlling Combo		Controlling Combo		Controlling Combo		
COMB2				COMB2		

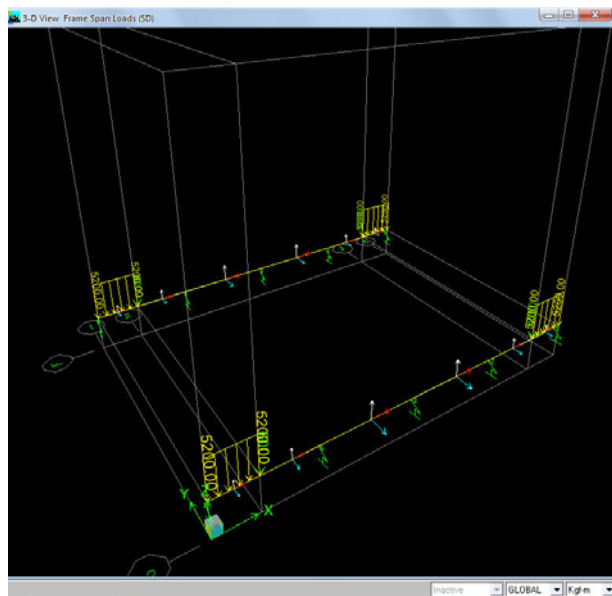
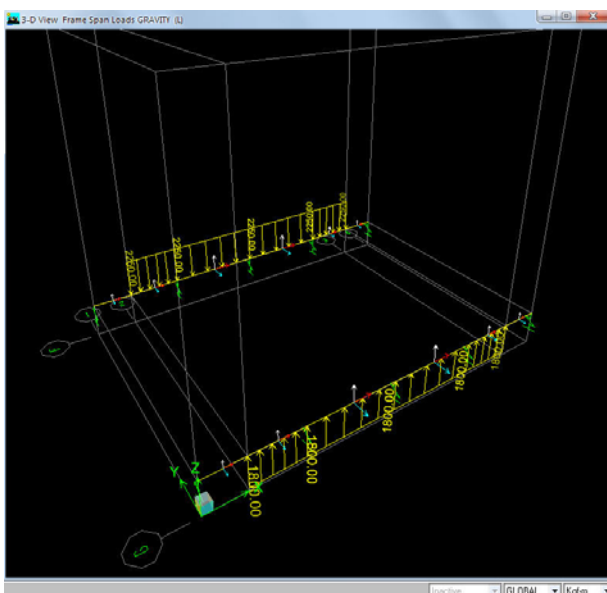
Torsion Reinforcement

----- Shear -----		----- Longitudinal -----		
Rebar At/s		Rebar Al		
0.000		0.000		
Design Tu Station Loc		Design Tu Station Loc		
0.000	45.000	0.000	45.000	
Controlling Combo		Controlling Combo		
COMB2		COMB2		

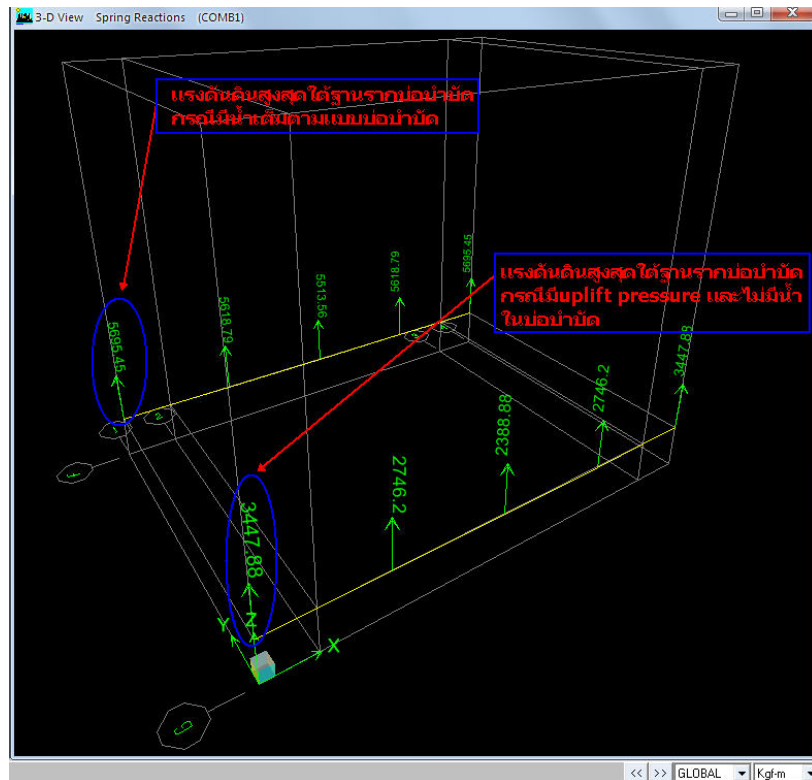


น้ำหนักทั้งหมดที่กระทำบนฝาดัง ถ่ายลงผนัง คสล.

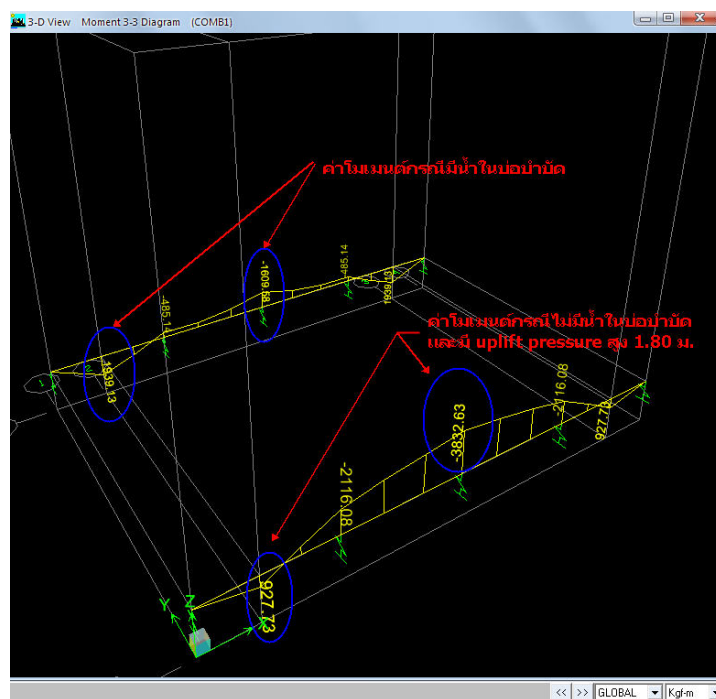
หมายเหตุ ค่า soil spring ของดินที่รับน้ำหนักได้ 20 ton/sq.m (ใช้ 20ton/cm.)



น้ำหนักน้ำในถังสูง 1.8 ม.และดินที่กดทับรอบฐานรากบ่อ กรณีนี้คิดแรง uplift pressure ด้วย
กรณีน้ำได้ดินสูงจากกันบ่อ 1.8 ม.



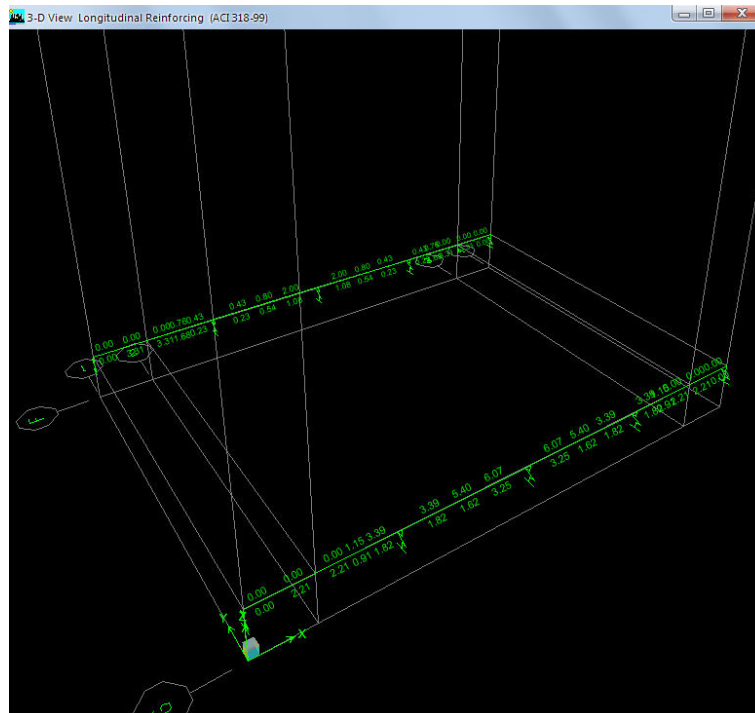
แรงดันดินใต้กันตัง(จากรูปดังข้างสามารถวางอยู่ได้โดยไม่ลยเพราะแรงดันดินมีค่าเป็นบวกอยู่)



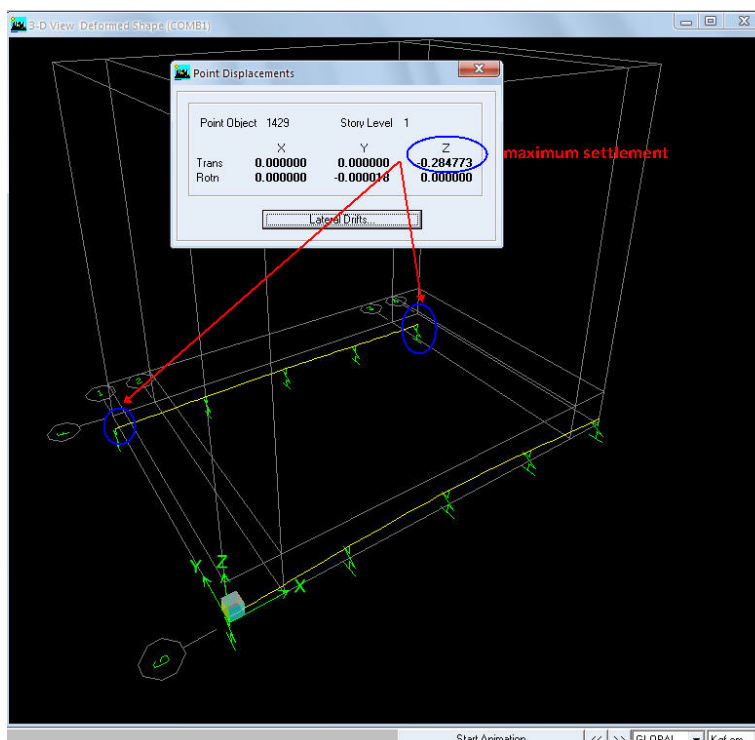
ค่าโมเมนต์ที่เกิดขึ้นกับพื้นถึงต่อความกว้างพื้น 1 เมตร

Line F เป็นค่าโมเมนต์ที่มีน้ำในบ่อสูง 2.245 ม.

Line G เป็นค่าโมเมนต์ที่ไม่มีน้ำในบ่อแต่มี uplift pressure



ปริมาณเหล็กเสริมในพื้นที่ถึง ต่อความกว้าง 1 เมตร
จากค่าที่คำนวณได้ พบว่าสามารถใช้ปริมาณเหล็กเสริมตามแบบเดิมได้



ค่าการทรุดตัวที่เกิดขึ้นได้ฐานราก 0.2847 ซม. ไม่เกินค่าที่ยอมให้

สรุป สามารถปรับแก้ไขฐานราก Waste water tank ที่วางบนฐานรากเสาเข็มให้สามารถวางบนดินได้โดยดินที่รองรับสามารถ
รับน้ำหนักแบกทานปลอดภัยได้ 20 ตัน/ตร.ม ตามที่ได้ทดสอบ plate bearing test ตามไฟล์แนบท้าย

5. TEST RESULTS

Yield pressure, determined by 10 mm. settlement criteria was used to find the yield pressure. This 10 mm. settlement criteria is considered assuming that there will be 25 mm. settlement for the actual foundation of 1.0 x 1.0 m. square footing.

Where the maximum settlement under the maximum test pressure was less than 10 mm., no yield pressure was found by the above criteria, therefore the yield pressure was not shown in the summary table.

Allowable pressure was calculated from maximum test pressure by considering a factor of safety 3.0 times as shown in the following table 02

Table 02. Summary of Test Results

Test No.	Test ^x Elev. (m.)	Max. Test Pressure (ton/m ²)	Settlement at Max. Test Pressure (mm.)	Recommended Allowable Bearing Capacity (ton/m ²) F.S. = 3.0	Modulus of subgrade reaction, K (Kg./cm ³) At Max. Pressure
PBT-1	-3.00	60	5.86	20	10.24
PBT-2	-1.75	60	25.59	20	2.34

(x) : Refer to Ground Level(+2.50 m.)

It should be noted that the utilization of allowable bearing capacity for foundation design or other matters, shall consider together with the result of soil investigation and/or dynamic sounding

PROJECT PENNSYLVANIA

Chonburi

PBT-1

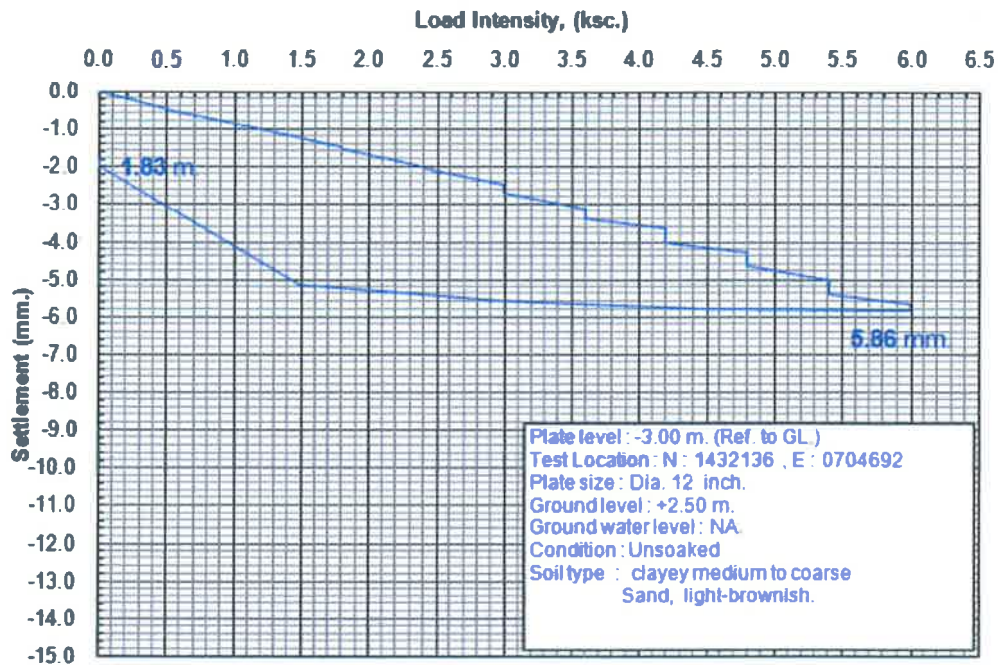


Fig. 1 Load - Intensity - Settlement Curve

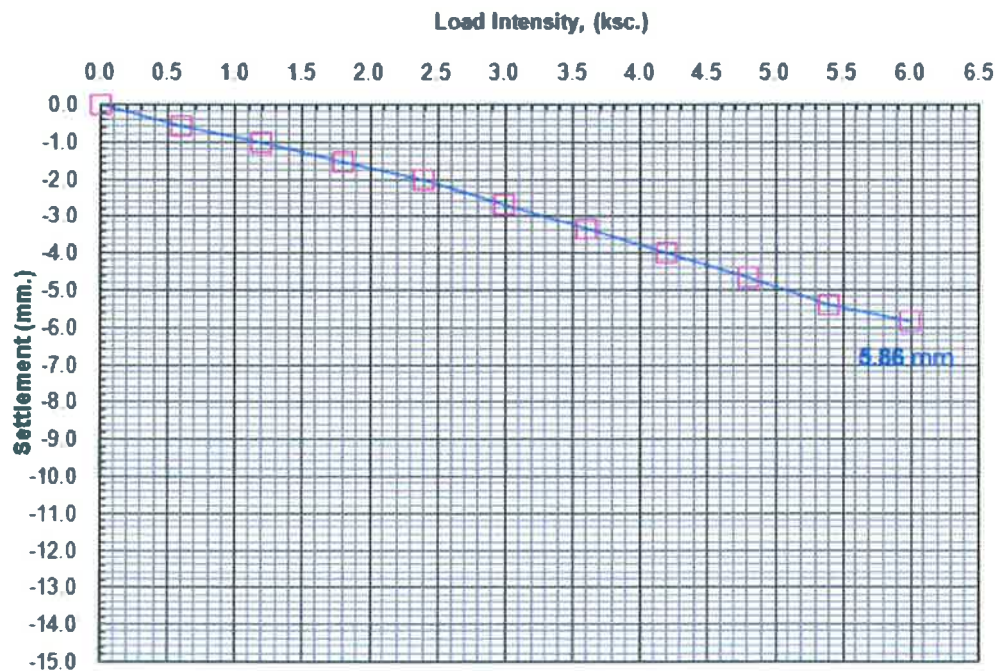


Fig. 2 Load - Intensity - Final - Settlement Curve

PROJECT PENNSYLVANIA

Chonburi

PBT-2

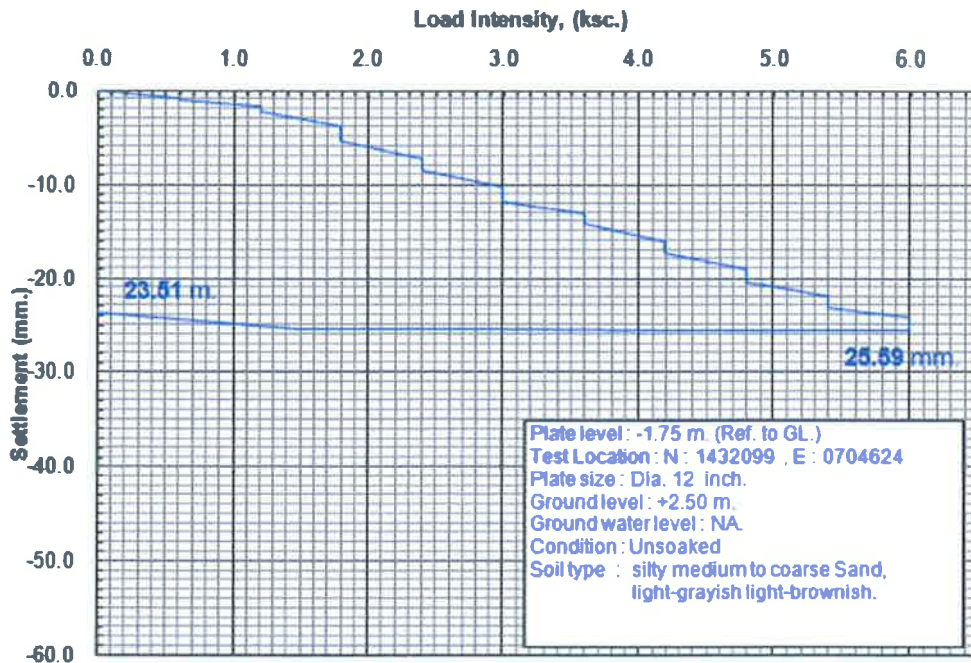


Fig. 3 Load - Intensity - Settlement Curve

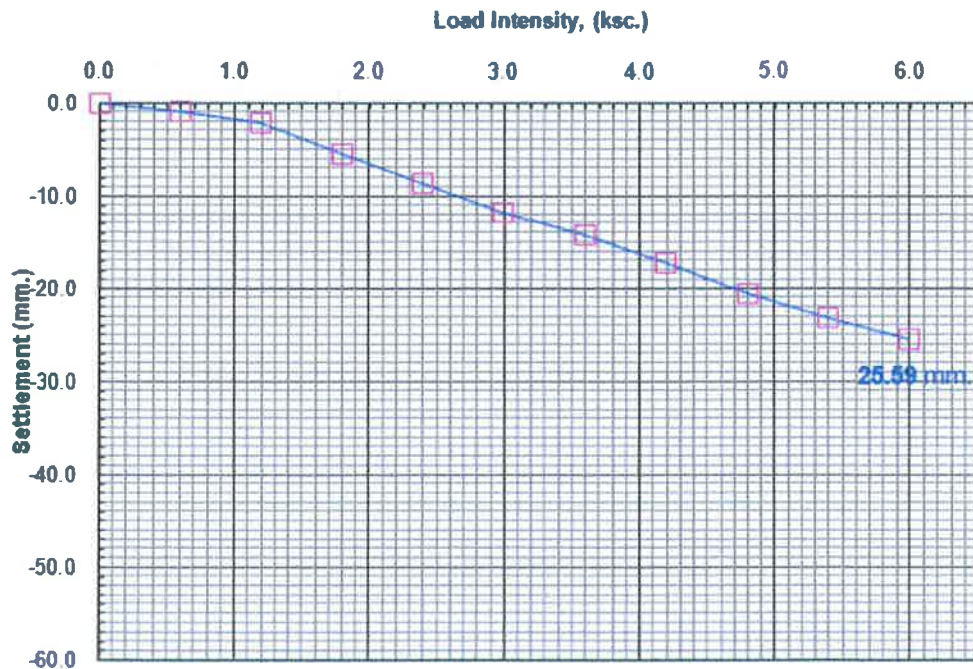
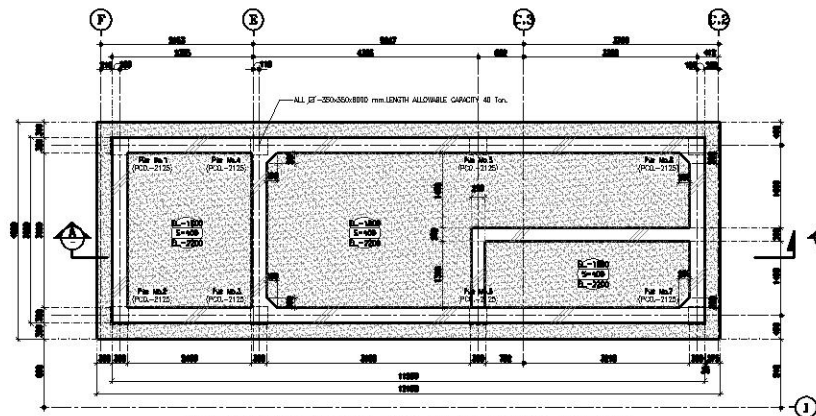
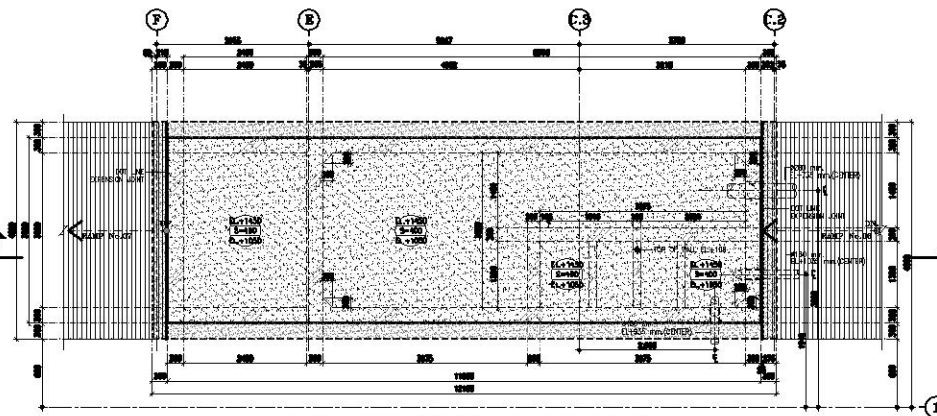


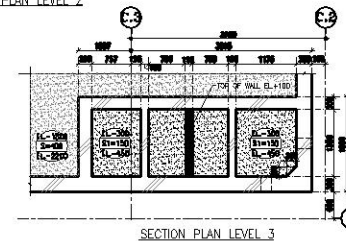
Fig. 4 Load - Intensity - Final - Settlement Curve



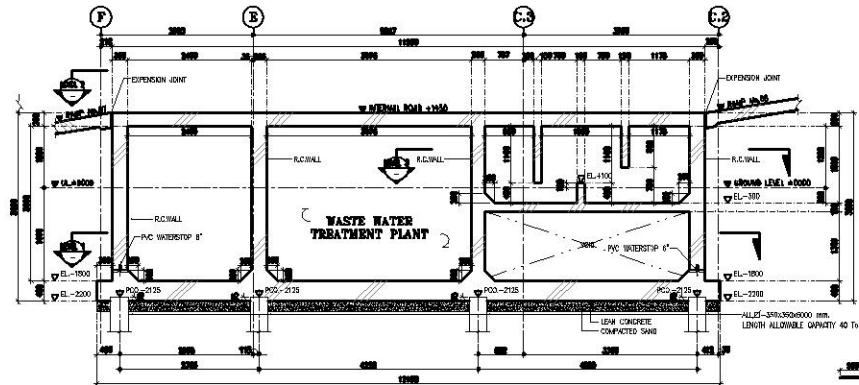
PIILING & FOUNDATION PLAN WASTE WATER TREATMENT PLANT 1:50
SECTION PLAN LEVEL 1



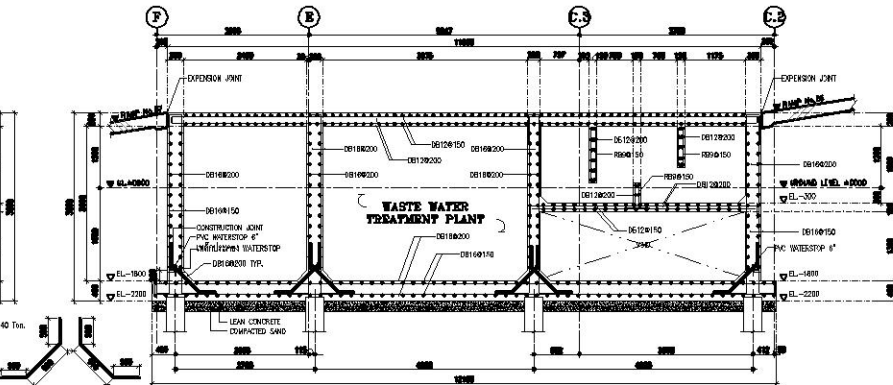
WASTE COVER TOP SLAB WATER TREATMENT PLANT 1:50
SECTION PLAN LEVEL 2



SECTION PLAN LEVEL 3

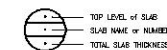


SECTION A-A 1:50

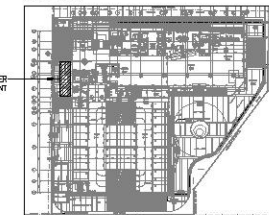


REINFORCEMENT CONCRETE DETAIL 1:50

SYMBOL



KEYPLAN



แบบโครงสร้างเดิมก่อนขออนุมัติแก้ไขเป็นฐานแผ้วางบนดิน

PROJECT NAME Pennsylvania Hotel	
LOCATION Pudong Road, LHWK 11, 110000	
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