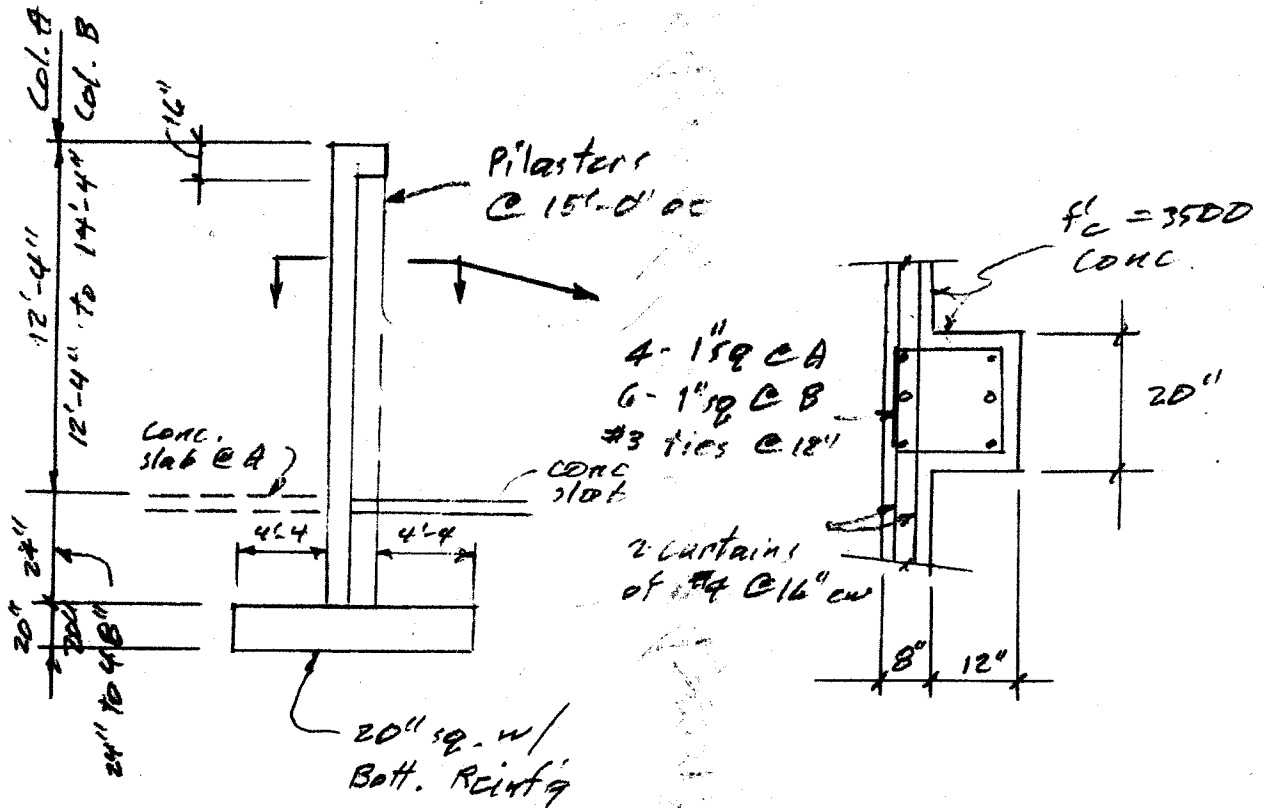


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 Sacramento, California 95833
 916/920-2020 FAX 916/920-1556

Job No.	Job <u>Iceland Arena Walls</u>
<u>10092</u>	Client <u>Rob Kerth</u>
Designed by <u>KAL</u>	Date <u>11/20/10</u> Page <u>1</u> of <u>10</u>



Kenneth A. Luttrell

Check (E) WALL

Seismic Forces

Out of Plane Wall Force

$$F_p = 0.4 S_{DS} I W \text{ (ASCE 7-05 12.11.2)}$$

$$F_p = 0.4 (0.501) (1.25) = 0.251 (100\text{psf}) = 25.1 \text{ psf}$$

Seismic base shear

$$V = C_s W$$

$$C_s = S_{DS} / \left(\frac{R}{I} \right)$$

$$R = 3 \text{ (table 15.4-2)}$$

$$I = 1.25$$

$$C_s = 0.501 / \left(\frac{3}{1.25} \right) = 0.209$$

$$V = 0.209 (100\text{psf}) = 20.9 \text{ psf}$$

Wind Loads

$$V = 85 \text{ mph}$$

Exposure C

$$I = 1.25$$

$$\lambda = 1.21$$

$$K_z = 1$$

$$P_s = \lambda K_z I P_{s30}$$

$$P_s = 1.21 (1) (1.25) (11.5 \text{ psf})$$

$$P_s = 17.4 \text{ psf}$$

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Job No.	Job <i>Iceland Arena Walls</i>
<i>10092</i>	Client
Designed by	Date <i>1 1</i> Page <i>3</i> of <i>10</i>

Worst Case Side Walls

$$H = 14'-4"$$

8" Conc Wall

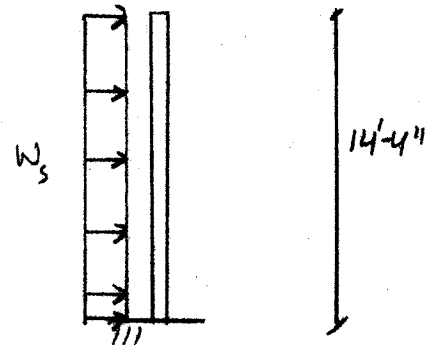
2 layers #4 EW @ 16" OC

$$T_w = 15'-0" \text{ OC}$$

Seismic Load

$$W_s = 25.1 \text{ psf} (T_w)$$

$$W_s = 25.1 \text{ psf} (15') = 376.5 \text{ pif}$$





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 Project Notes :

4/10 Job # 10092

Printed: 24 NOV 2010, 11:04AM

Concrete Column

EMERCALC, INC. 1993-2008, Ver: 6.1.00

License Owner: COLE YEE SHUBERT & ASSOCIATES

Description : -None-

General Information

Code Ref : 2006 IBC, ACI 318-05

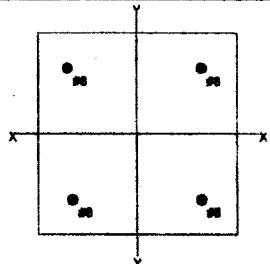
f_c : Concrete 28 day strength = 3.50 ksi
 E = 3,122.0 ksi
 Density = 145.0 pcf
 β = 0.850
 F_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
 Allow. Reinforcing Limits ASTM A615 Bars Used
 Min. Reinf. = 1.0 %
 Max. Reinf. = 8.0 %
 Load Combination 2006 IBC & ASCE 7-05

Overall Column Height = 14.50 ft
 End Fixity Top Free, Bottom Fixed
 ACI Code Year ACI 318-05
 Brace condition for deflection (buckling) along columns :
 X-X (width) axis : Unbraced Length for X-X Axis buckling = 14.5ft, $K = 2.1$
 Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 14.5 ft, $K = 2.1$
 Type of Stirrups used : Ties
 F_y - Stirrups = ksi
 E - Stirrups = ksi

Column Cross Section

Column Dimensions 20.0in Square Column, Column Edge to Rebar
 Edge Cover = 3.0in

Column Reinforcing : 4 - #8.0 bars @ corners,



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 5,840.28 lbs * Dead Load Factor
 BENDING LOADS ...
 Lat. Uniform Load creating M_x -x, $E = 0.3770$ k/ft

DESIGN SUMMARY

Maximum Stress Ratio 0.3290 : 1
 Load Combination +0.90D+E+1.60H
 Location of max. above base 14.50 ft
 At $P_n = P_u$, Load Contour location values are ...
 $P_u = 5.256$ k $\phi * P_n = 5.256$ k
 $M_{u-x} = 39.723$ k-ft $\phi * M_n-x = 120.73$ k-ft
 $M_{u-y} = 0.0$ k-ft $\phi * M_n-y = 0.0$ k-ft
 Mux-Muy Angle = 0.0 deg
 M_u at Angle = 39.723 k-ft
 $\Phi * M_n$ at Angle = 120.73 k-ft

Maximum SERVICE Load Reactions ..
 Top along Y-Y k Bottom along Y-Y k
 Top along X-X k Bottom along X-X k

Maximum SERVICE Load Deflections ...
 Along Y-Y -0.08609 in at 14.50 ft above base
 for load combination : E Only
 Along X-X 0.0 in at 0.0 ft above base
 for load combination :

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity 1,370.20 k
 P_{nmin} : Nominal Min. Tension Axial Capacity -189.60 k
 ϕP_n , max : Usable Compressive Axial Capacity 712.50 k
 ϕP_n , min : Usable Tension Axial Capacity -123.24 k

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$
 ρ : % Reinforcing 0.790 % Rebar < Min of 1.0 %
 Reinforcing Area 3.160 in²
 Concrete Area 400.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load Analysis k			Dist. from base ft	Bending Analysis k-ft			$M_u / \phi * M_n$ ϕM_{ny} at Mx-My Angle
		P_u	$\phi * P_n$	$P_u / \phi P_n$		$\delta x * M_{ux}$	ϕM_{nx}	$\delta y * M_{uy}$	
+1.40D	14.50	8.18	8.18	1.000	14.50	0.82	123.09	0.007	
+1.20D+0.50L+0.20S+E	14.50	7.01	7.01	1.000	14.50	39.75	122.15	0.325	
+0.90D+E+1.60H	14.50	5.26	5.26	1.000	14.50	39.72	120.73	0.329	

FORM



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Title :
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Project Notes :

5/10

Job # 10092

Printed: 24 NOV 2010, 11:04AM

Concrete Column

ENERCALC, INC. 1989-2009, Ver: 8.1.00

License Owner: COLL YEE SHUBERT & ASSOCIATES

Description : -None-

Maximum Reactions - Unfactored

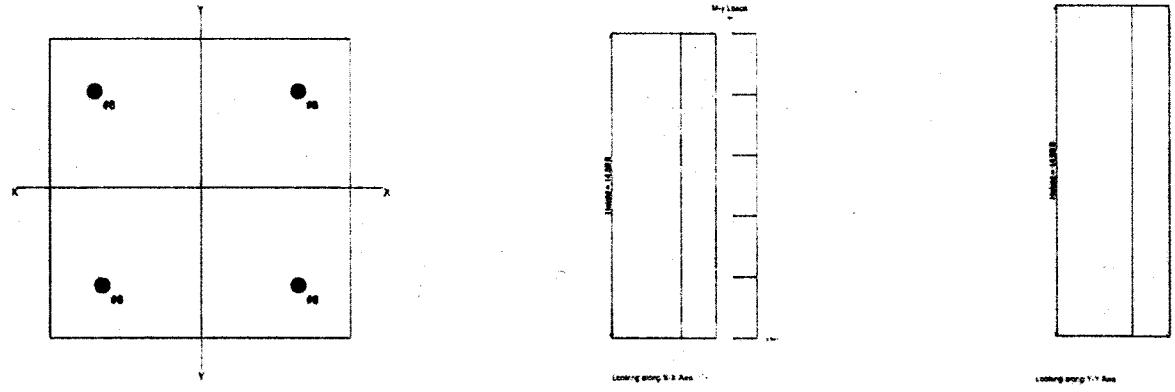
Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis	
	@ Base	@ Top	@ Base	@ Top
E Only	5.467			

Maximum Deflections for Load Combinations - Unfactored Loads

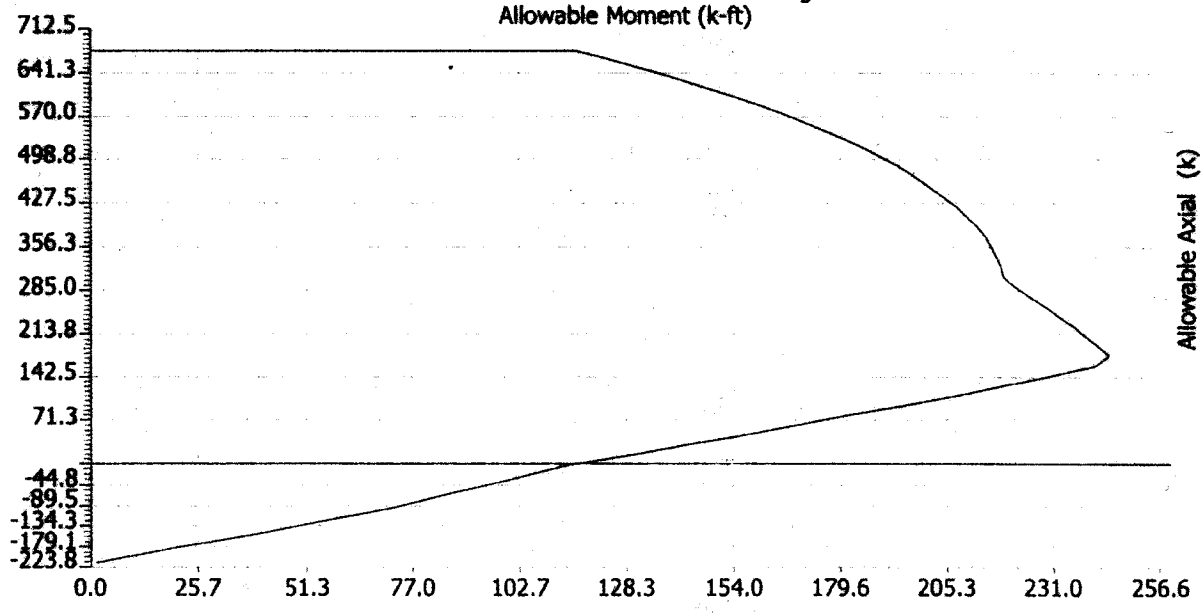
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches



Interaction Diagram

Concrete Column P-M Interaction Diagram
Allowable Moment (k-ft)





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Job # 10092

Printed: 24 NOV 2010, 11:13AM

General Footing Design

ENERCALC, INC. 1993-2009, Ver: 6.1.00

License Owner: COLL. YEE SHUBERT & ASSOCIATES

Description : --None--

General Information

Calculations per IBC 2006, CBC 2007, ACI 318-05

Material Properties

f_c : Concrete 28 day strength	=	3.0	ksi
f_y : Rebar Yield	=	60.0	ksi
E_c : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
ϕ Values Flexure	=	0.90	
Shear	=	0.850	

Analysis Settings

Min Steel % Bending Reinf.	=	0.00140	
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.50	:1
Min. Sliding Safety Factor	=	1.50	:1
AutoCalc Footing Weight as DL	:	No	
AutoCalc Pedestal Weight as DL	:	No	

Soil Design Values

Allowable Soil Bearing	=	2.0	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Reference Depth below Surface	=		ft
Allow. Pressure Increase per foot of depth when base footing is below	=		ksf
	=		ft

Increases based on footing Width

Allow. Pressure Increase per foot of width when footing is wider than	=		ksf
	=		ft

Dimensions

Width along X-X Axis	=	1.670	ft
Length along Z-Z Axis	=	8.670	ft
Footing Thickness	=	20.0	in

Load location offset from footing center...

ex : Along X-X Axis	=	0	in
ez : Along Z-Z Axis	=	0	in

Pedestal dimensions...

px : Along X-X Axis	=		in
pz : Along Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete..

at Bottom of footing	=	3.0	in
----------------------	---	-----	----



Reinforcing

Bars along X-X Axis	=		
Number of Bars	=	4.0	
Reinforcing Bar Size	=	# 3	
Bars along Z-Z Axis	=		
Number of Bars	=	3.0	
Reinforcing Bar Size	=	# 4	

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separationig X-X Axis			
# Bars required within zone	=	32.3	%
# Bars required on each side of zone	=	67.7	%



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	21.0					k
OB : Overburden	=						ksf
M-xx	=					39.640	k-ft
M-zz	=					0.0	k-ft
V-x	=						k
V-z	=					5.467	k



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Title :
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Project Desc.:
Project Notes :

7/10

Job # 10092

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General Footing Design

ENERCALC, INC. 1993-2009, Ver: 6.1.00

License Owner: COLE YEE SHUBERT & ASSOCIATES

Description : -None-

DESIGN SUMMARY

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
FAIL	1.536	Soil Bearing	3.072 ksf	2.0 ksf	+D+0.70E+H
PASS	1.601	Overturing - X-X	34.126 k-ft	54.621 k-ft	0.6D+0.7E
PASS	n/a	Overturing - Z-Z	0.0 k-ft	0.0 k-ft	No Overturing
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
FAIL	0.9877	Sliding - Z-Z	3.827 k	3.780 k	0.6D+0.7E
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1828	Z Flexure (+X)	0.7077 k-ft	3.871 k-ft	+1.40D
PASS	0.1828	Z Flexure (-X)	0.7077 k-ft	3.871 k-ft	+1.40D
FAIL	1.169	X Flexure (+Z)	31.471 k-ft	26.916 k-ft	+1.20D+0.50L+0.20S+E
PASS	0.7087	X Flexure (-Z)	19.076 k-ft	26.916 k-ft	+1.40D
PASS	n/a	1-way Shear (+X)	0.0 psi	93.113 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a
PASS	0.5097	1-way Shear (+Z)	47.458 psi	93.113 psi	+1.20D+0.50L+0.20S+E
PASS	0.3089	1-way Shear (-Z)	28.766 psi	93.113 psi	+1.40D
PASS	n/a	2-way Punching	21.730 psi	93.113 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress				Actual / Allowable Ratio
				+Z	+Z	-X	-X	
X-X, +D	2.0	n/a	0.0	1.450	1.450	n/a	n/a	0.725
X-X, +D+L+H	2.0	n/a	0.0	1.450	1.450	n/a	n/a	0.725
X-X, +D+L+H	2.0	n/a	0.0	1.450	1.450	n/a	n/a	0.725
X-X, +D+0.70E+H	2.0	n/a	19.501	0.0	3.072	n/a	n/a	1.536
X-X, +D+0.750L+0.750L+0.5250E+H	2.0	n/a	14.626	0.2434	2.657	n/a	n/a	1.329
X-X, +D+0.750L+0.750S+0.5250E+H	2.0	n/a	14.626	0.2434	2.657	n/a	n/a	1.329
X-X, +0.60D+0.70E+H	2.0	n/a	32.501	0.0	3.056	n/a	n/a	1.528
Z-Z, +D	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +D+L+H	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +D+L+H	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +D+0.70E+H	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +D+0.750L+0.750L+0.5250E+H	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +D+0.750L+0.750S+0.5250E+H	2.0	0.0	n/a	n/a	n/a	1.450	1.450	0.725
Z-Z, +0.60D+0.70E+H	2.0	0.0	n/a	n/a	n/a	0.8702	0.8702	0.435

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+0.7E	34.126 k-ft	54.621 k-ft	1.601	OK
Z-Z, D	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+0.7E	None	0.0 k-ft	Infinity	OK

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status
X-X, D	0.0 k	6.30 k	No Sliding	OK
X-X, 0.6D+0.7E	0.0 k	3.780 k	No Sliding	OK
Z-Z, D	0.0 k	6.30 k	No Sliding	OK
Z-Z, 0.6D+0.7E	3.827 k	3.780 k	0.9877	No Good!

Footing Flexure

Footing Flexure Load Combination...	Mu	Which Side ?	Tension @ Bot. or Top ?	As Req'd	Gvm. As	Actual As	Phi*Mn	Status
Z-Z, +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z, +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z, +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z, +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z, +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK



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Job # 10092

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General Footing Design

EMERICALC, INC. 1883-3008, Ver. 8.1.88

License Owner: CCLE, YEE, SHUBERT & ASSOCIATES

Description : -None-

Footing Flexure

Load Combination...	Mu	Which Side ?	Tension @ Bot. or Top ?	As Req'd	Gvrn. As	Actual As	Phi*Mn	Status
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK
Z-Z. +0.90D+E+1.60H	0.4550 k-ft	+X	Bottom	0.01 in2/ft	Bending	0.05 in2/ft	3.871 k-ft	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Phi*Vn / Vu	Status
+0.90D+E+1.60H	0.0 psi	0.0 psi	0.0 psi	44.180 psi	44.180 psi	93.113 psi	0.4745	OK
+0.90D+E+1.60H	0.0 psi	0.0 psi	0.0 psi	44.180 psi	44.180 psi	93.113 psi	0.4745	OK
+0.90D+E+1.60H	0.0 psi	0.0 psi	0.0 psi	44.180 psi	44.180 psi	93.113 psi	0.4745	OK

Punching Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+0.90D+E+1.60H	14.962 psi	186.23 psi	0.08034	OK
+0.90D+E+1.60H	14.962 psi	186.23 psi	0.08034	OK
+0.90D+E+1.60H	14.962 psi	186.23 psi	0.08034	OK



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Job # 10092

Printed: 24 NOV 2010, 11:14AM

Concrete Column

EMERCALC, INC. 1989-2008, Ver: 6.1.00

License Owner: DALE YEE SHUBERT & ASSOCIATES

Description : -None-

General Information

Code Ref : 2006 IBC, ACI 318-05

f_c : Concrete 28 day strength = 3.50 ksi
 E = 3,122.0 ksi
 Density = 145.0 pcf
 β = 0.850
 F_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
 Allow. Reinforcing Limits *ASTM A615 Bars Used*
 Min. Reinf. = 1.0 %
 Max. Reinf. = 8.0 %

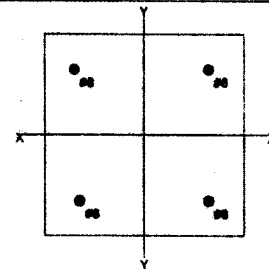
Overall Column Height = 14.50 ft
 End Fixity Top Free, Bottom Fixed
 ACI Code Year ACI 318-05
 Brace condition for deflection (buckling) along columns :
 X-X (width) axis : Unbraced Length for X-X Axis buckling = 14.5ft, $K = 2.1$
 Y-Y (depth) axis : Unbraced Length for Y-Y Axis buckling = 14.5 ft, $K = 2.1$
 Type of Stirrups used : Ties
 F_y - Stirrups = ksi
 E - Stirrups = ksi

Load Combination 2006 IBC & ASCE 7-05

Column Cross Section

Column Dimensions 20.0in Square Column, Column Edge to Rebar
 Edge Cover = 3.0in

Column Reinforcing : 4 - #8.0 bars @ corners,



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 5,840.28 lbs * Dead Load Factor

AXIAL LOADS ...

Axial Load at 14.50 ft above base, $D = 21.750$ k

BENDING LOADS ...

Lat. Uniform Load creating M_x-x , $E = 0.3770$ k/ft

DESIGN SUMMARY

Maximum Stress Ratio 0.2935 : 1
 Load Combination +0.90D+E+1.60H
 Location of max. above base 14.50 ft
 At $P_n = P_u$, Load Contour location values are ...
 $P_u = 24.831$ k $\phi * P_n = 24.831$ k
 $M_{u-x} = 40.063$ k-ft $\phi * M_n-x = 136.50$ k-ft
 $M_{u-y} = 0.0$ k-ft $\phi * M_n-y = 0.0$ k-ft
 Mux-Muy Angle = 0.0 deg
 M_u at Angle = 40.063 k-ft
 $\Phi * M_n$ at Angle = 136.50 k-ft

Maximum SERVICE Load Reactions ...
 Top along Y-Y k Bottom along Y-Y k
 Top along X-X k Bottom along X-X k

Maximum SERVICE Load Deflections ...
 Along Y-Y -0.08609 in at 14.50 ft above base
 for load combination : E Only
 Along X-X 0.0 in at 0.0 ft above base
 for load combination :

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity 1,370.20 k
 P_{nmin} : Nominal Min. Tension Axial Capacity -189.60 k
 ϕP_n , max : Usable Compressive Axial Capacity 712.50 k
 ϕP_n , min : Usable Tension Axial Capacity -123.24 k

General Section Information $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$
 ρ : % Reinforcing 0.790 % Rebar < Min of 1.0 %
 Reinforcing Area 3.160 in²
 Concrete Area 400.0 in²

Governing Load Combination Results

Governing Factored Load Combination	Dist. from base ft	Axial Load Analysis k			Dist. from base ft	Bending Analysis k-ft			$M_u / \phi * M_n$ ϕM_{ny} at M_x-M_y Angle
		P_u	$\phi * P_n$	$P_u / \phi P_n$		$\delta x * M_{ux}$	ϕM_{nx}	$\delta y * M_{uy}$	
+1.40D	14.50	38.63	38.63	1.000	14.50	3.93	147.51	0.027	
+1.20D+0.50L+0.20S+E	14.50	33.11	33.11	1.000	14.50	40.21	143.13	0.281	
+0.90D+E+1.60H	14.50	24.83	24.83	1.000	14.50	40.06	136.50	0.294	



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Title :
Dsgnr:
Project Desc.:
Project Notes :

10/10

Job # 10092

Printed: 24 NOV 2010, 11:14AM

Concrete Column

ENERCALC, INC. 1983-2008, Ver: 8.1.00

License Owner: COLE, YEL SHUBERT & ASSOCIATES

Description: -None-

Maximum Reactions - Unfactored

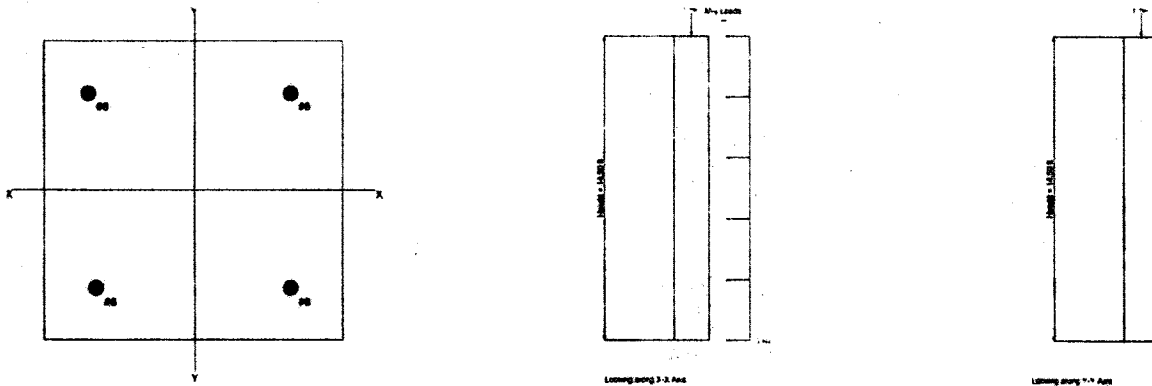
Note: Only non-zero reactions are listed.

Load Combination	Reaction along X-X Axis		Reaction along Y-Y Axis	
	@ Base	@ Top	@ Base	@ Top
D Only				
E Only	5.467			

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.000 in	0.000 ft	0.000 in	0.000 ft

Sketches



Interaction Diagram

Concrete Column P-M Interaction Diagram
Allowable Moment (k-ft)

