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916-366-9622

JOB 21010 BCDC
SHEET NO. 1 OF 1
CALCULATED BY BDoig DATE 7/26/2022
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REGISTERED PROFESSIONAL ENGINEER
BRUCE D. DOIG
NO. 2522
STRUCTURAL
STATE OF CALIFORNIA

DSA P/C Structural Calculations
Child Development Center
Palo Verde College,
Blythe, CA

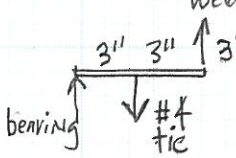
---

check embedded plate flexibility @ column base connection:

@ sidewall: max column moment @ base:
- M_{9i}: 15.66 K / LC14 → N1 rotation = 3.97e-3 (rad) LC 14 controls
- M_{10i}: 12.50 K / LC19 → $N_{/c}$ = .004 rad

@ endwall: max column moment @ base:
- M_{5i} 7.37 K / LC 10 → $N_{/Crit}$
- M_{6i} 7.28 K / LC 9

Col. flange T/C @ max M = 15.66(12)/6" = 31.32 K



3/4" plate x 6" trib: $I = bd^3/12 = .21\ in^3$

$\therefore \Delta = \frac{P(3)^2}{3EI}(3+3) = .0926"$ (AISC case 26)

$\therefore$ Rotation @ col. base = .0926"/3" = .0309 rad

$\therefore$ fe is .0309/.004 = 7.7x more flexible than frame (conserv. - neglects stretch @ #4 tie)

$\therefore$ frame mode rotation does not transfer to fnd. connection

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JOB **Child Development Center Palo Verde College/ 21010 BCDC**
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check reduction due to holes in beams:

6"ø - worst case C12x20.7:

C12: Aweb = 12(.282) = 3.38 / Aw reduction = 6(.282) = 1.69 in²
I = 129 in⁴ / Ireduction = $bd^3/12 = .282(6)^3/12 = 5.08$ in⁴

shear: 1.69/3.38 = .5 x cap

Δ / bending : $\frac{129 - 5.08}{129} = .961$ x cap

(ΔN/C by mcp - see calcs)

4"ø @ C9x13.4:

C9: Aweb = 9(.233) = 2.097 / ΔAw = 4(.233) = .932
I = 47.8 / ΔI = 1.243

shear: 1 - 4/9 = .556 cap

bending: $\frac{47.8 - 1.243}{47.8} = .974$ cap

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roof beams: shear interaction = .166 < .5 min OK
6"ø
bending interaction = .952 max < .961 OK

floor beams: shear: .179 < .556 OK
4"ø
bending: .727 < .974 OK

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Structural Calculations
Child Development Center
Palo Verde College, Blythe, CA

Index:

Client: AMS - American Modular Systems
Manteca, CA

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JOB 21010 BCDC
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Design Criteria:

Building Code: 2019 Calif. Building Code, w/ DSA adoptions (CBC)
CCR Title 24, Part 2

Geotechnical Report:

Geotechnical Report
Child Development Center
14th S. 2nd Street
Blythe, California

by: LandMark Consultants, Inc
Palm Desert, CA
June 15, 2021
LCI Report No. LP21061
w/ Addendum No. 1, 12/3/2021

criteria:
- allow bearing: 2000 psf (D+L)
- min embed: 12"
- 12" engineered fill below footings
- Site Class E
- S_{DS} = .442g (Table 2)
- differential settlement 4"/100' ↗
  (4" < .015(L)1/4 = .015(100')(12)1/4 = 4.5" OK)
  (ASCE 7-16, 12.13.9, exception)

Structural Materials:

Concrete: - UON: 4500 psi, w/c of .45, Type V cement
- on metal deck: 3000 psi; 110 pcf, structural lightweight
Reinforcing: ASTM A615, gr 60 (A706 where welded) (WWF fabric ASTM A1064)
Structural Steel: - UON: ASTM A36/ A572, gr 50 (as noted)
- HSS: ASTM A1085 (50 ksi)
Bolts: ASTM A307 UON (HS: ASTM F3125, gr A325)
Plywood: PS-1 or PS-2/CD w/ exterior glue
Metal Deck: ASC, IAPMO UES 329
Light gauge steel UON: ASTM A1011, SS grade (Fy as noted)
welding electrodes: E70 UON (E60 @ deck)
Screws: ASTM C1513, TEKS UON

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JOB 2100 BCDC
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Wind & Seismic Loads:

Seismic: 141 S. 2nd Str., Blythe, CA; (33.609 & -114.594)

Risk Category II; (Multi < 300 (103) / classroom bldg < 250 (225))

R = 3½
Cd = Ω0 = 3
Ie = 1.0

Site class E
Seismic desig category D
Sds = .442

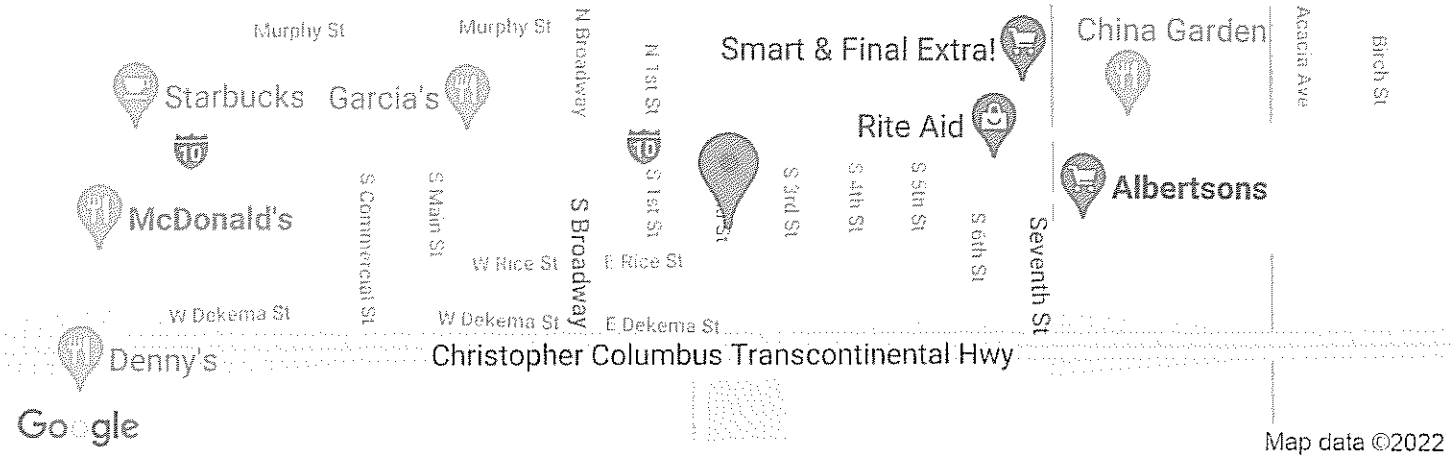
∴ V = $\frac{.442}{(3\frac{1}{2}/1)}$ W = .126 W_{ULT}

OSHPD

2010 BC DC pg 4

PV College CDC, Blythe, CA

Latitude, Longitude: 33.609, -114.594



Date	2/2/2022, 10:29:19 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	E - Soft Clay Soil

Type	Value	Description
S_S	0.288	MCE_R ground motion. (for 0.2 second period)
S_1	0.154	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.661	Site-modified spectral acceleration value
S_{M1}	0.645	Site-modified spectral acceleration value
S_{DS}	0.441	Numeric seismic design value at 0.2 second SA
S_{D1}	0.43	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	2.292	Site amplification factor at 0.2 second
F_v	4.2	Site amplification factor at 1.0 second
PGA	0.129	MCE_G peak ground acceleration
F_{PGA}	2.253	Site amplification factor at PGA
PGA_M	0.292	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	0.288	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.302	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.154	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.163	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.954	Mapped value of the risk coefficient at short periods
C_{R1}	0.941	Mapped value of the risk coefficient at a period of 1 s

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WIND: Risk Cat II

V = 99 mph / Exp. C

Kd = .85
Kzt = 1.0
Ke = 1.0
(15') Kz/Kh = .85
G = .85
GCpi = ±.18

$\therefore q_{h\,@15'} = .00256(.85)(1)(.85)(1)99^2 = 18.1$ psf (ULT)

Bldg MWFRS (ASCE 7-16, Sect 27.3), eqn 27.3-1 @ walls: $p = q_h(GC_p - GC_{pi})$ ← interval cancels for simple diaphr bldg

windward: 18.1(.85)(.8) = 12.3 psf
leeward: 18.1(.85)(-.5) = -7.7
} Δ = 20.0 psf (ULT)

@ parapets (Sec 27.3.4): $q_p(GC_{pn})$ @ 18', K_z = .86

w: (.88/.85) 18.1 (1.5) = 28.1 psf
lee: (.88/.85) 18.1 (-1) = 18.7
} Δ = 46.8 psf (ULT)

---

wind uplift @ joists (eqn 30.3-1): A = $\frac{11.83^2}{3}$ = 47 ft²

$p = q_h(GC_p - GC_{pi})$
$p = 18.1(1.9 + .18) = 37.65$ psf (ULT) (Zone 2)

walls design (eqn 30.3-1): Zones as conservative / $\Delta_{max} = l/360$, plaster .42

max l = 13'-1" = 13.083'
$\therefore A = \frac{13.08^2}{3} = 57$ ft²

$p = 18.1(1.15 + .18) = 24.1$ psf (ULT)

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parapet design:
(Sec 30.6.1.2)

per Table 30.6-2
use Fig. 30.4-1
($\lambda = 1.21$)
use V = 100mph

Load case A: $5^{+}_{wall} + 3^{-}_{rf} : 1.21\,(18 + 51.5) = 84.1$ psf (ULT)
Load case B: $5^{+}_{wall} + 5^{-}_{wall} : 1.21\,(18 + 24.1)$ ↑ N/Crit

HVAC:
(30.10 ⇒ 29.4.1)

$p_h = 18.1\,(GC_r = 1.9) = 34.4$ psf (ULT)
uplift $= 18.1\,(1.5) = 27.15$ psf ↑ (ULT)

MWFRS wind uplift:
(Sec. 27-3)

A = 240 ∴ F = .907
reduction

$q_h\,(GC_p - GC_{pi}) = 18.1\,((.85).9 + .18)(.907) = 15.5$ psf

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Gravity Loading:

Roof:

DL

single ply + re-roof: .6+.6	= 1.2 psf
1/4" dens deck bd:	= 1.2 psf
rigid insl. (.2)(2")	= .4
batt insl.	= .8
1/2" plywood	= 1.5
joists	= 1.6
sprinklers	= 1.5
misc, mech, elect	= 1.4
beams	= 5.0
trib cols	= 1.4
av ceiling	= 2.0
future solar	= 3.0
	1/2 = 21 psf

LL: 20 psf

+5psf trib partitions = 26psf seismic

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Floors:

DL: 5" Lwt conc w/ 3W x H, 18ga = 34.8 psf
av. finish = 1.5
insul = .5
misc mech elect = 1.0
beams = 3.0
trib. col's = 1.4 psf
42.2 psf av

max finish = 3.4 + 1.5 = 4.9
1/4" tile 1/8" grout

max = 45.6 psf

LL: 100 psf (typ) (no partition loads reqd > 80) (CBC 1607A.5.1)

w/seismic: 44 (av. combi) + 5 partn trib = 49 psf

max TL = 46 + 100 = 146 psf

21010 BCRC/99

TABLE 7 - 3WxH-36 COMPOSITE DECK WITH 5" THICK LWC (110 pcf)

Gage	Maximum Unshored Span	Gage	Single	Double	Triple	Gage	Single	Double	Triple
		22	11' - 2"	12' - 0"	12' - 5"	19	13' - 1"	15' - 2"	15' - 3"
		21	12' - 2"	12' - 10"	13' - 4"	18	13' - 6"	16' - 7"	15' - 9"
		20	12' - 7"	13' - 8"	14' - 1"	16	14' - 2"	17' - 8"	16' - 7"

Gage																
	Vertical Load Span (ft-in)	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-6"	12'-0"	12'-6"	13'-0"	13'-6"	14'-0"	14'-6"	15'-0"
	ASD & LRFD - Available Superimposed Load Capacity, W (psf)															
	ASD, W/Ω	453	399	353	314	281	252	221	194	170	151	134	120	107	97	87
	LRFD, ϕW	610	536	473	421	376	337	303	274	248	225	205	187	171	157	144
	L/360	-	-	-	-	-	-	221	194	170	151	134	120	107	97	87
	LRFD - Available Diaphragm Shear Capacity, ϕS_n (plf / ft) 36/4 Attachment Pattern															
19	Arc Spot Weld 1/2" Effective Dia	1927	1888	1854	1846	1817	1791	1767	1745	1725	1724	1707	1690	1675	1661	1648
	PAF Base Steel ≥ .25"	1644	1622	1602	1607	1590	1575	1561	1548	1536	1543	1532	1522	1513	1505	1497
	PAF Base Steel ≥ 0.125"	1623	1602	1583	1589	1573	1559	1545	1533	1522	1529	1519	1510	1501	1493	1486
	#12 Screw Base Steel ≥ .0385"	1606	1587	1569	1575	1560	1546	1534	1522	1512	1519	1509	1500	1492	1484	1477
	Concrete + Deck = 34.6 psf				I_{cr} = 68.1 in⁴/ft			ASD	M_{no}/Ω = 40.9 kip-in/ft				V_n/Ω = 2.86 kip/ft			
	$(I_{cr}+I_u)/2$ = 95.3 in⁴/ft				I_u = 122.6 in⁴/ft			LRFD	ϕM_{no} = 62.6 kip-in/ft				ϕV_n = 5.73 kip/ft			
	Vertical Load Span (ft-in)	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-6"	12'-0"	12'-6"	13'-0"	13'-6"	14'-0"	14'-6"	15'-0"
	ASD & LRFD - Available Superimposed Load Capacity, W (psf)															
	ASD, W/Ω	507	446	395	352	309	267	232	203	179	158	141	126	113	101	92
	LRFD, ϕW	683	601	531	472	422	379	342	309	280	255	233	213	195	179	164
	L/360	-	-	-	-	309	267	232	203	179	158	141	126	113	101	92
	LRFD - Available Diaphragm Shear Capacity, ϕS_n (plf / ft) 36/4 Attachment Pattern															
18	Arc Spot Weld 1/2" Effective Dia	2029	1984	1945	1938	1904	1874	1846	1821	1798	1798	1778	1759	1741	1725	1709
	PAF Base Steel ≥ .25"	1702	1676	1654	1662	1642	1624	1608	1593	1579	1589	1576	1565	1554	1544	1535
	PAF Base Steel ≥ 0.125"	1678	1654	1632	1642	1623	1606	1591	1576	1563	1573	1562	1551	1540	1531	1522
	#12 Screw Base Steel ≥ .0385"	1662	1638	1618	1628	1610	1593	1579	1565	1552	1563	1551	1541	1531	1522	1513
	Concrete + Deck = 34.8 psf				I_{cr} = 74.1 in⁴/ft			ASD	M_{no}/Ω = 45.5 kip-in/ft				V_n/Ω = 2.86 kip/ft			
	$(I_{cr}+I_u)/2$ = 100 in⁴/ft				I_u = 126.2 in⁴/ft			LRFD	ϕM_{no} = 69.6 kip-in/ft				ϕV_n = 5.73 kip/ft			
	Vertical Load Span (ft-in)	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-6"	12'-0"	12'-6"	13'-0"	13'-6"	14'-0"	14'-6"	15'-0"
	ASD & LRFD - Available Superimposed Load Capacity, W (psf)															
	ASD, W/Ω	620	546	466	396	340	293	255	223	196	174	155	138	124	111	101
	LRFD, ϕW	837	736	652	581	520	468	423	383	348	318	290	266	245	225	208
	L/360	-	-	466	396	340	293	255	223	196	174	155	138	124	111	101
	LRFD - Available Diaphragm Shear Capacity, ϕS_n (plf / ft) 36/4 Attachment Pattern															
16	Arc Spot Weld 1/2" Effective Dia	2253	2194	2142	2141	2096	2056	2020	1987	1957	1963	1936	1911	1887	1866	1845
	PAF Base Steel ≥ .25"	1831	1797	1767	1786	1759	1735	1714	1694	1676	1693	1676	1661	1647	1633	1621
	PAF Base Steel ≥ 0.125"	1785	1754	1727	1747	1723	1700	1680	1662	1645	1664	1648	1634	1620	1608	1596
	#12 Screw Base Steel ≥ .0385"	1786	1755	1727	1748	1723	1701	1681	1662	1645	1664	1649	1634	1621	1608	1596
	Concrete + Deck = 35.5 psf				I_{cr} = 86.1 in⁴/ft			ASD	M_{no}/Ω = 55.2 kip-in/ft				V_n/Ω = 2.86 kip/ft			
	$(I_{cr}+I_u)/2$ = 110 in⁴/ft				I_u = 133.7 in⁴/ft			LRFD	ϕM_{no} = 84.4 kip-in/ft				ϕV_n = 5.73 kip/ft			

All Gages	**LRFD - Available Diaphragm Shear Capacity, ϕS_n (plf / ft) for all vertical load spans, WWF Size or Area of Steel per foot width**					
	3/4" Welded Shear Studs	6x6 W1.4xW1.4 A_s = 0.028 in²/ft	6x6 W2.9xW2.9 A_s = 0.058 in²/ft	6x6 W4.0xW4.0 A_s = 0.080 in²/ft	4x4 W4xW4 A_s = 0.120 in²/ft	4x4 W6xW6 A_s = 0.180 in²/ft
	12 in o.c.	2720	4070	5060	6860	9560
	24 in o.c.	2720	4070	5060	6860	7750
	36 in o.c.	2720	4070	5060	5170	5170

Exterior Walls:

DL (only)

plaster:	: 10 psf
1/2" OSB	: 1.5
2x6 stud walls	: 1.8
insulation	: 1/2
misc, mech, elect	: 1/2
1/2" gyp bd	: 1.8
av. finish	: 3.4 psf
	19.5 psf

Interior Walls:

typ;

1/2" tack bd E.S.	: 2(1.25) = 2 1/2
1/2" gyp bd E.S.	: 2(1.8) = 3.6
misc mech elect	: 1/2
insulation	: 1/2
framing	: 1.8
	8.9, say 9 psf

@restrooms:

(4.1) 5/16" tile + 1/16" (1) grout	= 5.1
1/2" cement bd	= 2.9
framing	: 1.8
insulation	: 1/2
misc mech elect	: 1/2
1/2" gyp bd	: 1.8
1/2 tack bd	: 1.25
	13.9 say 14 psf

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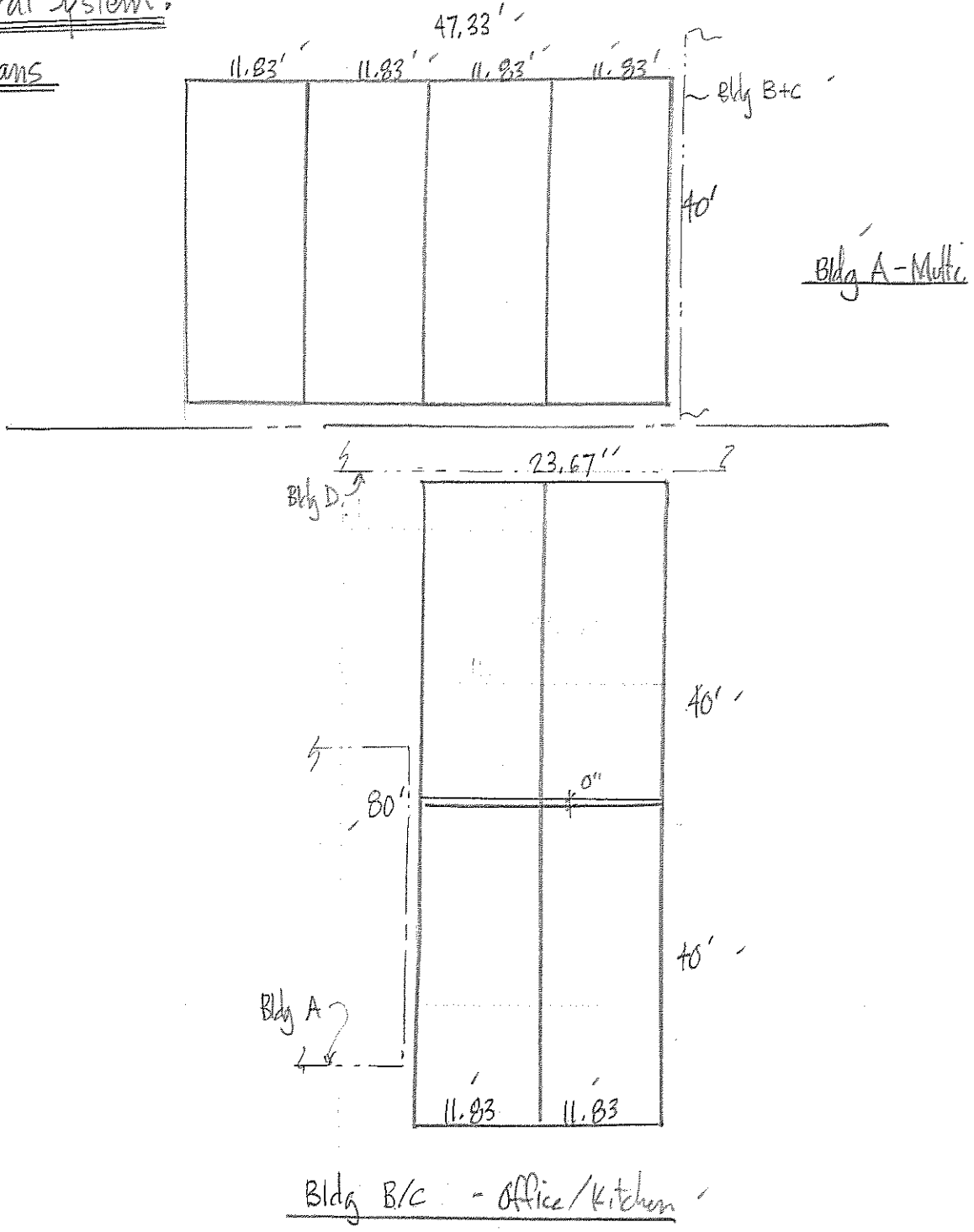
Lateral System:

Plans



Bldg B/C - Office/Kitchen

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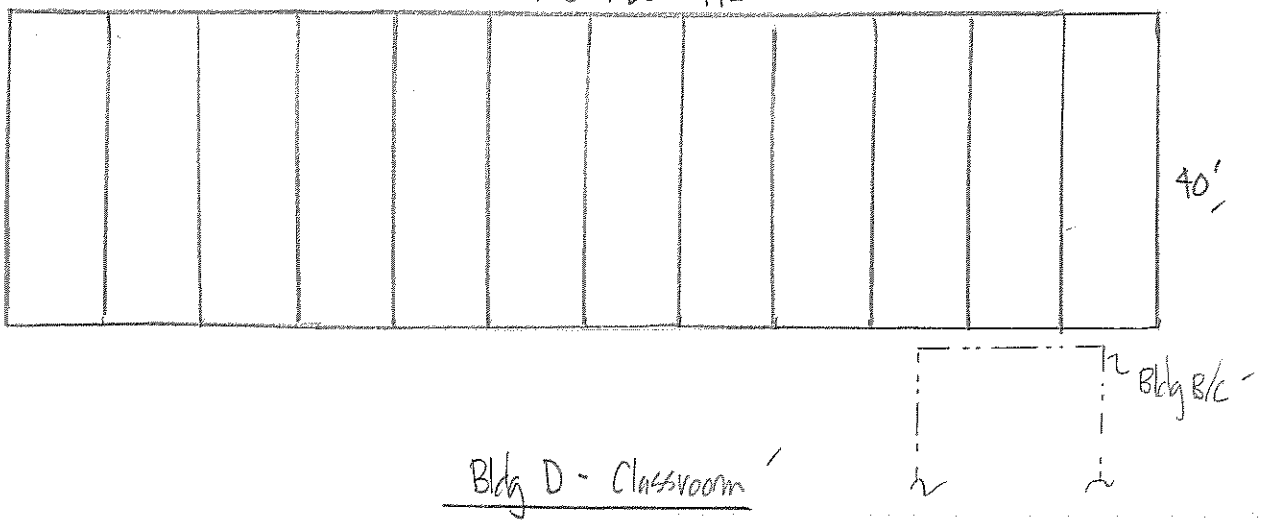

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Lateral Loadings - Bldg A:

Seismic:

roof: roof: 48(40) 26 = 49,950
trib extr walls: 19½'(7')(176') = 24,050
para pets: '5.1'(176+12) 19½ = 18,700
mech units: 2(600) = 12,00,
misc = 4100,

Σ = 98,000#
∴ V = .126(98,000) = 12,350#
(6.43 psf) use for Ω_0 combos,

---

floor: floor: 49(48)(40) = 94,100#,
trib extr walls: 19½(7)(176) = 24,050

Σ = 118,150# x .126 = V = 14,900# controls
(7.76 psf),

WIND:

roof: [5.1(46.8) + 7(20)] = 380(40) = 15,200# ll ends
380(48) = 18,240# ll sides
} controls, use design @ roof

flr.: 7(20) = 140(40) = 5600#
140(48) = 6720# N/Crit,

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Lateral Loadings Bldg B/C:

Seismic:

roof: roof : 26 (24)(80) = 49,950#
trib extr walls : 7½(208')19½' = 30,450
parapets : 4.5(208+6)19½' = 18,800
mech units : 1,200+850 = 2050#
misc = 1750.

$\Sigma = 103{,}000^{\#} \times .126 = V = 13{,}000^{\#}$ controls ⊥ sidewalls (6.77 psf)

---

floor: floor : 24(80)49 = 94,100#
trib extr walls : 7½(208)19½ = 30,450

$\Sigma 124{,}550^{\#} \times .126 = V = 15{,}700^{\#}$ controls (8.18 psf)

Wind:

roof: [(4.5)46.8 + 7½(20)] = 361(80) = 28,900# controls ⊥ ends
361(24) = 8664 N/Crit ⊥ sidewalls

floor: 7½(20) = 150(80) = 12,000
150(24) = 3,600 } N/Crit

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Lateral Loadings Bldg D:

Seismic

roof: roof: 26'(144)40 = 149,800#
trib extr walls: 19½'(7)(368) = 50,300
parapets: 19½'(5.1)(368) = 36,600
mech units: 4(600) = 2400
misc: 2000#

$\Sigma = 241{,}100^{\#} \times .126 = V = 36{,}400$ controls 11 ends (5.27 psf)

floor: floor: 49(144)(40) = 282,250#
trib extr. walls: 19½(7)(368) = 50,300

$\Sigma = 332{,}600 \therefore 41{,}910 = V$ (7.27 psf)

Wind: (sim Bldg A)

roof: 380(144) = 54,750 controls 11 sides
380(40) = 15,200 N/crit

floor: 146(144) = 20,160
140(40) = 5,600 } N/crit

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SHEET NO. 16 OF
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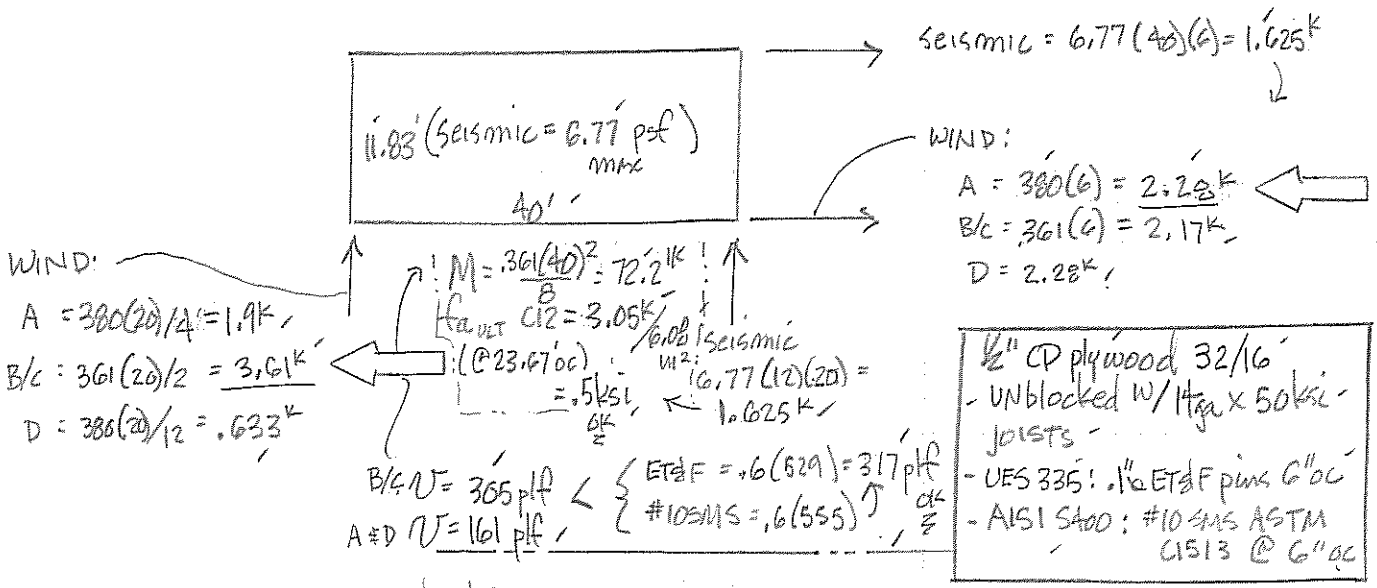
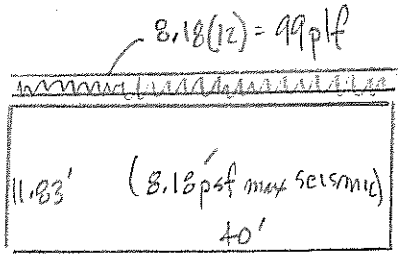
CHECKED BY DATE
SCALE

Diaphragms:

Roof:



Floor: (seismic controls):



(same @ sides) ↑ R = 1980# M = 19.8'k ∴ T/C = 1.67k ∴ fa(ULT) C9 = .42ksi, n/l ∴ OK

∴ V = 167 plf < 1565 (pg 9) OK

↑ wind A = 140(20)/4 = 700#
B/C = 150(20)/2 = 1500#
D = 140(20)/12 = 234#

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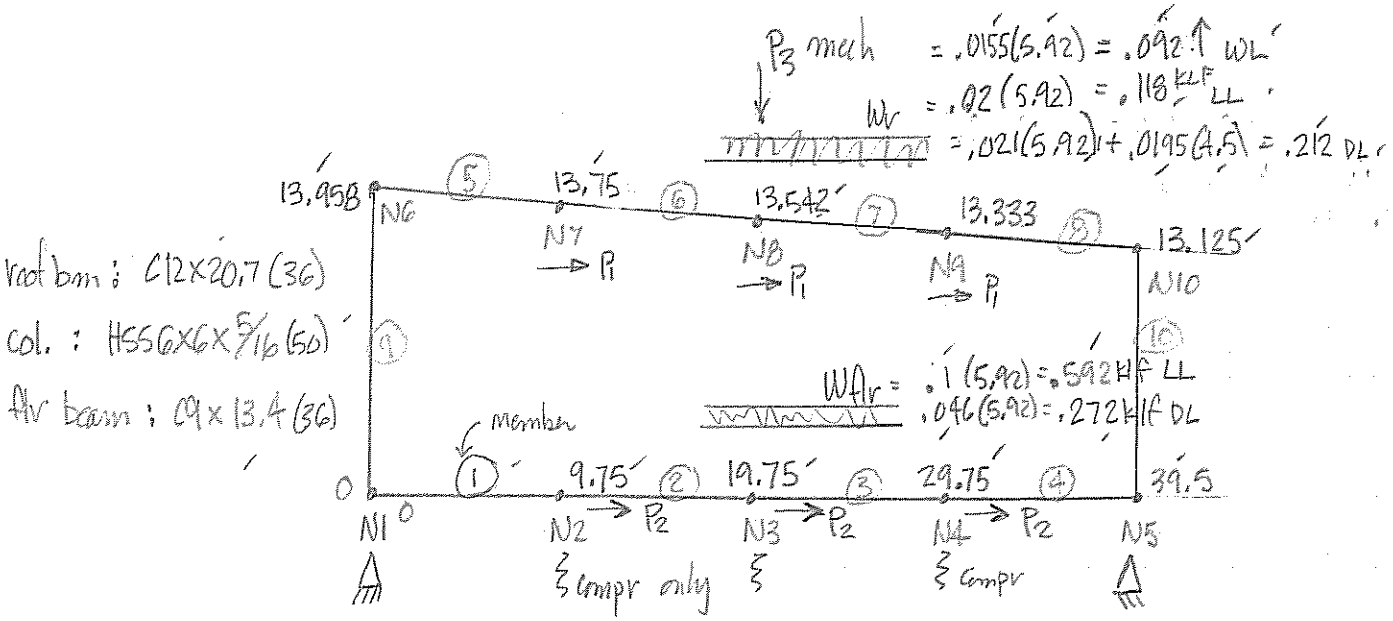
Moment Frames: (worst case = B/C w/ higher frames):

sidewall frames: (note: design is ASD):



P_1 = 2.28 wind / 3 = .76^k W
= 1.625^k seismic / 3 = .542^k EQ

P_2 = .90 wind / 3 = .3^k W
= 1.98 seismic / 3 = .66^k EQ

P_3 = 600$^{\#}$ (.06) = .36^k

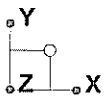
allow Δ_{cd} = $\frac{13.542(12)(.02)}{aV}$ = 3.25"

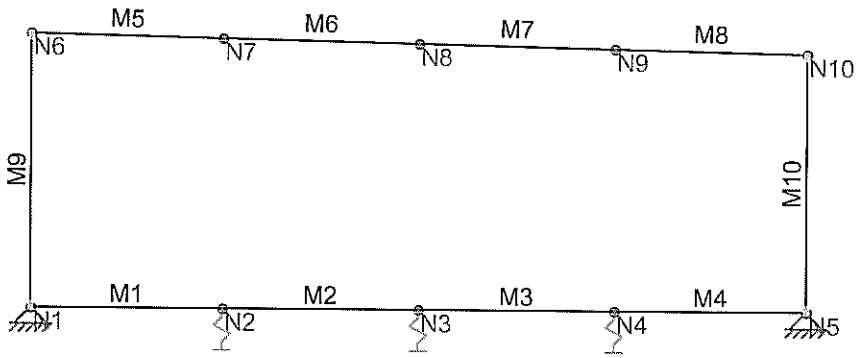
Ω_o load combos (where needed):

Eh = 3.0Ev / Ev = .2S_{ds} = .088 DL
(.442)

∴ (1.2+.088)DL ± 3E + (1) Flr LL
= 1.288 DL ± 3E + Flr LL

& (.9-.088)DL ± 3E
= .811 DL ± 3E





Anderson & Doig SE	Blythe CDC Sidewall	SK - 1
BDoig		Feb 7, 2022 at 10:07 AM
21010 BCDC		21010 BCDC Sidewall.r2d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Merge Tolerance (in)	0.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th (360-16): ASD
Adjust Stiffness?	Yes(Iterative)
Cold Formed Steel Code	AISI S100-16: ASD
Wood Code	AWC NDS-18: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	TMS 402-16: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Number of Shear Regions	4
Region Spacing Increment (in)	4
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[ksi]
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50
3	A992	29000	11154	0.3	0.65	0.49	50
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35
7	A1085	29000	11154	0.3	0.65	0.49	50

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	I (90,270) [i...	I (0,180) [in4]
1	RfBm	C12X20.7	Beam	None	A36 Gr.36	Typical	6.08	3.86	129
2	FlrBm	C9X13.4	Beam	None	A36 Gr.36	Typical	3.94	1.75	47.8
3	Col	HSS6X6X5_A..	Column	Tube A1085	A1085	Typical	7.118	38.486	38.486

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	9.75	0	0
3	N3	19.75	0	0
4	N4	29.75	0	0
5	N5	39.5	0	0
6	N6	0	13.958	0
7	N7	9.75	13.75	0
8	N8	19.75	13.542	0
9	N9	29.75	13.333	0
10	N10	39.5	13.125	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N2		CS1000	
3	N3		CS1000	
4	N4		CS1000	
5	N5	Reaction	Reaction	

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lb-out[ft]	Lb-in[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	K-out	K-in	Cb	Function
1	M1	FlrBm	9.75		39.5	Lb out						Lateral
2	M2	FlrBm	10		39.5	Lb out						Lateral
3	M3	FlrBm	10		39.5	Lb out						Lateral
4	M4	FlrBm	9.75		39.5	Lb out						Lateral
5	M5	RfBm	9.752		39.5	2						Lateral
6	M6	RfBm	10.002		39.5	2						Lateral
7	M7	RfBm	10.002		39.5	2						Lateral
8	M8	RfBm	9.752		39.5	2						Lateral
9	M9	Col	13.958			Lb out			1.2	1.2		Lateral
10	M10	Col	13.125			Lb out			1.2	1.2		Lateral

Member Primary Data

	Label	I Joint	J Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2		FlrBm	Beam	None	A36 Gr.36	Typical
2	M2	N2	N3		FlrBm	Beam	None	A36 Gr.36	Typical
3	M3	N3	N4		FlrBm	Beam	None	A36 Gr.36	Typical
4	M4	N4	N5		FlrBm	Beam	None	A36 Gr.36	Typical
5	M5	N6	N7		RfBm	Beam	None	A36 Gr.36	Typical
6	M6	N7	N8		RfBm	Beam	None	A36 Gr.36	Typical
7	M7	N8	N9		RfBm	Beam	None	A36 Gr.36	Typical
8	M8	N9	N10		RfBm	Beam	None	A36 Gr.36	Typical
9	M9	N1	N6		Col	Column	Tube A1085	A1085	Typical
10	M10	N5	N10		Col	Column	Tube A1085	A1085	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rati...	TOM	Inactive
1	M1						Yes			
2	M2						Yes			
3	M3						Yes			
4	M4						Yes			

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rati...	TOM	Inactive
5	M5						Yes			
6	M6						Yes			
7	M7						Yes			
8	M8						Yes			
9	M9			2.25	3		Yes	** NA **		
10	M10			2.25	3		Yes	** NA **		

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Joint	Point	Distributed
1	DL	DL			1		8
2	FlrLL	LL					4
3	RfLL	RLL					4
4	EQ	EL			6		
5	WL	WL			6		4

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N8	L	Y	-0.36	Active

Joint Loads and Enforced Displacements (BLC 4 : EQ)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N2	L	X	0.66	Active
2	N3	L	X	0.66	Active
3	N4	L	X	0.66	Active
4	N7	L	X	0.542	Active
5	N8	L	X	0.542	Active
6	N9	L	X	0.542	Active

Joint Loads and Enforced Displacements (BLC 5 : WL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N2	L	X	0.3	Active
2	N3	L	X	0.3	Active
3	N4	L	X	0.3	Active
4	N7	L	X	0.76	Active
5	N8	L	X	0.76	Active
6	N9	L	X	0.76	Active

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	Y	-0.272	-0.272	0	0	Active
2	M2	Y	-0.272	-0.272	0	0	Active
3	M3	Y	-0.272	-0.272	0	0	Active
4	M4	Y	-0.272	-0.272	0	0	Active
5	M5	Y	-0.212	-0.212	0	0	Active
6	M6	Y	-0.212	-0.212	0	0	Active
7	M7	Y	-0.212	-0.212	0	0	Active
8	M8	Y	-0.212	-0.212	0	0	Active

Member Distributed Loads (BLC 2 : FlrLL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	Y	-0.592	-0.592	0	0	Active

Member Distributed Loads (BLC 2 : FlrLL) (Continued)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
2	M2	Y	-0.592	-0.592	0	0	Active
3	M3	Y	-0.592	-0.592	0	0	Active
4	M4	Y	-0.592	-0.592	0	0	Active

Member Distributed Loads (BLC 3 : RfLL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M5	Y	-0.118	-0.118	0	0	Active
2	M6	Y	-0.118	-0.118	0	0	Active
3	M7	Y	-0.118	-0.118	0	0	Active
4	M8	Y	-0.118	-0.118	0	0	Active

Member Distributed Loads (BLC 5 : WL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M5	Y	0.092	0.092	0	0	Active
2	M6	Y	0.092	0.092	0	0	Active
3	M7	Y	0.092	0.092	0	0	Active
4	M8	Y	0.092	0.092	0	0	Active

Load Combinations

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..
1	IBC 16-8	Yes	C		DL	1																		
2	IBC 16-9	Yes	C		DL	1	LL	1	LLS	1														
3	IBC 16-10 ..	Yes	C		DL	1	RLL	1																
4	IBC 16-10 ..		C		DL	1	SL	1	SLN	1														
5	IBC 16-10 ..		C		DL	1	RL	1																
6	IBC 16-11 ..	Yes	C		DL	1	LL	0.75	LLS	0.75	RLL	0.75												
7	IBC 16-11 ..		C		DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75										
8	IBC 16-11 ..		C		DL	1	LL	0.75	LLS	0.75	RL	0.75												
9	IBC 16-12 ..	Yes	C		DL	1	WL	0.6																
10	IBC 16-12 ..	Yes	C		DL	1	WL	-0.6																
11	IBC 16-12 ..	Yes	C		DL	1	EL	0.7																
12	IBC 16-12 ..	Yes	C		DL	1	EL	-0.7																
13	IBC 16-13 ..	Yes	C		DL	1	WL	0.45	LL	0.75	LLS	0.75	RLL	0.75										
14	IBC 16-13 ..	Yes	C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	RLL	0.75										
15	IBC 16-13 ..		C		DL	1	WL	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
16	IBC 16-13 ..		C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
17	IBC 16-13 ..		C		DL	1	WL	0.45	LL	0.75	LLS	0.75	RL	0.75										
18	IBC 16-13 ..		C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	RL	0.75										
19	IBC 16-14 ..	Yes	C		DL	1	EL	0.525	LL	0.75	LLS	0.75	RLL	0.75										
20	IBC 16-14 ..	Yes	C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	RLL	0.75										
21	IBC 16-14 ..		C		DL	1	EL	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
22	IBC 16-14 ..		C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
23	IBC 16-14 ..		C		DL	1	EL	0.525	LL	0.75	LLS	0.75	RL	0.75										
24	IBC 16-14 ..		C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	RL	0.75										
25	IBC 16-15 ..	Yes	C		DL	0.6	WL	0.6																
26	IBC 16-15 ..	Yes	C		DL	0.6	WL	-0.6																
27	IBC 16-16 ..	Yes	C		DL	0.6	EL	0.7																
28	IBC 16-16 ..	Yes	C		DL	0.6	EL	-0.7																
29	+Em	Yes	C		DL		EL	3																
30	-Em	Yes	C		DL		EL	-3																
31	max +Em	Yes	C		DL	1.288	EL	3	LL	1														
32	max -Em	Yes	C		DL	1.288	EL	-3	LL	1														
33	min +Em	Yes	C		DL	0.811	EL	3																
34	Min -Em	Yes	C		DL	0.811	EL	-3																

Load Combination Design

	Description	ASIF	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless
1	IBC 16-8		0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	IBC 16-9			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	IBC 16-10 (a)		1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-10 (b)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-10 (c)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-11 (a)		1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (b)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-11 (c)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-12 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-12 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-12 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-13 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-13 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-13 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	IBC 16-13 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	IBC 16-13 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	IBC 16-14 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	IBC 16-14 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	IBC 16-14 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	IBC 16-14 (b) ...	ASCE Combos	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	IBC 16-14 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	IBC 16-14 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	IBC 16-15 (a)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	IBC 16-15 (b)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	IBC 16-16 (a)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	IBC 16-16 (b)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	+Em	Add Env	1.6								
30	-Em		1.6								
31	max +Em		1.6								
32	max -Em	/Em	1.6								
33	min +Em	Combs	1.6								
34	Min -Em		1.6								

Envelope AISC 15th (360-16): ASD Steel Code Checks

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear C...	Loc[ft]	LC	Pnc/om [k]	Pnt/om [k]	Mn/om [k-ft]	Cb	Eqn
1	M1	C9X13.4	0.727	0	14	0.179	0	14	19.215	84.934	22.635	3	H1-1b
2	M2	C9X13.4	0.335	10	2	0.164	10	2	18.267	84.934	22.635	2....	H1-1b
3	M3	C9X13.4	0.335	0	2	0.163	0	2	18.267	84.934	22.635	2....	H1-1b
4	M4	C9X13.4	0.592	9.75	19	0.164	9.75	19	19.215	84.934	22.635	3	H1-1b
5	M5	C12X20.7	0.781	0	14	0.166	0	14	42.364	131.066	45.988	2....	H1-1b
6	M6	C12X20.7	0.952	10.002	14	0.088	0	14	40.273	131.066	45.988	1	H1-1b
7	M7	C12X20.7	0.948	0	14	0.08	10.002	3	40.273	131.066	45.988	1	H1-1b
8	M8	C12X20.7	0.672	9.752	19	0.156	9.752	14	42.364	131.066	45.988	2....	H1-1b
9	M9	HSS6X6X5_A1...	0.902	13.521	14	0.063	13.521	14	127.641	213.115	37.913	2....	H1-1b
10	M10	HSS6X6X5_A1...	0.769	12.688	19	0.056	12.688	19	135.699	213.115	37.913	2....	H1-1b

OK
2

Node Displacements

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
1	1	N1	0	0	2.012e-3
2	1	N2	0	-0.002	-5.345e-4
3	1	N3	0	-0.003	2.637e-5

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
4	1	N4	0	-0.002	4.21e-4
5	1	N5	0	0	-1.597e-3
6	1	N6	-0.067	-0.004	-1.032e-2
7	1	N7	-0.098	-1.397	-1.07e-2
8	1	N8 DL	-0.114	(-2.108)	-4.53e-5
9	1	N9	-0.101	-1.405	1.068e-2
10	1	N10	-0.073	-0.004	1.05e-2
11	2	N1	0	0	8.984e-4
12	2	N2	0	-0.008	-3.41e-4
13	2	N3	0	-0.009	2.725e-5
14	2	N4	0	-0.008	2.237e-4
15	2	N5	0	0	-4.7e-4
16	2	N6 so ΔLL = 1.123"	-0.072	-0.004	-9.932e-3
17	2	N7	-0.103	-1.364	-1.052e-2
18	2	N8 = 2/420	-0.119	-2.065	-5.365e-5
19	2	N9	-0.107	-1.374	1.05e-2
20	2	N10 OK	-0.079	-0.004	1.015e-2
21	3	N1	0	0	3.359e-3
22	3	N2	0	-0.001	-8.676e-4
23	3	N3	0	-0.003	4.101e-5
24	3	N4	0	-0.001	6.91e-4
25	3	N5	0	0	-2.714e-3
26	3	N6	-0.103	-0.007	-1.589e-2
27	3	N7	-0.151	-2.145	-1.638e-2
28	3	N8 TL	-0.176	(-3.231)	-7.132e-5
29	3	N9	-0.156	-2.158	1.635e-2
30	3	N10	-0.112	-0.006	1.617e-2
31	6	N1	0	0	2.186e-3
32	6	N2	0	-0.006	-6.389e-4
33	6	N3	0	-0.008	3.797e-5
34	6	N4	0	-0.006	4.755e-4
35	6	N5	0	0	-1.589e-3
36	6	N6	-0.098	-0.006	-1.42e-2
37	6	N7	-0.141	-1.933	-1.482e-2
38	6	N8	-0.164	-2.917	-7.089e-5
39	6	N9	-0.146	-1.946	1.479e-2
40	6	N10	-0.107	-0.006	1.449e-2
41	9	N1	0	0	-3.088e-4
42	9	N2	0	-0.003	8.593e-5
43	9	N3	0	-0.003	-2.036e-4
44	9	N4	0	-0.001	7.903e-4
45	9	N5	0	0	-2.891e-3
46	9	N6	0.474	-0.003	-9.102e-3
47	9	N7	0.45	-1.101	-7.786e-3
48	9	N8	0.439	-1.563	7.207e-4
49	9	N9	0.45	-0.971	8.109e-3
50	9	N10	0.469	-0.003	6.157e-3
51	10	N1	0	0	4.363e-3
52	10	N2	0	-0.001	-1.163e-3
53	10	N3	0	-0.003	2.601e-4
54	10	N4	0	-0.002	4.388e-5
55	10	N5	0	0	-2.744e-4
56	10	N6	-0.616	-0.006	-1.152e-2
57	10	N7	-0.654	-1.694	-1.363e-2
58	10	N8	-0.676 .004	-2.655	-8.199e-4
59	10	N9	-0.661 OK	-1.842	1.326e-2
60	10	N10	-0.623	-0.005	1.488e-2

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
61	11	N1	0	0	5.886e-4
62	11	N2	0.001	-0.002	-1.434e-4
63	11	N3	0.001	-0.003	-1.609e-4
64	11	N4	0.001	-0.001	8.362e-4
65	11	N5	0	0	-3.119e-3
66	11	N6	0.373	-0.004	-1.147e-2
67	11	N7	0.341	-1.44	-1.047e-2
68	11	N8	0.326	-2.088	5.862e-4
69	11	N9	0.34	-1.334	1.073e-2
70	11	N10	0.366	-0.004	9.066e-3
71	12	N1	0	0	3.434e-3
72	12	N2	-0.001	-0.001	-9.255e-4
73	12	N3	-0.001	-0.003	2.137e-4
74	12	N4	-0.001	-0.003	5.727e-6
75	12	N5	0	0	-7.516e-5
76	12	N6	-0.506	-0.004	-9.166e-3
77	12	N7	-0.537	-1.354	-1.093e-2
78	12	N8	-0.555	-2.127	-6.764e-4
79	12	N9	-0.543	-1.476	1.063e-2
80	12	N10	-0.512	-0.004	1.193e-2
81	13	N1	0	0	4.209e-4
82	13	N2	0	-0.007	-1.669e-4
83	13	N3	0	-0.008	-1.372e-4
84	13	N4	0	-0.006	7.576e-4
85	13	N5	0	0	-2.578e-3
86	13	N6	0.314	-0.005	-1.329e-2
87	13	N7	0.276	-1.709	-1.261e-2
88	13	N8	0.257	-2.505	5.107e-4
89	13	N9	0.274	-1.617	1.284e-2
90	13	N10	0.306	-0.005	1.119e-2
91	14	N1	0	0	3.969e-3
92	14	N2	0	-0.005	-1.116e-3
93	14	N3	0	-0.008	2.153e-4
94	14	N4	0	-0.007	1.888e-4
95	14	N5	0	0	-5.835e-4
96	14	N6	-0.515	-0.007	-1.511e-2
97	14	N7	-0.563	-2.157	-1.704e-2
98	14	N8	-0.591	-3.331	-6.575e-4
99	14	N9	-0.571	-2.276	1.674e-2
100	14	N10	-0.525	-0.006	1.78e-2
101	19	N1	0	0	1.105e-3
102	19	N2	0.001	-0.006	-3.418e-4
103	19	N3	0.001	-0.008	-1.044e-4
104	19	N4	0.001	-0.006	7.91e-4
105	19	N5	0	0	-2.746e-3
106	19	N6	0.236	-0.006	-1.507e-2
107	19	N7	0.192	-1.966	-1.464e-2
108	19	N8	0.171	-2.902	4.074e-4
109	19	N9	0.189	-1.892	1.483e-2
110	19	N10	0.227	-0.006	1.34e-2
111	20	N1	0	0	3.267e-3
112	20	N2	-0.001	-0.006	-9.359e-4
113	20	N3	-0.001	-0.008	1.803e-4
114	20	N4	-0.001	-0.007	1.599e-4
115	20	N5	0	0	-4.325e-4
116	20	N6	-0.432	-0.006	-1.333e-2
117	20	N7	-0.475	-1.901	-1.5e-2

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
118	20	N8	-0.499	-2.932	-5.489e-4
119	20	N9	-0.481	-1.999	1.475e-2
120	20	N10	-0.441	-0.006	1.557e-2
121	25	N1	0	0	-1.094e-3
122	25	N2	0	-0.002	2.943e-4
123	25	N3	0	-0.002	-2.113e-4
124	25	N4	0	-0.001	6.154e-4
125	25	N5	0	0	-2.228e-3
126	25	N6	0.494	-0.001	-4.954e-3
127	25	N7	0.483	-0.541	-3.504e-3
128	25	N8	0.478	-0.719	7.324e-4
129	25	N9	0.484	-0.409	3.83e-3
130	25	N10	0.492	-0.002	1.969e-3
131	26	N1	0	0	3.521e-3
132	26	N2	0	0	-9.397e-4
133	26	N3	0	-0.002	2.46e-4
134	26	N4	0	-0.002	-1.194e-4
135	26	N5	0	0	3.467e-4
136	26	N6	-0.581	-0.004	-7.366e-3
137	26	N7	-0.607	-1.129	-9.291e-3
138	26	N8	-0.622	-1.801	-7.926e-4
139	26	N9	-0.612	-1.272	8.936e-3
140	26	N10	-0.586	-0.003	1.061e-2
141	27	N1	0	0	-2.063e-4
142	27	N2	0.001	-0.002	6.75e-5
143	27	N3	0.001	-0.002	-1.694e-4
144	27	N4	0.001	-0.001	6.617e-4
145	27	N5	0	0	-2.457e-3
146	27	N6	0.395	-0.002	-7.301e-3
147	27	N7	0.376	-0.877	-6.16e-3
148	27	N8	0.367	-1.239	5.999e-4
149	27	N9	0.376	-0.769	6.428e-3
150	27	N10	0.391	-0.003	4.852e-3
151	28	N1	0	0	2.603e-3
152	28	N2	-0.001	-0.001	-7.046e-4
153	28	N3	-0.001	-0.002	2.004e-4
154	28	N4	-0.001	-0.002	-1.581e-4
155	28	N5	0	0	5.475e-4
156	28	N6	-0.473	-0.003	-5.027e-3
157	28	N7	-0.491	-0.792	-6.619e-3
158	28	N8	-0.503	-1.279	-6.514e-4
159	28	N9	-0.496	-0.91	6.327e-3
160	28	N10	-0.477	-0.002	7.688e-3
161	29	N1	0	0	-7.95e-3
162	29	N2	0.004	-0.001	4.513e-3
163	29	N3	0.005	0.592	4.347e-3
164	29	N4	0.004	0.813	-1.698e-3
165	29	N5	0	0	-1.312e-2
166	29	N6	2.244	0.001	-6.113e-3
167	29	N7	2.241	-0.268	6.879e-4
168	29	N8	2.247	0.001	2.957e-3
169	29	N9	2.252	0.265	6.235e-4
170	29	N10	2.245	-0.001	-5.914e-3
171	30	N1	0	0	1.225e-2
172	30	N2	-0.004	0.766	1.684e-3
173	30	N3	-0.005	0.568	-4.058e-3
174	30	N4	-0.004	-0.001	-4.516e-3

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
175	30	N5	0	0	8.27e-3
176	30	N6	-2.199	-0.001	4.493e-3
177	30	N7	-2.198	0.13	-1.443e-3
178	30	N8	-2.205	-0.181	-2.906e-3
179	30	N9	-2.208	-0.394	1.534e-4
180	30	N10	-2.197	0.001	7.33e-3
181	31	N1	0	0	-4.595e-3
182	31	N2	0.004	-0.011	1.174e-3
183	31	N3	0.005	-0.01	-7.634e-4
184	31	N4	0.004	-0.006	2.112e-3
185	31	N5	0	0	-7.406e-3
186	31	N6	1.782	-0.005	-1.777e-2
187	31	N7	1.741	-1.944	-1.257e-2
188	31	N8	1.726	-2.579	2.632e-3
189	31	N9	1.746	-1.469	1.375e-2
190	31	N10	1.773	-0.006	7.013e-3
191	32	N1	0	0	7.525e-3
192	32	N2	-0.004	-0.006	-2.157e-3
193	32	N3	-0.005	-0.01	8.32e-4
194	32	N4	-0.004	-0.011	-1.425e-3
195	32	N5	0	0	5.556e-3
196	32	N6	-1.963	-0.006	-7.963e-3
197	32	N7	-2	-1.579	-1.455e-2
198	32	N8	-2.027	-2.748	-2.758e-3
199	32	N9	-2.015	-2.076	1.331e-2
200	32	N10	-1.97	-0.004	1.924e-2
201	33	N1	0	0	-4.52e-3
202	33	N2	0.004	-0.004	1.068e-3
203	33	N3	0.005	-0.002	2.319e-5
204	33	N4	0.004	0.126	2.163e-3
205	33	N5	0	0	-8.95e-3
206	33	N6	1.869	-0.003	-1.346e-2
207	33	N7	1.841	-1.328	-7.722e-3
208	33	N8	1.834	-1.636	2.698e-3
209	33	N9	1.848	-0.842	8.924e-3
210	33	N10	1.863	-0.004	2.467e-3
211	34	N1	0	0	8.77e-3
212	34	N2	-0.004	0.118	-2.143e-3
213	34	N3	-0.005	-0.002	6.842e-5
214	34	N4	-0.004	-0.004	-1.269e-3
215	34	N5	0	0	5.253e-3
216	34	N6	-1.965	-0.004	-3.572e-3
217	34	N7	-1.988	-0.959	-9.716e-3
218	34	N8	-2.007	-1.807	-2.754e-3
219	34	N9	-2	-1.455	8.489e-3
220	34	N10	-1.969	-0.002	1.48e-2

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	7.87	32	13.581	32	0	34
2		min	-5.618	29	-2.534	29	0	1
3	N2	max	0	34	10.975	31	0	34
4		min	0	1	0	30	0	1
5	N3	max	0	34	9.82	31	0	34
6		min	0	1	0	29	0	1

Envelope Node Reactions (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
7	N4	max	0	34	11.378	32	0	34
8		min	0	1	0	29	0	1
9	N5	max	5.876	30	13.614	31	0	34
10		min	-8.136	31	-2.676	30	0	1
11	Totals:	max	10.818	30	48.474	32		
12		min	-10.818	29	0	29		

Node Reactions (By Combination)

	LC	Node Label	X [k]	Y [k]	MZ [k-ft]
1	1	N1	1.9	6.367	0
2	1	N2	0	1.774	0
3	1	N3	0	3.123	0
4	1	N4	0	1.938	0
5	1	N5	-1.9	6.279	0
6	1	Totals:	0	19.48	
7	1	COG (ft):	X: 19.75	Y: 6.073	
8	2	N1	2.064	8.876	0
9	2	N2	0	8.077	0
10	2	N3	0	8.879	0
11	2	N4	0	8.247	0
12	2	N5	-2.064	8.785	0
13	2	Totals:	0	42.864	
14	2	COG (ft):	X: 19.75	Y: 2.76	
15	3	N1	2.87	9.151	0
16	3	N2	0	1.175	0
17	3	N3	0	3.377	0
18	3	N4	0	1.429	0
19	3	N5	-2.87	9.009	0
20	3	Totals:	0	24.142	
21	3	COG (ft):	X: 19.75	Y: 7.515	
22	6	N1	2.75	10.337	0
23	6	N2	0	6.053	0
24	6	N3	0	7.63	0
25	6	N4	0	6.288	0
26	6	N5	-2.75	10.206	0
27	6	Totals:	0	40.514	
28	6	COG (ft):	X: 19.75	Y: 4.089	
29	9	N1	0.532	4.261	0
30	9	N2	0	2.718	0
31	9	N3	0	3.017	0
32	9	N4	0	1.454	0
33	9	N5	-2.44	5.848	0
34	9	Totals:	-1.908	17.299	
35	9	COG (ft):	X: 19.75	Y: 5.131	
36	10	N1	3.268	8.483	0
37	10	N2	0	0.817	0
38	10	N3	0	3.229	0
39	10	N4	0	2.432	0
40	10	N5	-1.36	6.699	0
41	10	Totals:	1.908	21.661	
42	10	COG (ft):	X: 19.75	Y: 6.825	
43	11	N1	0.668	5.693	0
44	11	N2	0	2.333	0
45	11	N3	0	3.133	0
46	11	N4	0	1.334	0

Node Reactions (By Combination) (Continued)

	LC	Node Label	X [k]	Y [k]	MZ [k-ft]
47	11	N5	-3.193	6.987	0
48	11	Totals:	-2.524	19.48	
49	11	COG (ft):	X: 19.75	Y: 6.073	
50	12	N1	3.13	7.041	0
51	12	N2	0	1.215	0
52	12	N3	0	3.113	0
53	12	N4	0	2.541	0
54	12	N5	-0.606	5.57	0
55	12	Totals:	2.524	19.48	
56	12	COG (ft):	X: 19.75	Y: 6.073	
57	13	N1	1.721	8.749	0
58	13	N2	0	6.771	0
59	13	N3	0	7.55	0
60	13	N4	0	5.919	0
61	13	N5	-3.152	9.89	0
62	13	Totals:	-1.431	38.879	
63	13	COG (ft):	X: 19.75	Y: 3.691	
64	14	N1	3.778	11.931	0
65	14	N2	0	5.328	0
66	14	N3	0	7.71	0
67	14	N4	0	6.664	0
68	14	N5	-2.347	10.516	0
69	14	Totals:	1.431	42.15	
70	14	COG (ft):	X: 19.75	Y: 4.455	
71	19	N1	1.826	9.826	0
72	19	N2	0	6.478	0
73	19	N3	0	7.638	0
74	19	N4	0	5.83	0
75	19	N5	-3.719	10.743	0
76	19	Totals:	-1.893	40.514	
77	19	COG (ft):	X: 19.75	Y: 4.089	
78	20	N1	3.672	10.847	0
79	20	N2	0	5.628	0
80	20	N3	0	7.622	0
81	20	N4	0	6.747	0
82	20	N5	-1.779	9.669	0
83	20	Totals:	1.893	40.514	
84	20	COG (ft):	X: 19.75	Y: 4.089	
85	25	N1	-0.229	1.721	0
86	25	N2	0	2.001	0
87	25	N3	0	1.767	0
88	25	N4	0	0.689	0
89	25	N5	-1.679	3.328	0
90	25	Totals:	-1.908	9.507	
91	25	COG (ft):	X: 19.75	Y: 4.36	
92	26	N1	2.499	5.923	0
93	26	N2	0	0.123	0
94	26	N3	0	1.978	0
95	26	N4	0	1.65	0
96	26	N5	-0.591	4.194	0
97	26	Totals:	1.908	13.869	
98	26	COG (ft):	X: 19.75	Y: 7.247	
99	27	N1	-0.097	3.149	0
100	27	N2	0	1.62	0
101	27	N3	0	1.883	0
102	27	N4	0	0.568	0
103	27	N5	-2.427	4.468	0

Node Reactions (By Combination) (Continued)

	LC	Node Label	X [k]	Y [k]	MZ [k-ft]
104	27	Totals:	-2.524	11.688	
105	27	COG (ft):	X: 19.75	Y: 6.073	
106	28	N1	2.366	4.485	0
107	28	N2	0	0.516	0
108	28	N3	0	1.862	0
109	28	N4	0	1.76	0
110	28	N5	0.158	3.065	0
111	28	Totals:	2.524	11.688	
112	28	COG (ft):	X: 19.75	Y: 6.073	
113	29	N1	-5.618	-2.534	0
114	29	N2	0	1.13	0
115	29	N3	0	0	0
116	29	N4	0	0	0
117	29	N5	-5.2	1.403	0
118	29	Totals:	-10.818	0	
119	29	COG (ft):	NC	NC	
120	30	N1	4.942	1.355	0
121	30	N2	0	0	0
122	30	N3	0	0	0
123	30	N4	0	1.321	0
124	30	N5	5.876	-2.676	0
125	30	Totals:	10.818	0	
126	30	COG (ft):	NC	NC	
127	31	N1	-2.682	7.828	0
128	31	N2	0	10.975	0
129	31	N3	0	9.82	0
130	31	N4	0	6.237	0
131	31	N5	-8.136	13.614	0
132	31	Totals:	-10.818	48.474	
133	31	COG (ft):	X: 19.75	Y: 3.143	
134	32	N1	7.87	13.581	0
135	32	N2	0	6.213	0
136	32	N3	0	9.733	0
137	32	N4	0	11.378	0
138	32	N5	2.948	7.57	0
139	32	Totals:	10.818	48.474	
140	32	COG (ft):	X: 19.75	Y: 3.143	
141	33	N1	-3.832	2.156	0
142	33	N2	0	4.207	0
143	33	N3	0	1.77	0
144	33	N4	0	0	0
145	33	N5	-6.986	7.666	0
146	33	Totals:	-10.818	15.798	
147	33	COG (ft):	X: 19.75	Y: 6.073	
148	34	N1	6.725	7.613	0
149	34	N2	0	0	0
150	34	N3	0	1.735	0
151	34	N4	0	4.496	0
152	34	N5	4.093	1.954	0
153	34	Totals:	10.818	15.798	
154	34	COG (ft):	X: 19.75	Y: 6.073	

Member End Reactions

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
1	1	M1	I	0	2.024	7.569
2			J	0	-0.628	0.763
3	1	M2	I	0	1.146	0.763
4			J	0	-1.574	2.906
5	1	M3	I	0	1.549	2.906
6			J	0	-1.171	1.02
7	1	M4	I	0	0.766	1.02
8			J	0	-1.886	6.478
9	1	M5	I	1.807	4.418	18.995
10			J	1.851	2.351	-14.007
11	1	M6	I	1.853	2.332	-14.007
12			J	1.897	0.212	-26.734
13	1	M7	I	1.904	-0.183	-26.734
14			J	1.949	-2.303	-14.301
15	1	M8	I	1.95	-2.322	-14.301
16			J	1.994	-4.389	18.422
17	1	M9	I	4.343	-1.903	-7.212
18			J	4.343	-1.903	18.52
19	1	M10	I	4.393	1.897	6.122
20			J	4.393	1.897	-17.947
21	2	M1	I	0	4.534	9.393
22			J	0	-3.89	6.254
23	2	M2	I	0	4.187	6.254
24			J	0	-4.453	7.579
25	2	M3	I	0	4.426	7.579
26			J	0	-4.214	6.518
27	2	M4	I	0	4.033	6.518
28			J	0	-4.391	8.267
29	2	M5	I	1.971	4.422	19.456
30			J	2.015	2.355	-13.594
31	2	M6	I	2.016	2.336	-13.594
32			J	2.06	0.216	-26.361
33	2	M7	I	2.068	-0.182	-26.361
34			J	2.112	-2.302	-13.943
35	2	M8	I	2.113	-2.321	-13.943
36			J	2.157	-4.388	18.775
37	2	M9	I	4.342	-2.067	-9.006
38			J	4.342	-2.067	18.939
39	2	M10	I	4.393	2.06	7.88
40			J	4.393	2.06	-18.26
41	3	M1	I	0	2.489	11.161
42			J	0	-0.163	-0.175
43	3	M2	I	0	1.012	-0.175
44			J	0	-1.708	3.309
45	3	M3	I	0	1.669	3.309
46			J	0	-1.051	0.223
47	3	M4	I	0	0.378	0.223
48			J	0	-2.274	9.466
49	3	M5	I	2.728	6.803	28.994
50			J	2.796	3.586	-21.663
51	3	M6	I	2.798	3.544	-21.663
52			J	2.867	0.244	-40.611
53	3	M7	I	2.874	-0.198	-40.611
54			J	2.943	-3.498	-22.129
55	3	M8	I	2.945	-3.542	-22.129
56			J	3.013	-6.76	28.107
57	3	M9	I	6.663	-2.877	-10.622

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
58			J	6.663	-2.877	28.275
59	3	M10	I	6.735	2.863	8.929
60			J	6.735	2.863	-27.391
61	6	M1	I	0	4.255	11.629
62			J	0	-2.726	4.178
63	6	M2	I	0	3.326	4.178
64			J	0	-3.834	6.713
65	6	M3	I	0	3.797	6.713
66			J	0	-3.363	4.547
67	6	M4	I	0	2.925	4.547
68			J	0	-4.056	10.059
69	6	M5	I	2.619	6.209	26.833
70			J	2.682	3.279	-19.435
71	6	M6	I	2.684	3.244	-19.435
72			J	2.746	0.239	-36.851
73	6	M7	I	2.754	-0.193	-36.851
74			J	2.817	-3.198	-19.897
75	6	M8	I	2.818	-3.236	-19.897
76			J	2.88	-6.166	25.945
77	6	M9	I	6.082	-2.756	-11.112
78			J	6.082	-2.756	26.144
79	6	M10	I	6.15	2.743	9.545
80			J	6.15	2.743	-25.259
81	9	M1	I	-0.27	1.244	1.445
82			J	-0.27	-1.408	2.241
83	9	M2	I	-0.09	1.31	2.241
84			J	-0.09	-1.41	2.738
85	9	M3	I	0.09	1.607	2.738
86			J	0.09	-1.113	0.265
87	9	M4	I	0.27	0.342	0.265
88			J	0.27	-2.31	9.861
89	9	M5	I	0.737	3.045	9.559
90			J	0.77	1.516	-12.681
91	9	M6	I	1.227	1.522	-12.681
92			J	1.259	-0.046	-20.058
93	9	M7	I	1.723	-0.418	-20.058
94			J	1.756	-1.986	-8.034
95	9	M8	I	2.212	-1.991	-8.034
96			J	2.245	-3.52	18.841
97	9	M9	I	3.017	-0.788	-1.297
98			J	3.017	-0.788	9.362
99	9	M10	I	3.538	2.187	9.451
100			J	3.538	2.187	-18.295
101	10	M1	I	0.27	2.814	13.773
102			J	0.27	0.162	-0.733
103	10	M2	I	0.09	0.979	-0.733
104			J	0.09	-1.741	3.074
105	10	M3	I	-0.09	1.488	3.074
106			J	-0.09	-1.232	1.792
107	10	M4	I	-0.27	1.2	1.792
108			J	-0.27	-1.452	3.02
109	10	M5	I	2.876	5.799	28.531
110			J	2.931	3.194	-15.322
111	10	M6	I	2.477	3.148	-15.322
112			J	2.533	0.476	-33.447
113	10	M7	I	2.084	0.052	-33.447
114			J	2.14	-2.62	-20.605

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
115	10	M8	I	1.685	-2.649	-20.605
116			J	1.741	-5.254	17.931
117	10	M9	I	5.67	-3.031	-13.204
118			J	5.67	-3.031	27.774
119	10	M10	I	5.247	1.596	2.721
120			J	5.247	1.596	-17.532
121	11	M1	I	-0.693	1.551	3.828
122			J	-0.693	-1.101	1.638
123	11	M2	I	-0.231	1.232	1.638
124			J	-0.231	-1.488	2.922
125	11	M3	I	0.231	1.645	2.922
126			J	0.231	-1.075	0.075
127	11	M4	I	0.693	0.259	0.075
128			J	0.693	-2.393	10.482
129	11	M5	I	1.273	4.196	14.969
130			J	1.317	2.129	-15.871
131	11	M6	I	1.697	2.125	-15.871
132			J	1.741	0.005	-26.527
133	11	M7	I	2.128	-0.383	-26.527
134			J	2.173	-2.503	-12.096
135	11	M8	I	2.553	-2.519	-12.096
136			J	2.597	-4.586	22.549
137	11	M9	I	4.142	-1.347	-3.575
138			J	4.142	-1.347	14.632
139	11	M10	I	4.594	2.517	10.01
140			J	4.594	2.517	-21.92
141	12	M1	I	0.693	2.497	11.307
142			J	0.693	-0.155	-0.111
143	12	M2	I	0.231	1.06	-0.111
144			J	0.231	-1.66	2.89
145	12	M3	I	-0.231	1.453	2.89
146			J	-0.231	-1.267	1.964
147	12	M4	I	-0.693	1.274	1.964
148			J	-0.693	-1.378	2.473
149	12	M5	I	2.34	4.638	23.018
150			J	2.384	2.571	-12.139
151	12	M6	I	2.006	2.54	-12.139
152			J	2.05	0.42	-26.938
153	12	M7	I	1.678	0.016	-26.938
154			J	1.722	-2.104	-16.5
155	12	M8	I	1.344	-2.124	-16.5
156			J	1.388	-4.191	14.29
157	12	M9	I	4.544	-2.459	-10.846
158			J	4.544	-2.459	22.403
159	12	M10	I	4.192	1.277	2.234
160			J	4.192	1.277	-13.971
161	13	M1	I	-0.203	3.662	6.971
162			J	-0.203	-3.319	5.302
163	13	M2	I	-0.068	3.452	5.302
164			J	-0.068	-3.708	6.586
165	13	M3	I	0.068	3.842	6.586
166			J	0.068	-3.318	3.969
167	13	M4	I	0.203	2.601	3.969
168			J	0.203	-4.38	12.645
169	13	M5	I	1.815	5.17	19.664
170			J	1.868	2.644	-18.435
171	13	M6	I	2.212	2.631	-18.435

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
172			J	2.266	0.04	-31.788
173	13	M7	I	2.615	-0.368	-31.788
174			J	2.669	-2.959	-15.149
175	13	M8	I	3.012	-2.986	-15.149
176			J	3.066	-5.512	26.291
177	13	M9	I	5.087	-1.908	-6.613
178			J	5.087	-1.908	19.187
179	13	M10	I	5.51	2.967	12.088
180			J	5.51	2.967	-25.55
181	14	M1	I	0.203	4.854	16.333
182			J	0.203	-2.127	3.043
183	14	M2	I	0.067	3.2	3.043
184			J	0.067	-3.96	6.84
185	14	M3	I	-0.068	3.751	6.84
186			J	-0.068	-3.409	5.134
187	14	M4	I	-0.203	3.255	5.134
188			J	-0.203	-3.726	7.43
189	14	M5	I	3.424	7.254	34.058
190			J	3.495	3.92	-20.43
191	14	M6	I	3.155	3.86	-20.43
192			J	3.226	0.441	-41.936
193	14	M7	I	2.892	-0.017	-41.936
194			J	2.963	-3.436	-24.667
195	14	M8	I	2.623	-3.483	-24.667
196			J	2.694	-6.817	25.558
197	14	M9	I	7.078	-3.61	-15.656
198			J	7.078	-3.61	33.155
199	14	M10	I	6.79	2.513	6.959
200			J	6.79	2.513	-24.93
201	19	M1	I	-0.52	3.895	8.787
202			J	-0.52	-3.086	4.842
203	19	M2	I	-0.173	3.392	4.842
204			J	-0.173	-3.768	6.725
205	19	M3	I	0.173	3.87	6.725
206			J	0.173	-3.29	3.829
207	19	M4	I	0.52	2.539	3.829
208			J	0.52	-4.442	13.102
209	19	M5	I	2.219	6.04	23.773
210			J	2.282	3.11	-20.846
211	19	M6	I	2.568	3.087	-20.846
212			J	2.63	0.082	-36.696
213	19	M7	I	2.922	-0.344	-36.696
214			J	2.985	-3.349	-18.23
215	19	M8	I	3.271	-3.387	-18.23
216			J	3.333	-6.317	29.084
217	19	M9	I	5.931	-2.333	-8.349
218			J	5.931	-2.333	23.19
219	19	M10	I	6.301	3.214	12.499
220			J	6.301	3.214	-28.281
221	20	M1	I	0.52	4.614	14.47
222			J	0.52	-2.367	3.514
223	20	M2	I	0.173	3.261	3.514
224			J	0.173	-3.899	6.701
225	20	M3	I	-0.173	3.724	6.701
226			J	-0.173	-3.436	5.264
227	20	M4	I	-0.52	3.311	5.264
228			J	-0.52	-3.67	7.016

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
229	20	M5	I	3.019	6.378	29.89
230			J	3.081	3.448	-18.022
231	20	M6	I	2.799	3.4	-18.022
232			J	2.861	0.395	-37.005
233	20	M7	I	2.584	-0.042	-37.005
234			J	2.647	-3.047	-21.561
235	20	M8	I	2.364	-3.084	-21.561
236			J	2.426	-6.014	22.804
237	20	M9	I	6.233	-3.178	-13.874
238			J	6.233	-3.178	29.095
239	20	M10	I	5.999	2.272	6.59
240			J	5.999	2.272	-22.236
241	25	M1	I	-0.27	0.441	-1.531
242			J	-0.27	-1.15	1.924
243	25	M2	I	-0.09	0.851	1.924
244			J	-0.09	-0.781	1.575
245	25	M3	I	0.09	0.986	1.575
246			J	0.09	-0.646	-0.128
247	25	M4	I	0.27	0.043	-0.128
248			J	0.27	-1.548	7.206
249	25	M5	I	0.013	1.281	2.013
250			J	0.028	0.579	-7.055
251	25	M6	I	0.484	0.589	-7.055
252			J	0.499	-0.131	-9.349
253	25	M7	I	0.96	-0.342	-9.349
254			J	0.975	-1.062	-2.325
255	25	M8	I	1.431	-1.056	-2.325
256			J	1.446	-1.758	11.398
257	25	M9	I	1.28	-0.035	1.537
258			J	1.28	-0.035	2.004
259	25	M10	I	1.781	1.417	6.941
260			J	1.781	1.417	-11.043
261	26	M1	I	0.27	1.992	10.647
262			J	0.27	0.401	-1.015
263	26	M2	I	0.09	0.524	-1.015
264			J	0.09	-1.108	1.909
265	26	M3	I	-0.09	0.869	1.909
266			J	-0.09	-0.763	1.374
267	26	M4	I	-0.27	0.888	1.374
268			J	-0.27	-0.703	0.475
269	26	M5	I	2.145	4.011	20.773
270			J	2.183	2.233	-9.675
271	26	M6	I	1.728	2.205	-9.675
272			J	1.766	0.381	-22.604
273	26	M7	I	1.315	0.13	-22.604
274			J	1.353	-1.694	-14.785
275	26	M8	I	0.898	-1.709	-14.785
276			J	0.936	-3.488	10.556
277	26	M9	I	3.931	-2.251	-10.225
278			J	3.931	-2.251	20.211
279	26	M10	I	3.491	0.84	0.318
280			J	3.491	0.84	-10.346
281	27	M1	I	-0.693	0.744	0.826
282			J	-0.693	-0.847	1.327
283	27	M2	I	-0.231	0.773	1.327
284			J	-0.231	-0.859	1.758
285	27	M3	I	0.231	1.024	1.758

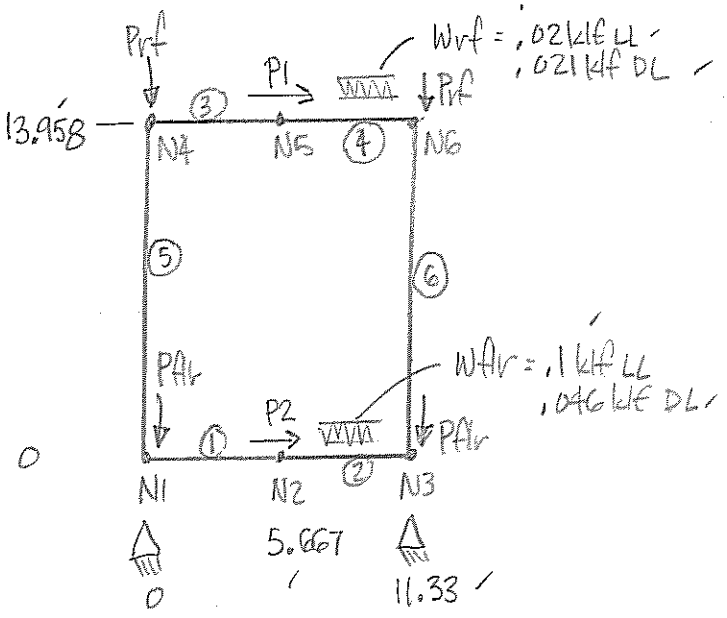
Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
286			J	0.231	-0.608	-0.318
287	27	M4	I	0.693	-0.04	-0.318
288			J	0.693	-1.631	7.83
289	27	M5	I	0.545	2.424	7.37
290			J	0.571	1.184	-10.219
291	27	M6	I	0.951	1.189	-10.219
292			J	0.978	-0.083	-15.752
293	27	M7	I	1.362	-0.304	-15.752
294			J	1.388	-1.576	-6.348
295	27	M8	I	1.768	-1.577	-6.348
296			J	1.795	-2.818	15.083
297	27	M9	I	2.405	-0.587	-0.716
298			J	2.405	-0.587	7.223
299	27	M10	I	2.837	1.746	7.503
300			J	2.837	1.746	-14.646
301	28	M1	I	0.693	1.679	8.211
302			J	0.693	0.087	-0.4
303	28	M2	I	0.231	0.603	-0.4
304			J	0.231	-1.029	1.726
305	28	M3	I	-0.231	0.834	1.726
306			J	-0.231	-0.798	1.546
307	28	M4	I	-0.693	0.962	1.546
308			J	-0.693	-0.629	-0.075
309	28	M5	I	1.613	2.859	15.315
310			J	1.639	1.618	-6.516
311	28	M6	I	1.261	1.6	-6.516
312			J	1.287	0.328	-16.162
313	28	M7	I	0.912	0.092	-16.162
314			J	0.939	-1.18	-10.72
315	28	M8	I	0.56	-1.19	-10.72
316			J	0.586	-2.431	6.937
317	28	M9	I	2.806	-1.685	-7.895
318			J	2.806	-1.685	14.893
319	28	M10	I	2.435	0.523	-0.173
320			J	2.435	0.523	-6.806

Anderson & Doig Structural Engineers
9851 Horn Rd. Suite 280
Sacramento, CA 95827
916-366-9622

JOB 21010 BCDC
SHEET NO. 37 OF
CALCULATED BY BDoig DATE 2/2022
CHECKED BY DATE
SCALE

endwall frames:



hf bm: C12x20.7 (36)

col: HHS 6x6x5/16 (50) A1085

flr beam: C9x13.4 (36)

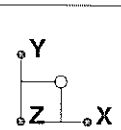
P1: 3.61 wind
1.625 EQ

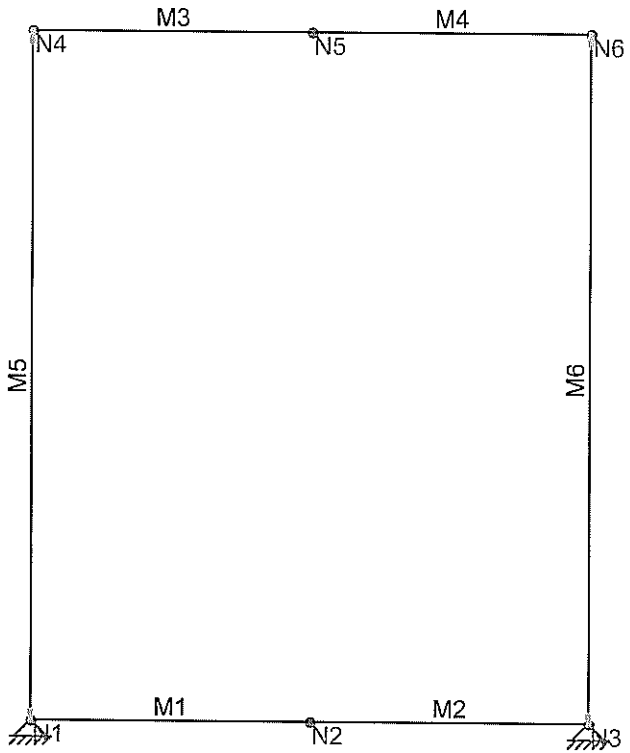
P2: 1.98 EQ
1.5 WIND

Prf: 20(5.92)20 = 2.367^k LL
(20).019½(41½) + 21(5.92)20 = 4.24^k DL
15.5(5.92)20 = 1.834^k WL

Pflr: 100(5.92)5 = 2.96^k LL
46(5.92)5 = 1.36^k DL

allow Δ_{cd} = 13.958(12)(.02) = 3.35"





Anderson & Doig SE	Blythe CDC Endwalls	SK -2
BDoig		Feb 7, 2022 at 1:12 PM
21010 BCDC		21010 BCDC Endwall.r2d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Merge Tolerance (in)	0.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th (360-16): ASD
Adjust Stiffness?	Yes(Iterative)
Cold Formed Steel Code	AISI S100-16: ASD
Wood Code	AWC NDS-18: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	TMS 402-16: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Number of Shear Regions	4
Region Spacing Increment (in)	4
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[ksi]
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50
3	A992	29000	11154	0.3	0.65	0.49	50
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35
7	A1085	29000	11154	0.3	0.65	0.49	50

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	I (90,270) [i...	I (0,180) [in4]
1	RfBm	C12X20.7	Beam	None	A36 Gr.36	Typical	6.08	3.86	129
2	FlrBm	C9X13.4	Beam	None	A36 Gr.36	Typical	3.94	1.75	47.8
3	Col	HSS6X6X5_A..	Column	None	A1085	Typical	7.118	38.486	38.486

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	5.667	0	0
3	N3	11.333	0	0
4	N4	0	13.958	0
5	N5	5.667	13.958	0
6	N6	11.333	13.958	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N3	Reaction	Reaction	

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lb-out[ft]	Lb-in[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	K-out	K-in	Cb	Function
1	M1	FlrBm	5.667		11.33	Lb out						Lateral
2	M2	FlrBm	5.666		11.33	Lb out						Lateral
3	M3	RfBm	5.667		11.33	Lb out						Lateral
4	M4	RfBm	5.666		11.33	Lb out						Lateral
5	M5	Col	13.958			Lb out			1.2	1.2		Lateral
6	M6	Col	13.958			Lb out			1.2	1.2		Lateral

Member Primary Data

	Label	I Joint	J Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2		FlrBm	Beam	None	A36 Gr.36	Typical
2	M2	N2	N3		FlrBm	Beam	None	A36 Gr.36	Typical
3	M3	N4	N5		RfBm	Beam	None	A36 Gr.36	Typical
4	M4	N5	N6		RfBm	Beam	None	A36 Gr.36	Typical
5	M5	N1	N4		Col	Column	None	A1085	Typical
6	M6	N3	N6		Col	Column	None	A1085	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rati...	TOM	Inactive
1	M1						Yes			
2	M2						Yes			
3	M3						Yes			
4	M4						Yes			
5	M5			2.25	3		Yes	** NA **		
6	M6			2.25	3		Yes	** NA **		

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Joint	Point	Distributed
1	DL	DL			4		4
2	FlrLL	LL			2		2
3	RfLL	RLL			2		2
4	EQ	EL			2		
5	WL	WL			4		

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N1	L	Y	-1.36	Active
2	N3	L	Y	-1.36	Active
3	N4	L	Y	-4.24	Active
4	N6	L	Y	-4.24	Active

Joint Loads and Enforced Displacements (BLC 2 : FlrLL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N1	L	Y	-2.96	Active
2	N3	L	Y	-2.96	Active

Joint Loads and Enforced Displacements (BLC 3 : RfLL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N4	L	Y	-2.367	Active
2	N6	L	Y	-2.367	Active

Joint Loads and Enforced Displacements (BLC 4 : EQ)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N2	L	X	1.98	Active
2	N5	L	X	1.625	Active

Joint Loads and Enforced Displacements (BLC 5 : WL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k...	Inactive
1	N4	L	Y	1.834	Active
2	N6	L	Y	1.834	Active
3	N2	L	X	1.5	Active
4	N5	L	X	3.61	Active

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	Y	-0.046	-0.046	0	0	Active
2	M2	Y	-0.046	-0.046	0	0	Active
3	M3	Y	-0.021	-0.021	0	0	Active
4	M4	Y	-0.021	-0.021	0	0	Active

Member Distributed Loads (BLC 2 : FlrLL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	Y	-0.1	-0.1	0	0	Active
2	M2	Y	-0.1	-0.1	0	0	Active

Member Distributed Loads (BLC 3 : RfLL)

	Member Label	Direction	Start Magnitude[k...	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.02	-0.02	0	0	Active
2	M4	Y	-0.02	-0.02	0	0	Active

Load Combinations

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..
1	IBC 16-8	Yes	C		DL	1																				
2	IBC 16-9	Yes	C		DL	1	LL	1	LLS	1																
3	IBC 16-10 ...	Yes	C		DL	1	RLL	1																		
4	IBC 16-10 ...		C		DL	1	SL	1	SLN	1																

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..
5	IBC 16-10 ...		C		DL	1	RL	1																
6	IBC 16-11 ...	Yes	C		DL	1	LL	0.75	LLS	0.75	RLL	0.75												
7	IBC 16-11 ...		C		DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75										
8	IBC 16-11 ...		C		DL	1	LL	0.75	LLS	0.75	RL	0.75												
9	IBC 16-12 ...	Yes	C		DL	1	WL	0.6																
10	IBC 16-12 ...	Yes	C		DL	1	WL	-0.6																
11	IBC 16-12 ...	Yes	C		DL	1	EL	0.7																
12	IBC 16-12 ...	Yes	C		DL	1	EL	-0.7																
13	IBC 16-13 ...	Yes	C		DL	1	WL	0.45	LL	0.75	LLS	0.75	RLL	0.75										
14	IBC 16-13 ...	Yes	C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	RLL	0.75										
15	IBC 16-13 ...		C		DL	1	WL	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
16	IBC 16-13 ...		C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
17	IBC 16-13 ...		C		DL	1	WL	0.45	LL	0.75	LLS	0.75	RL	0.75										
18	IBC 16-13 ...		C		DL	1	WL	-0.45	LL	0.75	LLS	0.75	RL	0.75										
19	IBC 16-14 ...	Yes	C		DL	1	EL	0.525	LL	0.75	LLS	0.75	RLL	0.75										
20	IBC 16-14 ...	Yes	C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	RLL	0.75										
21	IBC 16-14 ...		C		DL	1	EL	0.525	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
22	IBC 16-14 ...		C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
23	IBC 16-14 ...		C		DL	1	EL	0.525	LL	0.75	LLS	0.75	RL	0.75										
24	IBC 16-14 ...		C		DL	1	EL	-0.5...	LL	0.75	LLS	0.75	RL	0.75										
25	IBC 16-15 ...	Yes	C		DL	0.6	WL	0.6																
26	IBC 16-15 ...	Yes	C		DL	0.6	WL	-0.6																
27	IBC 16-16 ...	Yes	C		DL	0.6	EL	0.7																
28	IBC 16-16 ...	Yes	C		DL	0.6	EL	-0.7																
29	+Em	Yes	C		DL		EL	3																
30	-Em	Yes	C		DL		EL	-3																
31	max +Em	Yes	C		DL	1.288	EL	3	LL	1														
32	max -Em	Yes	C		DL	1.288	EL	-3	LL	1														
33	min +Em	Yes	C		DL	0.811	EL	3																
34	min -Em	Yes	C		DL	0.811	EL	-3																

ASD (member design)

Em embed

Load Combination Design

	Description	ASIF	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless
1	IBC 16-8		0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	IBC 16-9			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	IBC 16-10 (a)		1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-10 (b)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-10 (c)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-11 (a)		1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (b)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-11 (c)		1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-12 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-12 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-12 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-13 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-13 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-13 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	IBC 16-13 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	IBC 16-13 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	IBC 16-14 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	IBC 16-14 (a) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	IBC 16-14 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	IBC 16-14 (b) ...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	ASIF	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless
23	IBC 16-14 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	IBC 16-14 (c) (...		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	IBC 16-15 (a)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	IBC 16-15 (b)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	IBC 16-16 (a)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	IBC 16-16 (b)		1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	+Em		1.6								
30	-Em		1.6								
31	max +Em		1.6								
32	max -Em		1.6								
33	min +Em		1.6								
34	min -Em		1.6								

Envelope AISC 15th (360-16): ASD Steel Code Checks

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear C...	Loc[ft]	LC	Pnc/om [k]	Pnt/om [k]	Mn/om [k-ft]	Cb	Eqn
1	M1	C9X13.4	0.34	0	10	0.061	0	14	49.095	84.934	22.635	1....	H1-1b
2	M2	C9X13.4	0.336	5.666	9	0.061	5.666	13	49.104	84.934	22.635	1....	H1-1b
3	M3	C12X20.7	0.191	0	10	0.036	0	10	89.32	131.066	45.988	1....	H1-1b
4	M4	C12X20.7	0.188	5.666	9	0.036	5.666	9	89.332	131.066	45.988	1....	H1-1b
5	M5	HSS6X6X5_A1...	0.243	13.521	10	0.02	13.521	10	127.641	213.115	37.913	2....	H1-1b
6	M6	HSS6X6X5_A1...	0.232	13.521	9	0.02	13.521	9	127.641	213.115	37.913	2....	H1-1b

Node Displacements

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
1	1	N1	0	0	-1.47e-4
2	1	N2	0	-0.009	2.896e-8
3	1	N3	0	0	1.47e-4
4	1	N4	0	-0.004	-1.418e-5
5	1	N5	0	-0.005	0
6	1	N6	0	-0.004	1.418e-5
7	2	N1	0	0	-4.947e-4
8	2	N2	0	-0.028	9.438e-8
9	2	N3	0	0	4.947e-4
10	2	N4	0	-0.004	4.743e-5
11	2	N5	0	-0.003	0
12	2	N6	0	-0.004	-4.743e-5
13	3	N1	0	0	-1.347e-4
14	3	N2	0	-0.008	2.787e-8
15	3	N3	0	0	1.347e-4
16	3	N4	0	-0.007	-5.467e-5
17	3	N5	0	-0.01	1.01e-8
18	3	N6	0	-0.007	5.467e-5
19	6	N1	0	0	-3.986e-4
20	6	N2	0	-0.023	7.721e-8
21	6	N3	0	0	3.986e-4
22	6	N4	0	-0.006	1.662e-6
23	6	N5	0	-0.007	0
24	6	N6	0	-0.006	-1.662e-6
25	9	N1	0	0	-1.978e-3
26	9	N2	0	-0.009	8.179e-4
27	9	N3	0	0	-1.684e-3
28	9	N4	0.666	-0.002	-8.268e-4
29	9	N5	0.666	-0.004	3.059e-4
30	9	N6	0.666	-0.005	-7.984e-4

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
31	10	N1	0	0	1.708e-3
32	10	N2	0	-0.009	-8.286e-4
33	10	N3	0	0	2.002e-3
34	10	N4	-0.675	-0.007	8.091e-4
35	10	N5	-0.675	-0.006	-3.099e-4
36	10	N6	-0.675	-0.004	8.374e-4
37	11	N1	0	0	-1.115e-3
38	11	N2	0.001	-0.009	4.324e-4
39	11	N3	0	0	-8.21e-4
40	11	N4	0.352	-0.004	-4.437e-4
41	11	N5	0.352	-0.005	1.617e-4
42	11	N6	0.352	-0.005	-4.154e-4
43	12	N1	0	0	8.21e-4
44	12	N2	-0.001	-0.009	-4.323e-4
45	12	N3	0	0	1.115e-3
46	12	N4	-0.352	-0.005	4.154e-4
47	12	N5	-0.352	-0.005	-1.617e-4
48	12	N6	-0.352	-0.004	4.437e-4
49	13	N1	0	0	-1.79e-3
50	13	N2	0	-0.023	6.213e-4
51	13	N3	0	0	-9.923e-4
52	13	N4	0.506	-0.004	-6.155e-4
53	13	N5	0.506	-0.006	2.323e-4
54	13	N6	0.506	-0.006	-6.189e-4
55	14	N1	0	0	1.006e-3
56	14	N2	0	-0.023	-6.273e-4
57	14	N3	0	0	1.803e-3
58	14	N4	-0.511	-0.008	6.25e-4
59	14	N5	-0.511	-0.008	-2.346e-4
60	14	N6	-0.511	-0.006	6.216e-4
61	19	N1	0	0	-1.133e-3
62	19	N2	0	-0.023	3.279e-4
63	19	N3	0	0	-3.354e-4
64	19	N4	0.267	-0.006	-3.24e-4
65	19	N5	0.267	-0.007	1.226e-4
66	19	N6	0.267	-0.007	-3.274e-4
67	20	N1	0	0	3.354e-4
68	20	N2	0	-0.023	-3.278e-4
69	20	N3	0	0	1.133e-3
70	20	N4	-0.267	-0.007	3.274e-4
71	20	N5	-0.267	-0.007	-1.226e-4
72	20	N6	-0.267	-0.006	3.24e-4
73	25	N1	0	0	-1.901e-3
74	25	N2	0	-0.005	8.096e-4
75	25	N3	0	0	-1.725e-3
76	25	N4	0.659	0	-8.129e-4
77	25	N5	0.66	-0.002	3.028e-4
78	25	N6	0.659	-0.003	-7.959e-4
79	26	N1	0	0	1.748e-3
80	26	N2	0	-0.005	-8.201e-4
81	26	N3	0	0	1.925e-3
82	26	N4	-0.668	-0.005	8.063e-4
83	26	N5	-0.668	-0.004	-3.067e-4
84	26	N6	-0.668	-0.002	8.233e-4
85	27	N1	0	0	-1.046e-3
86	27	N2	0.001	-0.005	4.279e-4
87	27	N3	0	0	-8.699e-4

Node Displacements (Continued)

	LC	Node Label	X [in]	Y [in]	Rotation [rad]
88	27	N4	0.348	-0.002	-4.336e-4
89	27	N5	0.349	-0.003	1.6e-4
90	27	N6	0.348	-0.003	-4.166e-4
91	28	N1	0	0	8.699e-4
92	28	N2	-0.001	-0.005	-4.279e-4
93	28	N3	0	0	1.046e-3
94	28	N4	-0.348	-0.003	4.166e-4
95	28	N5	-0.349	-0.003	-1.6e-4
96	28	N6	-0.348	-0.002	4.336e-4
97	29	N1	0	0	-4.068e-3
98	29	N2	0.002	0	1.817e-3
99	29	N3	0	0	-4.068e-3
100	29	N4	1.479	0.003	-1.805e-3
101	29	N5	1.48	0	6.794e-4
102	29	N6	1.479	-0.003	-1.805e-3
103	30	N1	0	0	4.068e-3
104	30	N2	-0.002	0	-1.817e-3
105	30	N3	0	0	4.068e-3
106	30	N4	-1.479	-0.003	1.805e-3
107	30	N5	-1.48	0	-6.794e-4
108	30	N6	-1.479	0.003	1.805e-3
109	31	N1	0	0	-4.666e-3
110	31	N2	0.002	-0.031	1.844e-3
111	31	N3	0	0	-3.59e-3
112	31	N4	1.501	-0.002	-1.788e-3
113	31	N5	1.502	-0.005	6.894e-4
114	31	N6	1.501	-0.009	-1.875e-3
115	32	N1	0	0	3.59e-3
116	32	N2	-0.002	-0.031	-1.843e-3
117	32	N3	0	0	4.666e-3
118	32	N4	-1.501	-0.009	1.875e-3
119	32	N5	-1.502	-0.005	-6.894e-4
120	32	N6	-1.501	-0.002	1.788e-3
121	33	N1	0	0	-4.216e-3
122	33	N2	0.002	-0.007	1.83e-3
123	33	N3	0	0	-3.977e-3
124	33	N4	1.489	0	-1.829e-3
125	33	N5	1.491	-0.004	6.842e-4
126	33	N6	1.489	-0.007	-1.806e-3
127	34	N1	0	0	3.977e-3
128	34	N2	-0.002	-0.007	-1.83e-3
129	34	N3	0	0	4.216e-3
130	34	N4	-1.489	-0.007	1.806e-3
131	34	N5	-1.491	-0.004	-6.842e-4
132	34	N6	-1.489	0	1.829e-3

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	5.48	32	17.356	32	0	34
2		min	-5.421	29	-6.039	29	0	1
3	N3	max	5.422	30	17.356	31	0	34
4		min	-5.481	31	-6.039	30	0	1
5	Totals:	max	10.815	32	22.62	14		
6		min	-10.815	31	0	30		

Node Reactions (By Combination)

	LC	Node Label	X [k]	Y [k]	MZ [k-ft]
1	1	N1	0.033	5.98	0
2	1	N3	-0.033	5.98	0
3	1	Totals:	0	11.959	
4	1	COG (ft):	X: 5.666	Y: 10.175	
5	2	N1	0.092	9.506	0
6	2	N3	-0.092	9.506	0
7	2	Totals:	0	19.013	
8	2	COG (ft):	X: 5.667	Y: 6.4	
9	3	N1	0.039	8.46	0
10	3	N3	-0.039	8.46	0
11	3	Totals:	0	16.92	
12	3	COG (ft):	X: 5.667	Y: 11.284	
13	6	N1	0.082	10.485	0
14	6	N3	-0.082	10.485	0
15	6	Totals:	0	20.97	
16	6	COG (ft):	X: 5.666	Y: 8.279	
17	9	N1	-1.509	2.161	0
18	9	N3	-1.557	7.598	0
19	9	Totals:	-3.066	9.759	
20	9	COG (ft):	X: 5.666	Y: 9.322	
21	10	N1	1.557	9.834	0
22	10	N3	1.509	4.326	0
23	10	Totals:	3.066	14.16	
24	10	COG (ft):	X: 5.666	Y: 10.763	
25	11	N1	-1.231	4.543	0
26	11	N3	-1.293	7.417	0
27	11	Totals:	-2.524	11.959	
28	11	COG (ft):	X: 5.666	Y: 10.175	
29	12	N1	1.292	7.417	0
30	12	N3	1.231	4.543	0
31	12	Totals:	2.524	11.959	
32	12	COG (ft):	X: 5.666	Y: 10.175	
33	13	N1	-1.073	7.595	0
34	13	N3	-1.227	11.724	0
35	13	Totals:	-2.3	19.319	
36	13	COG (ft):	X: 5.667	Y: 7.794	
37	14	N1	1.226	13.395	0
38	14	N3	1.073	9.225	0
39	14	Totals:	2.3	22.62	
40	14	COG (ft):	X: 5.667	Y: 8.694	
41	19	N1	-0.866	9.395	0
42	19	N3	-1.027	11.574	0
43	19	Totals:	-1.893	20.97	
44	19	COG (ft):	X: 5.666	Y: 8.279	
45	20	N1	1.027	11.574	0
46	20	N3	0.866	9.395	0
47	20	Totals:	1.893	20.97	
48	20	COG (ft):	X: 5.666	Y: 8.279	
49	25	N1	-1.522	-0.204	0
50	25	N3	-1.544	5.179	0
51	25	Totals:	-3.066	4.975	
52	25	COG (ft):	X: 5.667	Y: 8.501	
53	26	N1	1.544	7.414	0
54	26	N3	1.522	1.962	0
55	26	Totals:	3.066	9.376	
56	26	COG (ft):	X: 5.667	Y: 11.063	

Node Reactions (By Combination) (Continued)

	LC	Node Label	X [k]	Y [k]	MZ [k-ft]
57	27	N1	-1.244	2.165	0
58	27	N3	-1.279	5.01	0
59	27	Totals:	-2.524	7.176	
60	27	COG (ft):	X: 5.667	Y: 10.175	
61	28	N1	1.279	5.01	0
62	28	N3	1.244	2.165	0
63	28	Totals:	2.524	7.176	
64	28	COG (ft):	X: 5.667	Y: 10.175	
65	29	N1	-5.421	-6.039	0
66	29	N3	-5.394	6.039	0
67	29	Totals:	-10.815	0	
68	29	COG (ft):	NC	NC	
69	30	N1	5.393	6.039	0
70	30	N3	5.422	-6.039	0
71	30	Totals:	10.815	0	
72	30	COG (ft):	NC	NC	
73	31	N1	-5.334	5.101	0
74	31	N3	-5.481	17.356	0
75	31	Totals:	-10.815	22.457	
76	31	COG (ft):	X: 5.667	Y: 6.979	
77	32	N1	5.48	17.356	0
78	32	N3	5.335	5.101	0
79	32	Totals:	10.815	22.457	
80	32	COG (ft):	X: 5.667	Y: 6.979	
81	33	N1	-5.409	-1.232	0
82	33	N3	-5.406	10.931	0
83	33	Totals:	-10.815	9.699	
84	33	COG (ft):	X: 5.667	Y: 10.175	
85	34	N1	5.406	10.931	0
86	34	N3	5.409	-1.232	0
87	34	Totals:	10.815	9.699	
88	34	COG (ft):	X: 5.667	Y: 10.175	

Member End Reactions

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
1	1	M1	I	0	0.261	0.293
2			J	0	0	-0.446
3	1	M2	I	0	0	-0.446
4			J	0	-0.261	0.293
5	1	M3	I	0.033	0.119	0.173
6			J	0.033	0	-0.164
7	1	M4	I	0.033	0	-0.164
8			J	0.033	-0.119	0.173
9	1	M5	I	4.359	-0.033	-0.286
10			J	4.359	-0.033	0.164
11	1	M6	I	4.359	0.033	0.286
12			J	4.359	0.033	-0.164
13	2	M1	I	0	0.827	0.89
14			J	0	0	-1.454
15	2	M2	I	0	0	-1.454
16			J	0	-0.827	0.89
17	2	M3	I	0.092	0.119	0.399
18			J	0.092	0	0.062
19	2	M4	I	0.092	0	0.062
20			J	0.092	-0.119	0.399

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
21	2	M5	I	4.359	-0.092	-0.873
22			J	4.359	-0.092	0.376
23	2	M6	I	4.359	0.092	0.873
24			J	4.359	0.092	-0.376
25	3	M1	I	0	0.261	0.309
26			J	0	0	-0.429
27	3	M2	I	0	0	-0.429
28			J	0	-0.261	0.309
29	3	M3	I	0.039	0.232	0.238
30			J	0.039	0	-0.42
31	3	M4	I	0.039	0	-0.42
32			J	0.039	-0.232	0.238
33	3	M5	I	6.839	-0.039	-0.302
34			J	6.839	-0.039	0.229
35	3	M6	I	6.839	0.039	0.302
36			J	6.839	0.039	-0.229
37	6	M1	I	0	0.686	0.753
38			J	0	0	-1.189
39	6	M2	I	0	0	-1.189
40			J	0	-0.686	0.753
41	6	M3	I	0.082	0.204	0.391
42			J	0.082	0	-0.187
43	6	M4	I	0.082	0	-0.187
44			J	0.082	-0.204	0.391
45	6	M5	I	6.219	-0.082	-0.738
46			J	6.219	-0.082	0.371
47	6	M6	I	6.219	0.082	0.738
48			J	6.219	0.082	-0.371
49	9	M1	I	-0.45	-1.01	-6.909
50			J	-0.45	-1.271	-0.445
51	9	M2	I	0.45	-1.271	-0.445
52			J	0.45	-1.532	7.494
53	9	M3	I	-1.059	-1.329	-8.032
54			J	-1.059	-1.448	-0.164
55	9	M4	I	1.107	-1.448	-0.164
56			J	1.107	-1.567	8.377
57	9	M5	I	1.811	1.07	6.708
58			J	1.811	1.07	-7.764
59	9	M6	I	4.707	1.137	7.281
60			J	4.707	1.137	-8.093
61	10	M1	I	0.45	1.548	7.588
62			J	0.45	1.287	-0.447
63	10	M2	I	-0.45	1.287	-0.447
64			J	-0.45	1.027	-7.003
65	10	M3	I	1.107	1.586	8.485
66			J	1.107	1.467	-0.165
67	10	M4	I	-1.059	1.467	-0.165
68			J	-1.059	1.348	-8.139
69	10	M5	I	6.926	-1.151	-7.372
70			J	6.926	-1.151	8.197
71	10	M6	I	3.993	-1.085	-6.799
72			J	3.993	-1.085	7.868
73	11	M1	I	-0.693	-0.411	-3.514
74			J	-0.693	-0.672	-0.446
75	11	M2	I	0.693	-0.672	-0.446
76			J	0.693	-0.932	4.099
77	11	M3	I	-0.538	-0.646	-4.164

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
78			J	-0.538	-0.765	-0.164
79	11	M4	I	0.6	-0.765	-0.164
80			J	0.6	-0.884	4.51
81	11	M5	I	3.594	0.55	3.411
82			J	3.594	0.55	-4.026
83	11	M6	I	5.124	0.617	3.983
84			J	5.124	0.617	-4.355
85	12	M1	I	0.693	0.932	4.099
86			J	0.693	0.672	-0.447
87	12	M2	I	-0.693	0.672	-0.447
88			J	-0.693	0.411	-3.514
89	12	M3	I	0.6	0.884	4.51
90			J	0.6	0.765	-0.165
91	12	M4	I	-0.538	0.765	-0.165
92			J	-0.538	0.646	-4.164
93	12	M5	I	5.124	-0.617	-3.983
94			J	5.124	-0.617	4.355
95	12	M6	I	3.594	-0.55	-3.411
96			J	3.594	-0.55	4.026
97	13	M1	I	-0.337	-0.279	-4.716
98			J	-0.337	-0.965	-1.189
99	13	M2	I	0.338	-0.965	-1.189
100			J	0.338	-1.651	6.223
101	13	M3	I	-0.736	-0.896	-5.84
102			J	-0.736	-1.1	-0.186
103	13	M4	I	0.889	-1.1	-0.186
104			J	0.889	-1.304	6.623
105	13	M5	I	4.294	0.756	4.574
106			J	4.294	0.756	-5.651
107	13	M6	I	6.494	0.92	6.05
108			J	6.494	0.92	-6.393
109	14	M1	I	0.337	1.66	6.277
110			J	0.337	0.975	-1.19
111	14	M2	I	-0.338	0.975	-1.19
112			J	-0.338	0.289	-4.77
113	14	M3	I	0.889	1.315	6.684
114			J	0.889	1.111	-0.187
115	14	M4	I	-0.736	1.111	-0.187
116			J	-0.736	0.907	-5.901
117	14	M5	I	8.155	-0.929	-6.103
118			J	8.155	-0.929	6.452
119	14	M6	I	5.934	-0.765	-4.626
120			J	5.934	-0.765	5.71
121	19	M1	I	-0.52	0.176	-2.133
122			J	-0.52	-0.509	-1.19
123	19	M2	I	0.52	-0.51	-1.19
124			J	0.52	-1.195	3.64
125	19	M3	I	-0.346	-0.376	-2.897
126			J	-0.346	-0.58	-0.186
127	19	M4	I	0.507	-0.58	-0.186
128			J	0.507	-0.784	3.68
129	19	M5	I	5.639	0.36	2.065
130			J	5.639	0.36	-2.807
131	19	M6	I	6.8	0.524	3.542
132			J	6.8	0.524	-3.549
133	20	M1	I	0.52	1.195	3.64
134			J	0.52	0.509	-1.19

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
135	20	M2	I	-0.52	0.509	-1.19
136			J	-0.52	-0.176	-2.133
137	20	M3	I	0.507	0.784	3.68
138			J	0.507	0.58	-0.187
139	20	M4	I	-0.346	0.58	-0.187
140			J	-0.346	0.376	-2.897
141	20	M5	I	6.8	-0.524	-3.542
142			J	6.8	-0.524	3.549
143	20	M6	I	5.639	-0.36	-2.065
144			J	5.639	-0.36	2.807
145	25	M1	I	-0.45	-1.102	-6.953
146			J	-0.45	-1.258	-0.267
147	25	M2	I	0.45	-1.258	-0.267
148			J	0.45	-1.414	7.304
149	25	M3	I	-1.072	-1.362	-8.018
150			J	-1.072	-1.433	-0.098
151	25	M4	I	1.094	-1.433	-0.098
152			J	1.094	-1.505	8.225
153	25	M5	I	0.082	1.073	6.752
154			J	0.082	1.073	-7.75
155	25	M6	I	2.948	1.113	7.095
156			J	2.948	1.113	-7.947
157	26	M1	I	0.45	1.431	7.396
158			J	0.45	1.274	-0.268
159	26	M2	I	-0.45	1.274	-0.268
160			J	-0.45	1.118	-7.045
161	26	M3	I	1.094	1.523	8.33
162			J	1.094	1.452	-0.099
163	26	M4	I	-1.072	1.452	-0.099
164			J	-1.072	1.38	-8.123
165	26	M5	I	5.168	-1.127	-7.185
166			J	5.168	-1.127	8.049
167	26	M6	I	2.264	-1.087	-6.841
168			J	2.264	-1.087	7.851
169	27	M1	I	-0.693	-0.508	-3.592
170			J	-0.693	-0.665	-0.267
171	27	M2	I	0.693	-0.665	-0.267
172			J	0.693	-0.821	3.943
173	27	M3	I	-0.551	-0.686	-4.189
174			J	-0.551	-0.758	-0.098
175	27	M4	I	0.586	-0.758	-0.098
176			J	0.586	-0.829	4.396
177	27	M5	I	1.858	0.557	3.487
178			J	1.858	0.557	-4.049
179	27	M6	I	3.373	0.597	3.831
180			J	3.373	0.597	-4.247
181	28	M1	I	0.693	0.821	3.943
182			J	0.693	0.665	-0.268
183	28	M2	I	-0.693	0.665	-0.268
184			J	-0.693	0.508	-3.592
185	28	M3	I	0.586	0.829	4.396
186			J	0.586	0.758	-0.099
187	28	M4	I	-0.551	0.758	-0.099
188			J	-0.551	0.686	-4.189
189	28	M5	I	3.373	-0.597	-3.831
190			J	3.373	-0.597	4.247
191	28	M6	I	1.858	-0.557	-3.487

Member End Reactions (Continued)

	LC	Member Label	Member E...	Axial[k]	Shear[k]	Moment[k-ft]
192			J	1.858	-0.557	4.049

Anderson & Doig Structural Engineers
9851 Horn Rd. Suite 280
Sacramento, CA 95827
916-366-9622

JOB 21010 BCDC
SHEET NO. 52 OF
CALCULATED BY BDoic DATE 2/2022
CHECKED BY DATE
SCALE

Frame Checks:

Required Beam Sx:

$S_x F_{y_{bm}} = 1.4 S_x F_{y_{col}}$

$\therefore$ reqd S_x beam $= \frac{1.4(12.1)(50)}{50} = 16.94 < 21.5$ OK

increase C12's from A36 to A572 gr 50

Anderson & Doig Structural Engineers
9851 Horn Rd. Suite 280
Sacramento, CA 95827
916-366-9622

JOB 21010 BCDC
SHEET NO. 53 OF
CALCULATED BY BDoig DATE 2/2022
CHECKED BY DATE
SCALE

Beam - Column Connections:

Emm combos control when:

@ULT: $R_N \geq R_{Emm}/.9$
@ASD: $R_N \geq R_{asd}(1.67)$
$\therefore R_{emm} \geq R_{asd}(1.67)(.9) = 1.5\,R_{asd}$

- See following page for connections capacity
- See following pages for M & V info (55-58):

C12x20.7 (50):
$t_f = .5"$
$b_f = 3.0"$

C9x13.4 (36):
$t_f = .413"$
$b_f = 2.43"$

C12:
f-f flange T/C = $\frac{51.09(12)}{(12-.5)} = 53.3^k = 17.71^k/in$ → 3/8" groove + 5/16" fillet
11.81 + 6.96 = 18.77 k/in OK

V = 10.88k — 10"-3/16" fillet weld — 41.7k > 10.88 OK

C9:
f-f flange T/C = $\frac{27.77(12)}{(9-.41)} = 38.79^k = 2.43 = 15.96^k/in$ → 5/16" groove + 5/16" fillet
9.84 + 6.96 = 16.01 k/in OK

V = 7.28k — 8"-3/16" fillet weld — 33.4k > 7.28 OK

Connection capacities:

weld; (ULT)

per 1/16" fillet weld: $\frac{1}{\sqrt{2}}\left(\frac{1}{16}\right)(.75)(.6)(70) = 1.39^{k}/in$

per 1/16" groove weld: $\left(\frac{1}{16}\right)(.75)(.6)(70) = 1.96^{k}/in$

→

	(ULT)
3/16	4.17 k/in
1/4	5.56 k/in
5/16	6.96 k/in
3/8	8.35 k/in

→

	(ULT)
3/16	5.91 k/in
1/4	7.87 k/in
5/16	9.84 k/in
3/8	11.81 k/in

---

bolt shear; (ULT)

5/8" ø A307 = 6.23 k/

$\phi R_N = \phi \cdot u \cdot D_u \cdot h_f \cdot T_b \cdot n_s$

$\phi = 1.0$, $D_u = 1.15$, $h_f = 1.0$, $n_s = 1$, $T_b = 5.3.1$, $u = .30$,

3/4" ø A325, slip crit = $(1.0)(.3)(1.13)(1.0)(T_b)1 = .34(T_b = 28) = 9.52^{k}$

7/8" ø A325, slip crit = $39(.34) = 13.26^{k}$

fillet: (ULT)

5/16" fillet min, Tavail = $.9\left(\frac{36}{}\right)5/16 = 10.125^{k}/in$ (ULT)

ASD

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	0.693	28	4.854	14	16.333	14
2			min	-0.693	11	0.441	25	-1.531	25
3		J	max	0.693	28	0.401	26	6.254	2
4			min	-0.693	11	-3.89	2	-1.015	26
5	M2	I	max	0.231	28	4.187	2	6.254	2
6			min	-0.231	11	0.524	26	-1.015	26
7		J	max	0.231	28	-0.781	25	7.579	2
8			min	-0.231	11	-4.453	2	1.575	25
9	M3	I	max	0.231	27	4.426	2	7.579	2
10			min	-0.231	12	0.834	28	1.575	25
11		J	max	0.231	27	-0.608	27	6.518	2
12			min	-0.231	12	-4.214	2	-0.318	27
13	M4	I	max	0.693	27	4.033	2	6.518	2
14			min	-0.693	12	-0.04	27	-0.318	27
15		J	max	0.693	27	-0.629	28	13.102	19
16			min	-0.693	12	-4.442	19	-0.075	28
17	M5	I	max	3.424	14	7.254	14	34.058	14
18			min	0.013	25	1.281	25	2.013	25
19		J	max	3.495	14	3.92	14	-6.516	28
20			min	0.028	25	0.579	25	-21.663	3
21	M6	I	max	3.155	14	3.86	14	-6.516	28
22			min	0.484	25	0.589	25	-21.663	3
23		J	max	3.226	14	0.476	10	-9.349	25
24			min	0.499	25	-0.131	25	-41.936	14
25	M7	I	max	2.922	19	0.13	26	-9.349	25
26			min	0.912	28	-0.418	9	-41.936	14
27		J	max	2.985	19	-1.062	25	-2.325	25
28			min	0.939	28	-3.498	3	-24.667	14
29	M8	I	max	3.271	19	-1.056	25	-2.325	25
30			min	0.56	28	-3.542	3	-24.667	14
31		J	max	3.333	19	-1.758	25	29.084	19
32			min	0.586	28	-6.817	14	6.937	28
33	M9	I	max	7.078	14	-0.035	25	1.537	25
34			min	1.28	25	-3.61	14	-15.656	14
35		J	max	7.078	14	-0.035	25	33.155	14
36			min	1.28	25	-3.61	14	2.004	25
37	M10	I	max	6.79	14	3.214	19	12.499	19
38			min	1.781	25	0.523	28	-0.173	28
39		J	max	6.79	14	3.214	19	-6.806	28
40			min	1.781	25	0.523	28	-28.281	19

C9: $M = 1.5(16.333) = 24.5^{lk}$ N/Cnt
$V = 1.5(4.854) = 7.28^{k}$ controls

C12: $M = 1.5(34.06) = 51.09^{lk}$ controls
$V = 1.5(7.254) = 10.88^{k}$ controls

Em

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	2.97	34	7.167	32	27.77	32
2			min	-2.97	31	-0.511	33	-10.455	33
3		J	max	2.97	34	1.071	34	10.252	31
4			min	-2.97	31	-6.116	31	0.004	34
5	M2	I	max	0.99	34	4.888	31	10.252	31
6			min	-0.99	31	1.078	34	0.004	34
7		J	max	0.99	34	-0.628	33	8.488	31
8			min	-0.99	31	-5.278	32	0.259	34
9	M3	I	max	0.99	33	5.288	31	8.488	31
10			min	-0.99	32	0.582	34	0.259	34
11		J	max	0.99	33	-1.088	33	10.895	32
12			min	-0.99	32	-4.966	32	0.114	33
13	M4	I	max	2.97	33	6.448	32	10.895	32
14			min	-2.97	32	-1.081	33	0.114	33
15		J	max	2.97	33	0.758	34	27.466	31
16			min	-2.97	32	-7.132	31	-12.402	34
17	M5	I	max	4.765	32	6.662	32	42.386	32
18			min	-0.921	33	2.623	33	-2.288	33
19		J	max	4.822	32	3.999	32	-3.411	34
20			min	-0.886	33	0.947	33	-25.702	31
21	M6	I	max	3.198	32	3.91	32	-3.411	34
22			min	0.741	33	0.984	33	-25.702	31
23		J	max	3.255	32	1.18	32	-20.943	33
24			min	0.776	33	-0.735	33	-35.053	32
25	M7	I	max	3.57	31	0.721	34	-20.943	33
26			min	0.483	34	-1.106	31	-35.053	32
27		J	max	3.627	31	-0.999	34	-2.124	33
28			min	0.519	34	-3.837	31	-27.567	32
29	M8	I	max	5.254	31	-1.031	34	-2.124	33
30			min	-1.106	34	-3.853	31	-27.567	32
31		J	max	5.311	31	-2.707	34	41.989	31
32			min	-1.071	34	-6.515	31	-3.115	34
33	M9	I	max	6.455	32	0.913	33	10.283	33
34			min	2.642	33	-5.026	32	-26.828	32
35		J	max	6.455	32	0.913	33	41.13	32
36			min	2.642	33	-5.026	32	-2.06	33
37	M10	I	max	6.521	31	5.292	31	26.474	31
38			min	2.684	34	-1.182	34	-12.181	34
39		J	max	6.521	31	5.292	31	2.82	34
40			min	2.684	34	-1.182	34	-40.666	31

C9: M = 27.77 ^1K controls
V = 7.167 K

C12: M = 42.386 ^1K
V = 6.662 K

ASD

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	0.693	28	1.66	14	7.588	10
2			min	-0.693	11	-1.102	25	-6.953	25
3		J	max	0.693	28	1.287	10	-0.267	25
4			min	-0.693	11	-1.271	9	-1.454	2
5	M2	I	max	0.693	27	1.287	10	-0.267	25
6			min	-0.693	12	-1.271	9	-1.454	2
7		J	max	0.693	27	1.118	26	7.494	9
8			min	-0.693	12	-1.651	13	-7.045	26
9	M3	I	max	1.107	10	1.586	10	8.485	10
10			min	-1.072	25	-1.362	25	-8.032	9
11		J	max	1.107	10	1.467	10	0.062	2
12			min	-1.072	25	-1.448	9	-0.42	3
13	M4	I	max	1.107	9	1.467	10	0.062	2
14			min	-1.072	26	-1.448	9	-0.42	3
15		J	max	1.107	9	1.38	26	8.377	9
16			min	-1.072	26	-1.567	9	-8.139	10
17	M5	I	max	8.155	14	1.073	25	6.752	25
18			min	0.082	25	-1.151	10	-7.372	10
19		J	max	8.155	14	1.073	25	8.197	10
20			min	0.082	25	-1.151	10	-7.764	9
21	M6	I	max	6.839	3	1.137	9	7.281	9
22			min	1.858	28	-1.087	26	-6.841	26
23		J	max	6.839	3	1.137	9	7.868	10
24			min	1.858	28	-1.087	26	-8.093	9

C9: $M = 1.5(7.588) = 11.38^{k}$

$V = 1.5(1.66) = 2.49^{k}$

N/Crit

C12: $M = 1.5(8.485) = 12.73^{k}$

$V = 1.5(1.586) = 2.38^{k}$

Em -

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	2.97	34	3.804	32	17.411	32
2			min	-2.97	31	-2.653	33	-15.996	33
3		J	max	2.97	34	2.901	32	-0.361	33
4			min	-2.97	31	-2.899	31	-1.588	32
5	M2	I	max	2.97	33	2.899	32	-0.361	33
6			min	-2.97	32	-2.901	31	-1.588	32
7		J	max	2.97	33	2.653	34	17.411	31
8			min	-2.97	32	-3.804	31	-15.996	34
9	M3	I	max	2.492	32	3.458	32	19.174	32
10			min	-2.457	33	-3.168	33	-18.356	33
11		J	max	2.492	32	3.304	32	0.017	31
12			min	-2.457	33	-3.305	31	-0.134	34
13	M4	I	max	2.492	31	3.305	32	0.017	31
14			min	-2.457	34	-3.304	31	-0.134	34
15		J	max	2.492	31	3.168	34	19.174	31
16			min	-2.457	34	-3.458	31	-18.356	34
17	M5	I	max	8.919	32	2.461	33	15.535	33
18			min	0.271	33	-2.621	32	-16.919	32
19		J	max	8.919	32	2.461	33	18.519	32
20			min	0.271	33	-2.621	32	-17.74	33
21	M6	I	max	8.919	31	2.621	31	16.919	31
22			min	0.271	34	-2.461	34	-15.535	34
23		J	max	8.919	31	2.621	31	17.74	34
24			min	0.271	34	-2.461	34	-18.519	31

C9: M = 17.411 ^k
V = 3.804 ^k

C12: M = 19.174 ^k
V = 3.458 ^k

N/Crit

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Module to Module Ties:

11 end walls: - equalize wind load (worst case: B/C):

$[(18.1).85(.8_{mwfrs} + .18) - 18.1(.85)(.65_{av.})]7\tfrac{1}{2}(20)$

+ parapet $= .25(4\tfrac{1}{2})\frac{.88}{.85}(18.1)(20) = 1183^{\#}$ ← N/Crit.
$\tau\,(1.5 - 2.5/2)_{av}$

- ASCE 7-16, Section 12.1.3:

.133 S_{ds} (241,100/2) = 7087# controls
.442 - ½ bldg D = mwfrs

---

11 sidewalls:

WIND: all mod's sim :. mil 12

ASCE 7, 12.1.3: sim abv = 7087#/5 (bolts @ ends & 10'oc) = 1417# each

transfer mwfrs diaphr shear (average) / bolts @ 10'oc = $\frac{305}{2}(10'oc) = 1525\#$/ea bolt

---

:. **endwall tie:** (7.09K)

5/16" x 3" plate
w/ 6" - 1/4" fillet weld

$5/16(3).9(36) = 30.4^{K} > 7.1$ OK
$5.56(6) = 33.4^{K} > 7.1$ OK

sidewall ties:

5-1/2" ø A307 bolts (ea end & 10'oc)

$V_{each\ bolt} = 1.525^{K} < 20.3_{KSI\ (ULT)}(.196) = 3.98$ ϕFN/each OK

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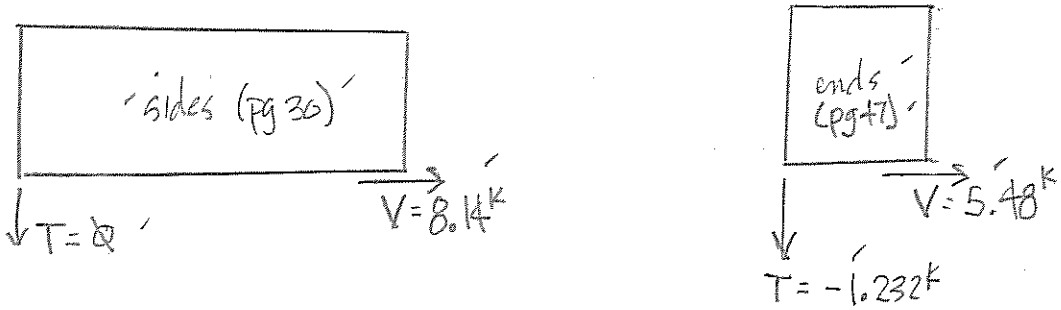
Foundation Connection: (Env Combo Loads):



---

col. conn to ftg: worst case: $\sqrt{8.14^2 + 1.232^2} = 8.233^k$

3"-1/4" fillet weld $3(5.56) = 16.68^k > 8.233$ OK

T @ fnd: (1.232^k)

1-#4 per ea column

$f_{t_u} = 1.232/1.2 = 6.16\ ksi \ll .9(60) = 54$ OK

V @ fnd: (8.14^k)

1- shear ftg, ea way, each col
3/4" x 4" long x 2" high

bearing: $(\phi = .65)(.85)(4.5)(2)(4) = 19.9^k > 8.14$ OK

Mu ftg = $8.14^k(1") = 8.14^{"k} < \phi M_N = (\phi = .9)(36)(Z = 1/4\,bd^2) = 18.2^{"k}$ OK

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FOUNDATIONS:

asd combos:

(pgs 28-30) sidewall: N1 & N5: T = 0' C = 11.93^k
(pg 46-47) end wall: N2 & N3: T = .204^k/mil C = 13.4^k controls

ext. walls: $w = (20+21)5.92 + 19\frac{1}{2}(18') + 146(5.92) + 150(1.5) = 1682$ plf
12" wide footing 2000 > 1682 OK
allow

@ module lines: $w = 146(11.833) + 1.33(1.5)150 = 2027$ plf
16" wide footing 2000(1.33) = 2667 > 2027 OK
stem

1-col-corner: $P = 13.4 + \left[19\frac{1}{2}(18) + 150(1\frac{1}{2})\right](5+5.92) = 19.69^k$
wall stem
$\therefore 19.7^k < (5.92+5)1' \times 2 = 21.84^k$ avail
$\therefore$ 12"w ftg's @ corner OK

2-col mod line: $P = 13.4(2) + \left[19\frac{1}{2}(18) + 1.5(150)\right]11.83 = 33.6^k$
wall stem
$[11.83' \times 1'_{end}w + 5'(1.33)_{mod\ line}]2 = 37^k$ avail OK > 33.6

$\therefore$ 12"w end wall + 16"w mod line OK

4 col.: sim 2 × 2-col (2 buildings mod to end):
mod line 2-Wdg, $\therefore$ 2-module line @ 16"w
+ 2 ends @ 24"w. OK

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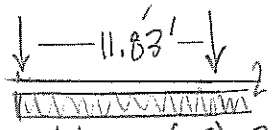
check 12" footings:



$w_u = 2(1.5) = 3 k/ft$

max: $M_u^+ = M_u^- = wl^2/8$ =

12" wide x 30" deep w/ 2-#5 cont T&B d=27" b=12" $A_s = .62 in^2$

$M_u = 630''^k < \frac{3}{4}\phi M_n = 667''^k$ OK

$V_u = (5.92 - 2.25)3 = 11^k \therefore \phi V_n = 34 psi < 50$ OK

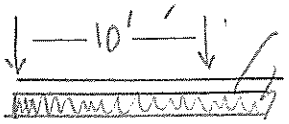
Coping's: check 12" wide x 12" deep w/ 2-#5 T&B to span 4' b=12 / d=9"

$M_u^{max} = wl^2/10 = 58''^k < \phi M_N = 288''^k$ OK

$V_u = (2 - .75)3 = \frac{3750}{12(9)} = 35 psi < .75\sqrt{4000} = 50 psi$ OK

---

check 16" footings:



$w_u = 3(1.33) = 4 k/ft$

max $M_u^+ / M_u^- = wl^2/8$

16" wide x 30" deep w/ 2-#5 cont T&B UON d=27" b=16" $A_s = .62$

$M_u = 600''^k < 670''^k = \frac{3}{4}\phi M_n$ OK

$V_u = (5 - 2.25)4 = \frac{11,000}{16(27)} = 26 psi < 50$ OK

Stem piers (5' span): check 16" w x 12" deep 2-#5 cont T&B b=16" d=9"

$M_u^{+/-} = wl^2/10 = 120''^k < \phi M_n = 290''^k$ OK

$V_u = (2.5 - .75)\frac{4}{k/ft} = \frac{7,000\#}{16(9)} = 48.6 psi < 50$ OK

Floors: (Dec pg's 8 & 9):

3W x H, 18 ga
w/ 5" Lwt conc.

max DL = 49 (-34.8) = 14.2 superimposed DL } TL superimposed = 114.2 psf
LL = 100 psf

span = 11.83 - .33 = 11.5' ∴ allow superimposed = 203 psf > 114.2
(c to c 4" angle legs) (pg 10)

OK ✓

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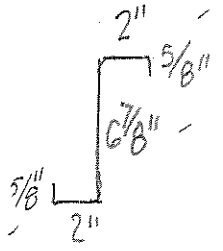
Roofs:

JOISTS:

JOIST:

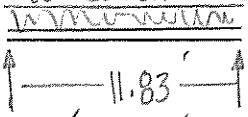


x 14ga (50ksi) 24" oc

design "t" = .0713"
(min = .0677")

case 1: top:

W = (20+21)2 = 82 plf

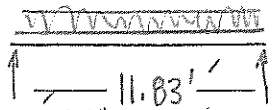


R = 485#
M = 1435'#

{ see attached pgs 65-66 - shows ok }

case 2: wind uplift:

$W_{\uparrow} = .6[37.65 - 11.6](2) = 31.3$ plf ↑
(pgs) w/o solar & frame



R = 185#
M = 548'#

{ see attached, pgs 65 & 67 - shows ok }

case 3: dbl joist @ HVAC:

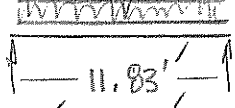
dbl joist ea end & center

HVAC + comb = 490 + 110 = 600#

per joist:

½ unit: 300#/2 = 150#

W = 82/2 = 41 plf



R = 318#
M = 1161'#

{ N/crit - see case 1 }

Project Name: 21010 BCDC typ Rf Joist
Model: Blythe typ joist
Code: AISI S100-16

Date: 02/09/2022
Simpson Strong-Tie® CFS Designer™ 3.4.6.0

Section Designation : 688Z200_62-68(50 ksi) Single Lipped Z

INPUT PROPERTIES :

Web Height =	6.8750 in	Steel Thickness =	0.0713 in
Top Flange =	2.0000 in	Inside Corner Radius =	0.1070 in
Bottom Flange =	2.0000 in	Yield Stress, Fy =	50.0000 ksi
Stiffening Lip =	0.6250 in	Fy With Cold-Work, Fya =	50.0000 ksi
Lip Angle =	90.00 degrees		

OUTPUT PROPERTIES :

Effective Section Properties, Strong Axis

Neutral Axis from Top Fiber (Ycg)	3.4676 in
Moment of Inertia for Deflection (Ixx)	5.6493 in^4
Section Modulus (Sxx)	1.6088 in^3
Allowable Bending Moment (Ma)	4013.87 Ft-Lb
Allowable Distortional Buckling Moment (Mda) at Kϕ = 0	3591.97 Ft-Lb

Gross Section Properties of Full Section, Strong Axis

Neutral Axis from Top Fiber (Ycg)	3.4375 in
Moment of Inertia (Ixxg)	5.6493 in^4
Section modules (Sxxg)	1.6434 in^3
Cross Sectional Area (Ag)	0.8267 in^2
Radius of Gyration (Rxg)	2.6141 in

Section Properties, Weak Axis

Gross Neutral Axis (Xcg) From Web Face	0.0357 in
Gross Moment of Inertia (Iyy)	0.6203 in^4
Radius of Gyration (Ry)	0.8662 in

Other Section Property Data

Member Weight per Foot of Length	2.8131 lb/ft
Allowable Shear Force In Web (Unpunched)	4949.25 lb
Pao for use in Interaction Equation C5-2	15368 lb

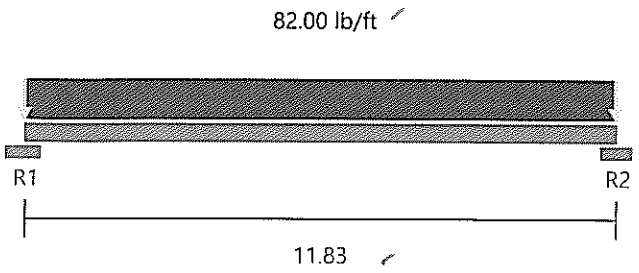
Principal Axis Properties

Product of Inertia, Ixy	1.3482 in^4
Angle X-axis to Minor Axis	75.9 degrees
Ix2 (Minor Axis)	0.2817 in^4
Iy2 (Major Axis)	5.9879 in^4
Min. Radius of Gyration, Rmin	0.5837 in
Max. Radius of Gyration, Rmax	2.6913 in

Location (1) and (6) are tip of compression and tension lip respectively
Location (2) and (5) are flange/lip corner of compression and tension side respectively
Location (3) and (4) are flange/web corner of compression and tension side respectively

Project Name: 21010 BCDC typ Rf Joist
Model: Blythe typ joist
Code: AISI S100-16

Date: 02/09/2022
Simpson Strong-Tie® CFS Designer™ 3.4.6.0



Section : 688Z200_62-68(50 ksi) Single Lipped Z
Maxo = 4013.9 Ft-Lb **Va =** 4949.2 lb **I =** 5.65 in^4

Loads have not been modified for strength checks
Loads have not been modified for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Ratio
Span	1435.2	0.358	1435.2	Full	4013.9	0.358	0.217	L/654

suppt by plywd

Distortional Buckling Check

Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	142.0	3592.0	0.400

Combined Bending and Web Crippling

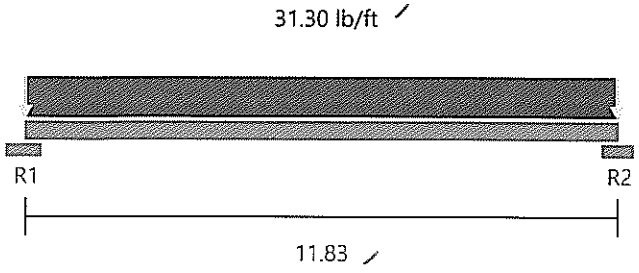
Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R2	485.2	1.00	899.6	1574.3	0.0	0.28	NO
R1	485.2	1.00	899.6	1574.3	0.0	0.28	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	V + M Intr.
R1	485.2	0.0	1.00	0.10	0.00	0.10
R2	485.2	0.0	1.00	0.10	0.00	0.10

Project Name: 21010 BCDC Uplift at Rf Joist
Model: Blythe joist uplift
Code: AISI S100-16

Date: 02/09/2022
Simpson Strong-Tie® CFS Designer™ 3.4.6.0



Section : 688Z200_62-68(50 ksi) Single Lipped Z
Maxo = 4013.9 Ft-Lb **Va =** 4949.2 lb **I =** 5.65 in^4

Loads have not been modified for strength checks
Loads have not been modified for deflection calculations

bottom flange unbraced

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Ratio
Span	547.8	0.136	547.8	None	873.0	0.628	0.083	L/1714

Distortional Buckling Check

Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	142.0	3592.0	0.153

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R2	185.2	1.00	899.6	1574.3	0.0	0.11	NO
R1	185.2	1.00	899.6	1574.3	0.0	0.11	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	V + M Intr.
R1	185.2	0.0	1.00	0.04	0.00	0.04
R2	185.2	0.0	1.00	0.04	0.00	0.04

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JOB 21010 BCDC
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Walls:

(pg 5) $l_{max} = 13.083'$

$P_{(5)} = 24.1\ psf\ (ULT) \times 16/12 = 32.1\ plf\ (ULT)$ (program factors to asd)

$.42\Delta = l/360$

$P = 1.33[41(5.92 + 18(19\tfrac{1}{2})] = 792\#$

32.1 plf — 13.083'

2x6 @ 16" oc Hem Fir No.2

(See following pages - shows ok)

$.42\Delta = .7(.4747) = .3323"$
$= l/472$ ok

Openings: 9' max:

Sill: $w = \frac{16}{2}(24.1)(.6)^{asd} = 72\tfrac{1}{2}\ plf$ → $.7 \times asd\ \Delta = .139"$
$= l/780$ ok

$M = 8810\ "\#$ $f_b = 582$ ok $< 1.6(850)(1.3)$

2-2x6 hem fir #2 $E = 1{,}300{,}000$
$I = 41.6\ in^4$
$S = 15.12\ in^3$

$R = 326\#$ → 4 - .131 x 3" end nails
$4(84)\ 2/3\ (1.6) = 4(89.6) = 358\#$ ok

header:

$w = 13.1/2\ (24.1)^{asd}(.6) = 94.7\ plf$ → $.7\Delta = .072"$, $l/1400$ ok

6x8 DFL Hem Fir $I_y = 164$, $S_y = 37.81$

$M = 11{,}507\ "\#$ $\therefore f_b = 304\ psi$ ok

$R = 426\#$ → 5 - .131 x 3" end nails $89.6(5) = 448\#$ ok

Anderson & Doig SE
9851 Horn Road, Ste 280
Sacramento, Calif.

Project Title: CDC, Palo Verde College, Blythe, CA
Engineer: BDoig
Project ID: 21010 BCDC
Project Descr: Child Development Center

Printed: 9 FEB 2022, 2:38PM

Wood Column

Project File: 21010 BCDC.ec6

DESCRIPTION: typical wall

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	13.083 ft		
(Used for non-slender calculations)			
Wood Species	Hem-Fir		
Wood Grade	No.2		
Fb +	850.0 psi	Fv	150.0 psi
Fb -	850.0 psi	Ft	525.0 psi
Fc - Prll	1,300.0 psi	Density	26.840 pcf
Fc - Perp	405.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	2x6		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	1.50 in	Allow Stress Modification Factors	
Exact Depth	5.50 in	Cf or Cv for Bending	1.30
Area	8.250 in^2	Cf or Cv for Compressio	1.10
Ix	20.797 in^4	Cf or Cv for Tension	1.30
Iy	1.547 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 NDS 15.2.2
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling ABOUT Y-Y Axis
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 13

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 20.118 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 13.083 ft, D = 0.6340, Lr = 0.1580 k
BENDING LOADS . . .
Lat. Uniform Load creating Mx-x, W = 0.03210 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4749 : 1**

Load Combination	+D+0.60W
Governing NDS Formula	Comp + Mxx, NDS Eq. 3.9-3
Location of max.above base	6.498 ft
At maximum location values are .	
Applied Axial	0.6541 k
Applied Mx	0.4121 k-ft
Applied My	0.0 k-ft
Fc : Allowable	451.907 psi

PASS Maximum Shear Stress Ratio = **0.09545 : 1**

Load Combination	+D+0.60W
Location of max.above base	13.083 ft
Applied Design Shear	22.907 psi
Allowable Shear	240.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.1260 k	Bottom along Y-Y	0.1260 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.4747 in at 6.585 ft above base
for load combination : +D+0.60W
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+Lr	1.250	0.249	0.2214	PASS	0.0 ft	0.0	PASS	13.083 ft
+D+0.60W	1.600	0.198	0.4749	PASS	6.498 ft	0.09545	PASS	13.083 ft
+D+0.750Lr+0.450W	1.600	0.198	0.3886	PASS	6.498 ft	0.07159	PASS	0.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
+D+0.60W			0.126	0.126	0.654				
+D+0.750Lr+0.450W			0.094	0.094	0.773				

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Project Title: CDC, Palo Verde College, Blythe, CA
Engineer: BDoig
Project ID: 21010 BCDC
Project Descr: Child Development Center

Printed: 9 FEB 2022, 2:38PM

Wood Column

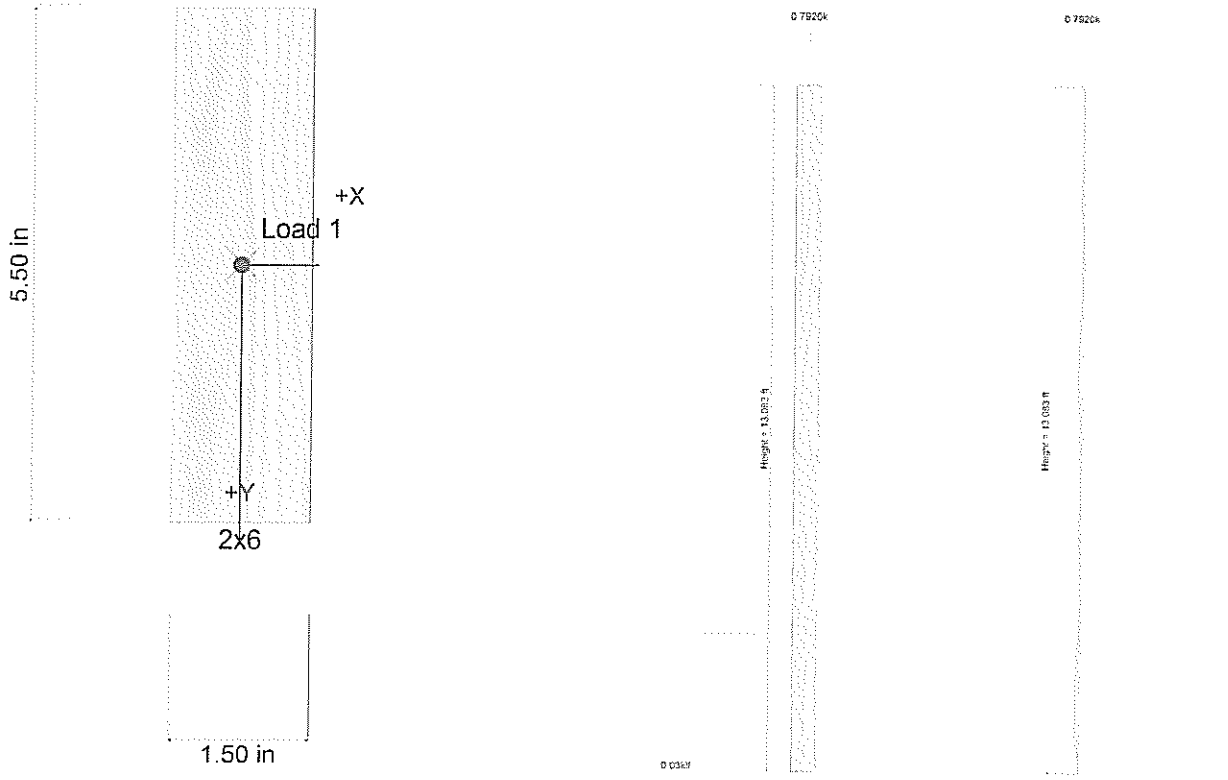
Project File: 21010 BCDC.ec6

DESCRIPTION: typical wall

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+0.60W	0.0000 in	0.000 ft	0.475 in	6.585 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	0.356 in	6.585 ft

Sketches



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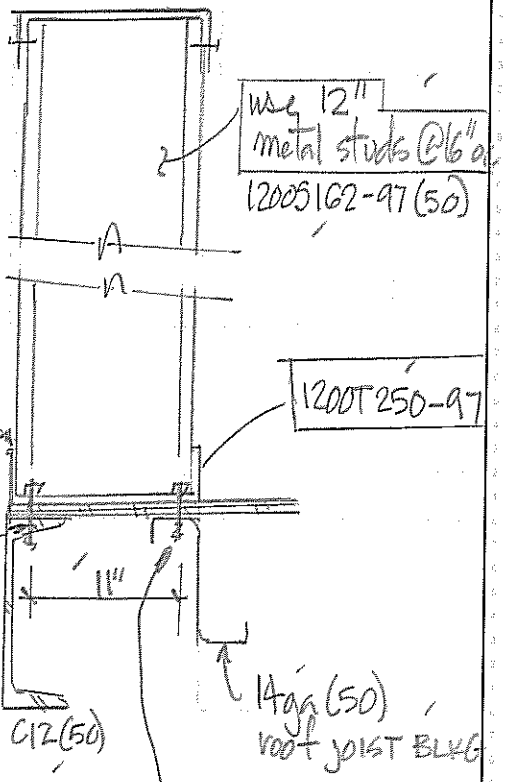
Parapets: 5'-6" max:

$w = .6(1.33)(84.1)$ psf
$= 67.26$ plf

5.5'

$M = 12{,}208$ "# @ 11" oc T/C = 1118#



allow $= \frac{.1}{\sqrt{2}}(60).3(1\tfrac{1}{2})$
$= 1.91^{k} > 1.11$ OK

Tallow $= 2(693) = 1378^{\#} > 1110$ OK

Tallow $= 6(193) = 1158^{\#} > 1110$ OK

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JOB 21010 BCDC
SHEET NO. T2 OF
CALCULATED BY BDoig DATE Feb 2022
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HVAC Anchorage:

ht = 49" + 14" curb = 63" x 48" x 44"

wind: (pg 6)
$p_h = 34.4$ psf (ULT) ∴ $(63/12)(48/12)34.4 = 722^{\#}$ ULT
$p_v = 27.15$ (ULT) ∴ $(48/12)(44/12)27.15 = 398^{\#}$ ULT

Seismic:

$$F_p = \frac{.4(2\frac{1}{2})(.4\frac{g}{g}+2)(1+2)}{6} W_p = .221\, W_p \quad \therefore F_p = 133^{\#} \text{ N/Grit}$$

I = 1.0
$W_p = 490 + 110_{curb} = 600^{\#}$
$a_p = 2\frac{1}{2}$
$R_p = 6$

4 - #12 SMS @ 12" oc @ 4 sides to 14g (50) framing

V = 722/16 = 45# each ULT
x.6 = 27# ASD
Vall 25g to 14g = 157# OK

$$T = \frac{722\left(\frac{63}{2}\right) + 398(22) - 600(22)}{44"\,(4)_{ea}} = 103^{\#}/\text{ea (ULT)}$$

x.6 = 62.4# ASD

Tallow = 193#
14ga (50)
(pullover 25ga min = 166# > 62.4 OK)

$$\frac{27}{157} + \frac{62.4}{193} = 0.50 \quad \text{OK}$$

Unit Report For 5 Ton

Project: Fire Training Facility
Prepared By: Richard Medina

11/10/2021
10:30AM

Unit Parameters

Unit Model: **50VT-C60---5**
Unit Size: **60 (5 Tons)**
Volts-Phase-Hertz: **208-3-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **4' 0.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Total Operating Weight: **487** lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

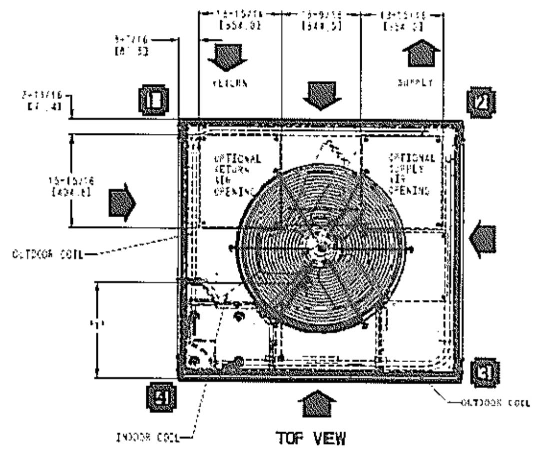
No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50VT-C60---5	Rooftop Unit	1
	Base Unit	

Certified Drawing for 5 Ton



TOP VIEW

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT LB	UNIT WT KG	UNIT HEIGHT IN/MM "A"		CENTER OF GRAVITY IN/MM X		Y		Z	
50VT-C36---(3/5/6)10	208/230-1-60 208/230-3-60 460-3-60	387	175.5	45-3/4	1238	20-1/2	521	17-1/2	445	17-3/8	441
50VT-C42---(3/5/6)10	208/230-1-60 208/230-3-60 460-3-60	435	197.3	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	440
50VT-C48---(3/5/6)10	208/230-1-60 208/230-3-60 460-3-60	456	207.0	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
50VT-C60---(3/5/6)10	208/230-1-60 208/230-3-60 460-3-60	487	221.0	47-3/4	1238	20-1/2	521	17-1/2	445	18	457

UNIT	VOLTAGE	CORNER WEIGHTS LB/KG "A"		"B"		"C"		"D"	
36	208/230/460	58.1	26.4	47.8	45.3	114	52.1	165.3	75.4
42	208/230/460	65.3	29.6	87.0	39.5	130	59.7	157.4	69.7
48	208/230/460	55.4	31.0	31.7	41.4	135.6	62.1	155.6	72.4
60	208/230/460	73.1	33.1	97.4	44.2	146	66.3	170.3	77.4

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

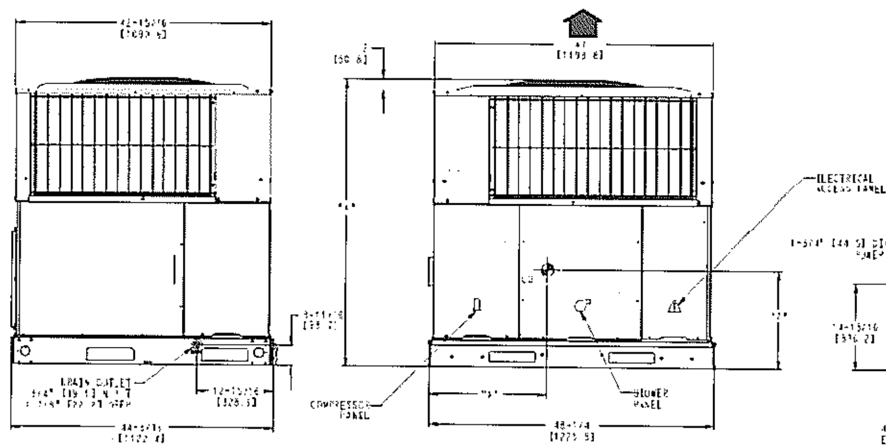
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.4]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.4]
POWER ENTRY SIDE (EXCEPT FOR NEC REQUIREMENTS)	42 [1066.8]
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.4]
DUCT PANEL	12 [304.8]*

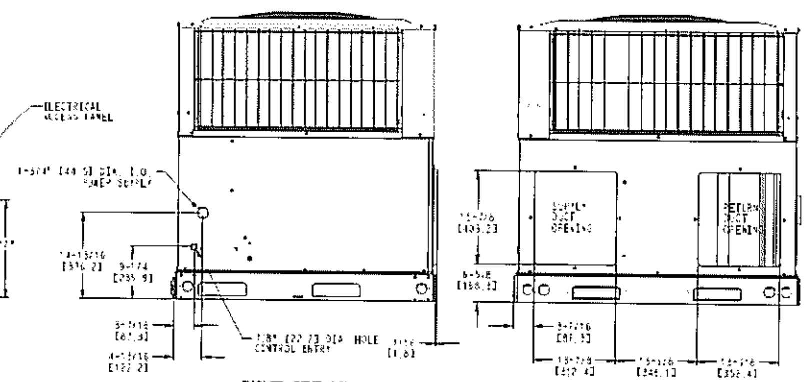
*MINIMUM DISTANCES IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAY BE COMPROMISED

DIMENSIONS IN [ ] ARE IN MM



LEFT SIDE VIEW

FRONT VIEW



RIGHT SIDE VIEW

REAR VIEW

50VT500411

2106 BCDC / Pg 74

Structural Calculations

TRASH ENCLOSURE
141 S 2ND STREET BLYTHE, CA 92225

Project No.: 21070
June 21, 2022

June 21, 2022
Project: Child Development Center (Trash Enclosure)
Location: 141 S. 2nd Street Blythe, CA
Client: N/A

TABLE OF CONTENTS

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:08:52.469Z

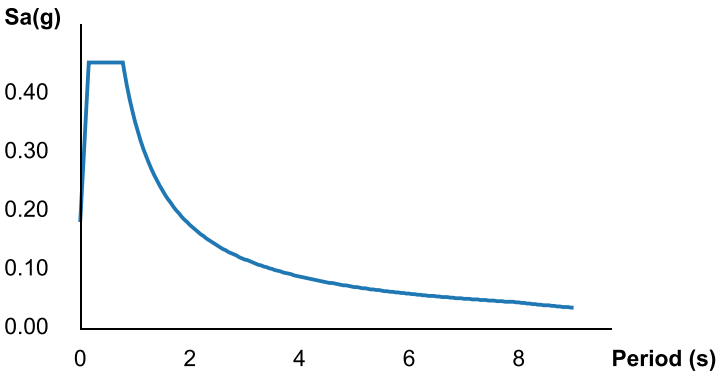
Hazard Type: Seismic

Reference Document: ASCE7-16

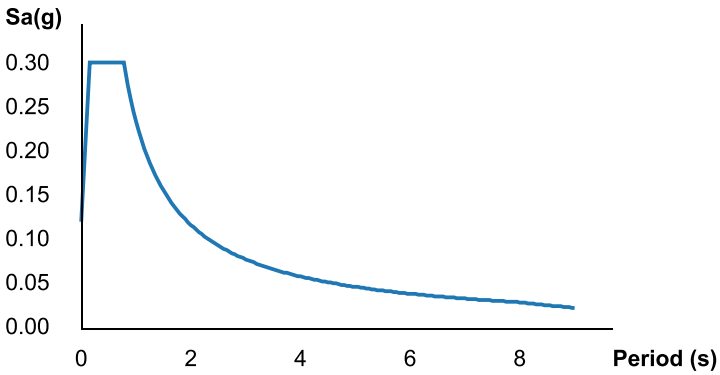
Risk Category: II

Site Class: D-default

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.288	MCE_R ground motion (period=0.2s)
S_1	0.154	MCE_R ground motion (period=1.0s)
S_{MS}	0.453	Site-modified spectral acceleration value
S_{M1}	0.352	Site-modified spectral acceleration value
S_{DS}	0.302	Numeric seismic design value at 0.2s SA
S_{D1}	0.235	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1.569	Site amplification factor at 0.2s
F_v	2.293	Site amplification factor at 1.0s

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:10:36.013Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	69 mph
MRI 25-Year	75 mph
MRI 50-Year	80 mph
MRI 100-Year	85 mph
Risk Category I	93 mph
Risk Category II	99 mph
Risk Category III	105 mph
Risk Category IV	109 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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CORE	Company	: CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	: Trash Enclosure	Checked	: K.V.
	Job No.	: 21070	Date	: 06/21/2022
	Plan	:	Client	: N/A

BUILDING INFORMATION

A. General:

Number of stories	1
Building risk category	II
Design Code	2019 CBC
Load standard	ASCE 7-16
Design Load Combination	ASD

B. Lateral Loads Data:

WIND STANDARD	ASCE 7-16(Directional Procedure)		
Exposure	C		
Wind Speed V	99		
Enclosure	Enclosed Building		
Velocity pressure q_z	$0.00256K_zK_{zt}K_dK_eV^2$		(26.10-1)
Velocity pressure exposure coefficient K_z	from		(Table 26.10-1)
Directionality Factor K_d	0.85		(Table 26.6-1)
Topographic factor defined K_{zt}	1		(26.8.2)
Gust Effect Factor G	0.85		(26.11)
Pressures for MWFRS p	$qGC_p - q_i(GC_{pi})$		(27.3-1)
External pressure coefficient Cp	from		(Fig. 27.3-1)
Internal pressure coefficient (GC_{pi})	0.18		(Table 26.13-1)}
SEISMIC STANDARD	ASCE 7-16(Equivalent Lateral Force Procedure)		
Seismic Design Category	D		(Table 11.6-1)
Importance factor I_e	1		(Table 1.5-2)
Soil Site Class	D-Default		(Table 20-3-1)
Response Spectral Acc. (0.2 sec) S_s	0.288		
Response Spectral Acc. (1.0 sec) S_1	0.154		
T_L (sec)	8		
Fa	1.569		(Table 11.4-1)
Fv	2.293		(Table 11.4-2)
Max. Considered earthquake acc. S_{MS}	0.451872		(11.4-1)
Max. Considered earthquake acc. S_{M1}	0.353122		(11.4-2)
Design spectral acc. At short period S_{DS}	0.301		(11.4-3)
Design spectral acc. at 1s period S_{D1}	0.235		(11.4-4)
Response modification coefficient R	6.5		(Table 12.2-1)
System overstrength coefficient Ω	2.5		(Table 12.2-1)
Approximate fundamental period parameters	Ct = 0.02	x = 0.75	(Table 12.8-2)
Building Height (ft)	10		
Building period $T=T_a$ (sec)	0.11		(12.8-7)
Base Shear Adjustment Factor	1		
Minimum Cs	0.01		(12.8.5 & 12.8-6)
Maximum Cs	0.32		(12.8-3 & 12.8-4)
Seismic response coefficient Cs	0.05		(12.8-2)
Adjusted Cs	0.05		
For allowable stress design V = 0.7CsW	0.0324W		

CORE	Company	: CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	: Trash Enclosure	Checked	: K.V.
	Job No.	: 21070	Date	: 06/21/2022
	Plan	:	Client	: N/A

DESIGN LOADS

Roof Loads (Load_Roof)

Framing	6.5	psf
Sheathing (1/2" CDX)	2.5	psf
Ceiling	2.5	psf
Insulation	1.5	psf
Misc.	2	psf
Total Dead Load	**15**	**psf**
Live Load	**20**	**psf**
Total Load	**35**	**psf**

Interior Wall (Wall_In)

Insulation	1	psf
Drywall	5	psf
Studs	1	psf
Misc.	3	psf
Total Dead Load	**10**	**psf**

Exterior Wall (Wall_Ex)

7/8" Stucco	10	psf
Insulation	1	psf
Drywall	2.5	psf
Studs	1	psf
Misc.	2.5	psf
Total Dead Load	**17**	**psf**

CORE	Company	:	CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	:	Trash Enclosure	Checked	: K.V.
	Job No.	:	21070	Date	: 06/21/2022
	Plan	:		Client	: N/A

LOAD COMBINATIONS

(Load Standard: ASCE 7-16)

id	Load case	Dead	Sds*Dead	Live	Roof Live	Snow	Wind	Seismic	Direction	Load Duration Factor CD
1	D	1								0.9
2	D + L	1		1						1
3	D + Lr	1			1					1.25
4	D + S	1				1				1.15
5	D + 0.75L + 0.75Lr	1		0.75	0.75					1.25
6	D + 0.75L + 0.75S	1		0.75		0.75				1.15
7	D + 0.6W (N)	1					0.6		N_S	1.6
8	D + 0.6W (S)	1					0.6		S_N	1.6
9	D + 0.6W (E)	1					0.6		E_W	1.6
10	D + 0.6W (W)	1					0.6		W_E	1.6
11	D + 0.75(0.6W) (N) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		N_S	1.6
12	D + 0.75(0.6W) (S) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		S_N	1.6
13	D + 0.75(0.6W) (E) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		E_W	1.6
14	D + 0.75(0.6W) (W) + 0.75L + 0.75Lr	1		0.75	0.75		0.45		W_E	1.6
15	D + 0.75(0.6W) (N) + 0.75L + 0.75S	1		0.75		0.75	0.45		N_S	1.6
16	D + 0.75(0.6W) (S) + 0.75L + 0.75S	1		0.75		0.75	0.45		S_N	1.6
17	D + 0.75(0.6W) (E) + 0.75L + 0.75S	1		0.75		0.75	0.45		E_W	1.6
18	D + 0.75(0.6W) (W) + 0.75L + 0.75S	1		0.75		0.75	0.45		W_E	1.6
19	0.6D + 0.6W (N)	0.6					0.6		N_S	1.6
20	0.6D + 0.6W (S)	0.6					0.6		S_N	1.6
21	0.6D + 0.6W (E)	0.6					0.6		E_W	1.6
22	0.6D + 0.6W (W)	0.6					0.6		W_E	1.6
23	(1.0 + 0.14Sds)D + 0.7ΩE (N)	1	0.14					0.7	N_S	1.6
24	(1.0 + 0.14Sds)D + 0.7ΩE (S)	1	0.14					0.7	S_N	1.6
25	(1.0 + 0.14Sds)D + 0.7ΩE (E)	1	0.14					0.7	E_W	1.6
26	(1.0 + 0.14Sds)D + 0.7ΩE (W)	1	0.14					0.7	W_E	1.6
27	(1.0 + 0.105Sds)D + 0.525ΩE (N) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	N_S	1.6
28	(1.0 + 0.105Sds)D + 0.525ΩE (S) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	S_N	1.6
29	(1.0 + 0.105Sds)D + 0.525ΩE (E) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	E_W	1.6
30	(1.0 + 0.105Sds)D + 0.525ΩE (W) + 0.75L + 0.75S	1	0.105	0.75		0.75		0.525	W_E	1.6
31	(0.6 - 0.14Sds)D + 0.7ΩE (N)	0.6	-0.14					0.7	N_S	1.6
32	(0.6 - 0.14Sds)D + 0.7ΩE (S)	0.6	-0.14					0.7	S_N	1.6
33	(0.6 - 0.14Sds)D + 0.7ΩE (E)	0.6	-0.14					0.7	E_W	1.6
34	(0.6 - 0.14Sds)D + 0.7ΩE (W)	0.6	-0.14					0.7	W_E	1.6

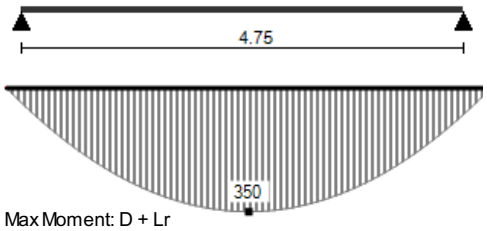
CORE	Company	: CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	: Trash Enclosure	Checked	: K.V.
	Job No.	: 21070	Date	: 06/21/2022
	Plan	:	Client	: N/A

Beam ID: 1 **Fl Bm Over the Trash** **Passed**

Section type: **HSS-Sq, Fy = 50 ksi**
Section name: **HSS6X6X1/4**
E (ksi): 29000
Width (in): 6
Depth (in): 6

Applied Loads:

Load_Roof 105PLF =6 x (15+20)/2 @ 0' to 4.75'
SELF WEIGHT 19PLF From 0' to 4.75'



Max Moment: D + Lr

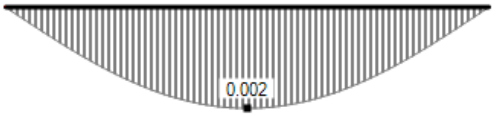
Reactions:

Support	D	L	Lr	S	W_{SN}	W_{WE}	E_{SN}	E_{WE}	Max. LC (Down/Up)
1	152	0	143	0	0	0	0	0	295/0
2	152	0	143	0	0	0	0	0	295/0

Max Shear: D + Lr

Code check:

	Actual	Loc.(ft)	Allowed	Ratio (%)
Moment (lbs-ft)	350	2.38	27944	1
Shear (lbs)	295	0	44471	1
Live Deflection	0.001	2.38	0.158	1
Total Deflection	0.002	2.38	0.238	1



Max Deflection: D + Lr

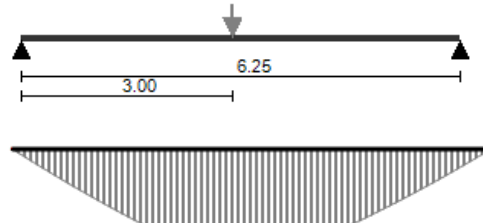
Beam ID: 2 **Fl Bm Over the Trash** **Passed**

Section type: **HSS-Sq, Fy = 50 ksi**
Section name: **HSS6X6X1/4**
E (ksi): 29000
Width (in): 6
Depth (in): 6

Applied Loads:

Load_Roof 35PLF =2 x (15+20)/2 @ 0' to 6.25'
POINT 1 of Beam 1 @ 3ft, (D=152 Lr=143)
POINT 2 of Beam 1 @ 3ft, (D=152 Lr=143)
SELF WEIGHT 19PLF From 0' to 6.25'

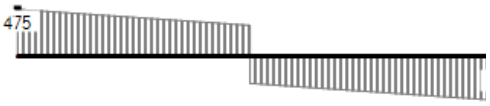
Point Load Location



Max Moment: D + Lr

Reactions:

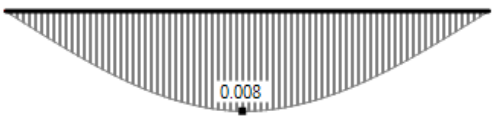
Support	D	L	Lr	S	W_{SN}	W_{WE}	E_{SN}	E_{WE}	Max. LC (Down/Up)
1	264	0	211	0	0	0	0	0	475/0
2	252	0	199	0	0	0	0	0	451/0



Max Shear: D + Lr

Code check:

	Actual	Loc.(ft)	Allowed	Ratio (%)
Moment (lbs-ft)	1182	3	27944	4
Shear (lbs)	475	0	44471	1
Live Deflection	0.004	3.06	0.208	2
Total Deflection	0.008	3.06	0.312	3



Max Deflection: D + Lr

CORE	Company	: CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	: Trash Enclosure	Checked	: K.V.
	Job No.	: 21070	Date	: 06/21/2022
	Plan	:	Client	: N/A

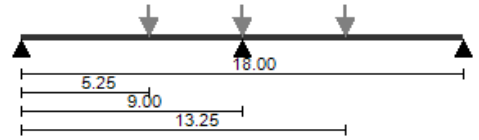
Beam ID: 3 **Fl Bm Over the Trash** **Passed**

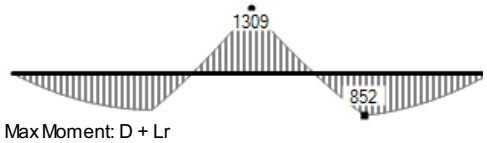
Section type: **HSS-Sq, Fy = 50 ksi**
Section name: **HSS6X6X1/4**
E (ksi): 29000
Width (in): 6
Depth (in): 6

Applied Loads:

Load_Roof 52.5PLF =3 x (15+20)/2 @ 0' to 18'
POINT 2 of Beam 2 @ 5.25ft, (D=252 Lr=199)
POINT 2 of Beam 2 @ 9ft, (D=252 Lr=199)
POINT 2 of Beam 2 @ 13.25ft, (D=252 Lr=199)

Point Load Location

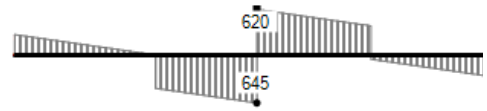




Max Moment: D + Lr

Reactions:

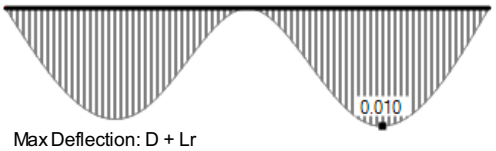
Support	D	L	Lr	S	W_{SN}	W_{WE}	E_{SN}	E_{WE}	Max. LC (Down/Up)
1	133	0	146	0	0	0	0	0	279/0
2	882	0	835	0	0	0	0	0	1717/0
3	147	0	157	0	0	0	0	0	304/0



Max Shear: D + Lr

Code check:

	Actual	Loc.(ft)	Allowed	Ratio (%)
Moment (lbs-ft)	1309	9	27944	5
Shear (lbs)	645	9	44471	1
Live Deflection	0.005	14.04	0.3	2
Total Deflection	0.010	14.04	0.45	2



Max Deflection: D + Lr

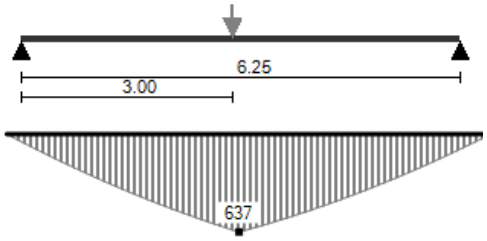
Beam ID: 4 **Fl Bm Over the Trash** **Passed**

Section type: **HSS-Sq, Fy = 50 ksi**
Section name: **HSS6X6X1/4**
E (ksi): 29000
Width (in): 6
Depth (in): 6

Applied Loads:

Load_Roof 17.5PLF =1 x (15+20)/2 @ 0' to 6.25'
POINT 1 of Beam 1 @ 3ft, (D=152 Lr=143)
SELF WEIGHT 19PLF From 0' to 6.25'

Point Load Location



Max Moment: D + Lr

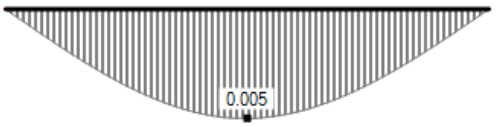
Reactions:

Support	D	L	Lr	S	W_{SN}	W_{WE}	E_{SN}	E_{WE}	Max. LC (Down/Up)
1	162	0	105	0	0	0	0	0	267/0
2	156	0	100	0	0	0	0	0	255/0

Max Shear: D + Lr

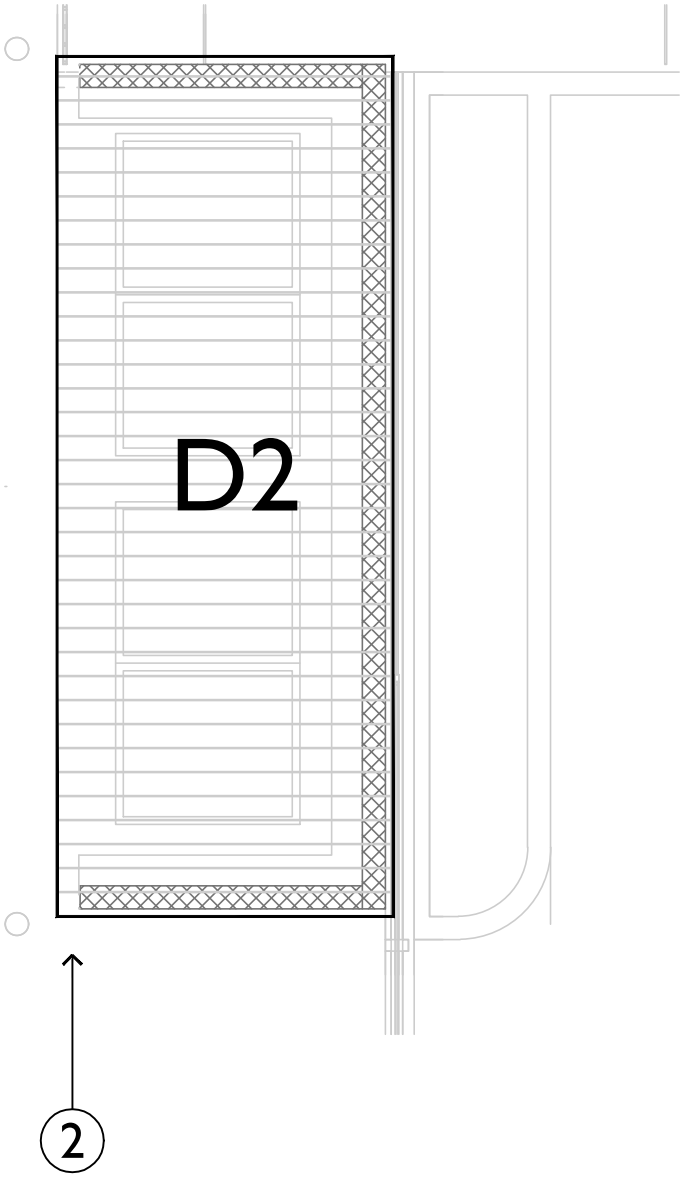
Code check:

	Actual	Loc.(ft)	Allowed	Ratio (%)
Moment (lbs-ft)	637	3	27944	2
Shear (lbs)	267	0	44471	1
Live Deflection	0.002	3.06	0.208	1
Total Deflection	0.005	3.12	0.312	2



Max Deflection: D + Lr

SHEET:	SW LAYOUT
JOB NO.:	21070
DATE:	06/21/2022
CLIENT:	PALO VERDE COLLEGE



ROOF SHEAR WALL LAYOUT

CORE	Company	:	CORE STRUCTURE, INC.	Designed	:	T.D.H.
	Project	:	Trash Enclosure	Checked	:	K.V.
	Job No.	:	21070	Date	:	06/21/2022
	Plan	:		Client	:	N/A

SECTION D2 – DIRECTION X

Building Dimension (ft): B = 18.25 L = 7 Mean Height = 10 Base Height = 0.5
Section Dimension (ft): Width = 18.25 Depth = 7 Wind Height = 10 Base Height = 0.5
Plate Height: ROOF = 10'

WIND LOAD:

L/B =7/18.25=0.38, Windward Wall Cpw = 0.8, Leeward Wall Cpl = -0.5, q_h = 17.17 PSF Wall(LW) P = $GC_{pl}q_h$ = 7.3 PLF

WIND HEIGHT (FT):	15	20	25	30	40	50
$q_z=0.00256K_zK_{zt}K_dV^2$	18.13	19.19	20.05	20.9	22.18	23.25
Wall(WW) P = $GC_{pw}q_z$	12.33	13.05	13.63	14.21	15.08	15.81
Wall P = $GC_{pw}q_z+GC_{pl}q_h$	19.62	20.35	20.93	21.51	22.38	23.1

ROOF ELEMENT	WDir+	WDir-	OWDir+	OWDir-
Parapet W=18.25' WW	0	0	0	0
Parapet W=18.25' LW	0	0	0	0

D2X_ROOF = 56.91 = 0.6 x 94.85 PLF
MAX TOTAL = 56.91 PLF

SEISMIC LOAD: V = 0.0324W

W_ROOF:

Load_Roof (DL)	= 15 x 137 / 18.25	= 112.60
Wall_Ex (DL)	= 17 x 36.5 x (10/2) / 18.25	= 170.00
Cs*W	= 0.0324 x (112.60 + 170.00)	= 9.16
TOTAL SEISMIC LOAD	9.16	= 9.16 PLF

Story	W_x (PLF)	H_x (ft)	W_xh_x /sum(W_ih_i)	F_x (PLF)	Sum(F_i)	Sum(W_i)	F_{px}(PLF)	F_{px} Min	F_{px} Max	F_{px} Design
D2X_ROOF	282.6	10	1	9.16	9.16	282.6	9.16	12.16	24.32	12.16

DIAPHRAGM DESIGN:

Story	Width (ft)	Depth (ft)	Seismic		Wind		Diaphragm	Chord
			Shear (plf)	Chord (lb)	Shear (plf)	Chord (lb)		
D2X_ROOF	18.25	7	15.9	72.3	74.2	338.5	15/32 Sheathing and Single-Floor Unblocked w/8d COMMON NAILS at 6", 6", 12" O.C. (Shear Capacity: E=240/W=335)	(10) 16d sinker per top plate splice

SECTION D2 – DIRECTION Y

Building Dimension (ft): B = 7 L = 18.25 Mean Height = 10 Base Height = 0.5
Section Dimension (ft): Width = 7 Depth = 18.25 Wind Height = 10 Base Height = 0.5
Plate Height: ROOF = 10'

WIND LOAD:

L/B =18.25/7=2.61, Windward Wall Cpw = 0.8, Leeward Wall Cpl = -0.27, q_h = 17.17 PSF Wall(LW) P = $GC_{pl}q_h$ = 3.93 PLF

WIND HEIGHT (FT):	15	20	25	30	40	50
$q_z=0.00256K_zK_{zt}K_dV^2$	18.13	19.19	20.05	20.9	22.18	23.25
Wall(WW) P = $GC_{pw}q_z$	12.33	13.05	13.63	14.21	15.08	15.81
Wall P = $GC_{pw}q_z+GC_{pl}q_h$	16.26	16.99	17.57	18.15	19.02	19.74

ROOF ELEMENT	WDir+	WDir-	OWDir+	OWDir-
Parapet W=7' LW	0	0	0	0
Parapet W=7' WW	0	0	0	0

D2Y_ROOF = 46.83 = 0.6 x 78.05 PLF
MAX TOTAL = 46.83 PLF

SEISMIC LOAD: V = 0.0324W

W_ROOF:

Load_Roof (DL)	= 15 x 137 / 7	= 293.57
Wall_Ex (DL)	= 17 x 14 x (10/2) / 7	= 170.00
Cs*W	= 0.0324 x (293.57 + 170.00)	= 15.02
TOTAL SEISMIC LOAD	= 15.02	= 15.02 PLF

Story	W_x (PLF)	H_x (ft)	W_xh_x /sum(W_ih_i)	F_x (PLF)	Sum(F_i)	Sum(W_i)	F_{px}(PLF)	F_{px} Min	F_{px} Max	F_{px} Design
D2Y_ROOF	463.57	10	1	15.02	15.02	463.57	15.02	19.95	39.9	19.95

DIAPHRAGM DESIGN:

Story	Width (ft)	Depth (ft)	Seismic		Wind		Diaphragm	Chord
			Shear (plf)	Chord (lb)	Shear (plf)	Chord (lb)		
D2Y_ROOF	7	18.25	3.8	6.7	9	15.7	15/32 Sheathing and Single-Floor Unblocked w/8d COMMON NAILS at 6", 6", 12" O.C. (Shear Capacity: E=180/W=252)	(10) 16d sinker per top plate splice

CORE	Company	: CORE STRUCTURE, INC.	Designed	: T.D.H.
	Project	: Trash Enclosure	Checked	: K.V.
	Job No.	: 21070	Date	: 06/21/2022
	Plan	:	Client	: N/A

SHEARWALL AND HARDWARE SCHEDULES

(Design Code: 2019 CBC)

A. SHEARWALL SCHEDULE

Panel Type	Sheathing	Edge Nail	Field Nail	Seismic Allowable(plf)	Wind Allowable(plf)	Sole Plate Nailing	Shear Clip	Mudsill Anchors		Ga (k/in)
								2x Mudsill	3x Mudsill	
SW1	3/8" Sheathing	8d @ 6	8d @ 12	260	364	16d Nails @ 6	A35 @ 24	5/8 x 10 @ 48	-	13
SW2	3/8" Sheathing	8d @ 4	8d @ 12	380	532	16d Nails @ 4	A35 @ 16	5/8 x 10 @ 42	-	19
SW3	3/8" Sheathing	8d @ 3	8d @ 12	490	686	16d Nails @ 3	A35 @ 8	5/8 x 10 @ 36	-	25
SW4	3/8" Sheathing	8d @ 2	8d @ 12	640	896	16d Nails @ 2	A35 @ 8	5/8 x 10 @ 24	-	39
SW5	15/32" Structural I	10d @ 2	10d @ 12	870	1218	(2) Rows Stagg, 16d Nails @ 3	A35 @ 6	5/8 x 10 @ 18	-	51
SW3D	3/8" Sheathing	8d @ 3	8d @ 12	980	1372	SDS1/4x6 @ 4	(Both Sides)A35 @ 8	-	5/8 x 12 @ 22	50
SW4D	3/8" Sheathing	8d @ 2	8d @ 12	1280	1792	SDS1/4x6 @ 3	(Both Sides)A35 @ 8	-	5/8 x 12 @ 16	78
SW5D	15/32" Structural I	10d @ 2	10d @ 12	1740	2436	SDS1/4x6 @ 2	(Both Sides)A35 @ 6	-	5/8 x 12 @ 8	102

B. HOLDOWN SCHEDULE

Holdown	Min. Post	Connectors	Anchor Bolt	Allowable (lbs)	Displacement all da (in)	Remarks
STHD10@corner	4X4	28-16d	N/A	2940	0.146	HD1
STHD10	4X4	28-16d	N/A	3400	0.146	HD1
STHD14	4X4	38-16d	N/A	3815	0.164	HD2
HTT5	4X4	26-10d	5/8"	4350	0.12	HD3
HDU8	4X6	20-SDS1/4x2 1/2	7/8"	7870	0.113	HD4
HDU11	4X8	30-SDS1/4x2 1/2	1"	11175	0.137	HD5
HDU14	4X8	36-SDS1/4x2 1/2	1"	14375	0.177	HD6
HD19	6X8	5-THR. BOLTS 1"	1 1/4"	19360	0.18	HD7

C. HOLDOWN STRAP SCHEDULE

Strap	Min. Post	Connectors	Allowable (lbs)	Displacement all da (in)	Remarks
CS16	2X4	22-10d	1705	0.026	A
(2)CS16	2-2X4	22-10d	3410	0.026	B
(2)CS14	2-2X4	30-10d	4980	0.031	C
CMST14	4X4	80-16d	6490	0.052	D
(3)CS14	3-2X4	30-10d	7470	0.031	C*
CMST12	4X6	104-16d	9200	0.069	E
(2)CMST14	4X8	80-16d	12980	0.052	F
(2)CMST12	6X8	104-16d	18400	0.069	G

D. PLATE SPLICE STRAP SCHEDULE

Straps			Alt. Nails per top plate splice	Allowable Tension Loads	Remarks
Type	Ga	Fasteners			
Simpson ST22	16	18-16d	10-16d sinker	1420	A
Simpson ST6224	16	28-16d	16-16d sinker	2540	B
Simpson ST6236	14	40-16d	22-16d sinker	3845	C
Simpson MST37	12	42-16d	24-16d sinker	5080	D
Simpson MSTC52	16	62-16d	32-16d sinker	5649	E
Simpson MST60	10	68-16d	36-16d sinker	6730	F
Simpson CMST12x72"	12	74-16d	42-16d sinker	9215	G

CORE	Company	:	CORE STRUCTURE, INC.	Designed	:	T.D.H.
	Project	:	Trash Enclosure	Checked	:	K.V.
	Job No.	:	21070	Date	:	06/21/2022
	Plan	:		Client	:	N/A

OVERTURNING LOAD COMBINATIONS

(Design Code: 2019 CBC)

ULIFT	DOWN
1. 0.6D - 0.6W	1. D + 0.6W
2. (0.6 - 0.14Sds)D - 0.7ρE	2. D + 0.75(L + Lr + 0.6W)
	3. D + 0.75(L + S + 0.6W)
	4. (1+0.105Sds)D + 0.75(L + S + 0.7ρE)
	5. (1+0.14Sds)D + 0.7ρE

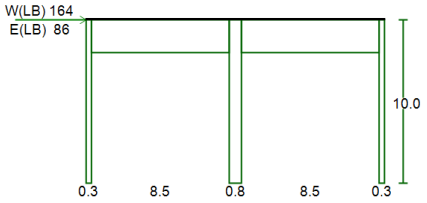
CORE	Company	:	CORE STRUCTURE, INC.	Designed	:	T.D.H.
	Project	:	Trash Enclosure	Checked	:	K.V.
	Job No.	:	21070	Date	:	06/21/2022
	Plan	:		Client	:	N/A

SW_LINE 2 **1st Floor** **Passed**

Exterior Wall Drection Y Location:(7.85, -18.43)

Loads

SECTION D2Y_ROOF: W=164 LB, E=53 LB (7ft)
Wall Self-Weight Seismic = 17 LB



Panel Type: USER DESGIN

Total Length (ft): 18.00 Total panel Length (ft): 0.00 **ρ = 1.3**

Core Structure, Inc.
23172 Plaza Pointe Drive
Suite 145
Laguna Hills, CA 92653
949-954-7244

Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Steel Column

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: CANT. COL @ LINE 2

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name :	**HSS4x4x1/4**	Overall Column Height	10.0 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top Free, Bottom Fixed
Steel Stress Grade	, A500, Grade C, Fy = 46 ksi, Carbon		
Fy : Steel Yield	46.0 ksi		
E : Elastic Bending Modulus	29,000.0 ksi		

Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 10.0 ft, K = 2.1
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 10.0 ft, K = 2.1

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 122.10 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 0.1620, LR = 0.1050 k
BENDING LOADS . . .
Lat. Point Load at 10.0 ft creating Mx-x, W = 0.140, E = 0.320 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.2161** : 1

Load Combination	+1.042D+0.70E+0.60H
Location of max.above base	0.0 ft
At maximum location values are . . .	
Pa : Axial	0.2961 k
Pn / Omega : Allowable	18.429 k
Ma-x : Applied	-2.240 k-ft
Mn-x / Omega : Allowable	10.765 k-ft
Ma-y : Applied	0.0 k-ft
Mn-y / Omega : Allowable	10.765 k-ft

PASS Maximum Shear Stress Ratio = **0.008811** : 1

Load Combination	+1.042D+0.70E+0.60H
Location of max.above base	0.0 ft
At maximum location values are . . .	
Va : Applied	0.2240 k
Vn / Omega : Allowable	25.423 k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.320 k

Maximum Load Deflections . . .

Along Y-Y 0.8107 in at 10.0 ft above base
for load combination : E Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.015	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+L+H	0.015	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+Lr+H	0.021	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+S+H	0.015	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.020	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.015	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.000	PASS	0.00 ft
+D+0.60W+H	0.086	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.003	PASS	0.00 ft
+D+0.750Lr+0.450W+H	0.068	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.002	PASS	0.00 ft
+D+0.750S+0.450W+H	0.066	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.002	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.083	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.003	PASS	0.00 ft
+1.042D+0.70E+0.60H	0.216	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.009	PASS	0.00 ft
+1.032D+0.750L+0.750S+0.525(	0.164	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.007	PASS	0.00 ft
+0.5579D+0.70E+H	0.212	PASS	0.00 ft	1.67	1.00	165.79	165.79	0.009	PASS	0.00 ft

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Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Steel Column

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: CANT. COL @ LINE 2

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
+D+H	0.284								
+D+L+H	0.284								
+D+Lr+H	0.389								
+D+S+H	0.284								
+D+0.750Lr+0.750L+H	0.363								
+D+0.750L+0.750S+H	0.284								
+D+0.60W+H	0.284			0.084		-0.840			
+D+0.750Lr+0.450W+H	0.363			0.063		-0.630			
+D+0.750S+0.450W+H	0.284			0.063		-0.630			
+0.60D+0.60W+0.60H	0.170			0.084		-0.840			
+D+0.70E+0.60H	0.284			0.224		-2.240			
+D+0.750L+0.750S+0.5250E+H	0.284			0.168		-1.680			
+0.60D+0.70E+H	0.170			0.224		-2.240			
D Only	0.284								
Lr Only	0.105								
L Only									
S Only									
W Only				0.140		-1.400			
E Only				0.320		-3.200			
H Only									

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	0.389								
"	Minimum									
Reaction, X-X Axis Base	Maximum	0.284								
"	Minimum	0.284								
Reaction, Y-Y Axis Base	Maximum				0.320		-3.200			
"	Minimum	0.284								
Reaction, X-X Axis Top	Maximum	0.284								
"	Minimum	0.284								
Reaction, Y-Y Axis Top	Maximum	0.284								
"	Minimum	0.284								
Moment, X-X Axis Base	Maximum	0.284								
"	Minimum		-3.200		0.320		-3.200			
Moment, Y-Y Axis Base	Maximum	0.284								
"	Minimum	0.284								
Moment, X-X Axis Top	Maximum	0.284								
"	Minimum	0.284								
Moment, Y-Y Axis Top	Maximum	0.284								
"	Minimum	0.284								

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.213	in	10.000	ft
+D+0.750Lr+0.450W+H	0.0000	in	0.000	ft	0.160	in	10.000	ft
+D+0.750S+0.450W+H	0.0000	in	0.000	ft	0.160	in	10.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.213	in	10.000	ft
+D+0.70E+0.60H	0.0000	in	0.000	ft	0.568	in	10.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.426	in	10.000	ft
+0.60D+0.70E+H	0.0000	in	0.000	ft	0.568	in	10.000	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

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Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Steel Column

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: CANT. COL @ LINE 2

Maximum Deflections for Load Combinations

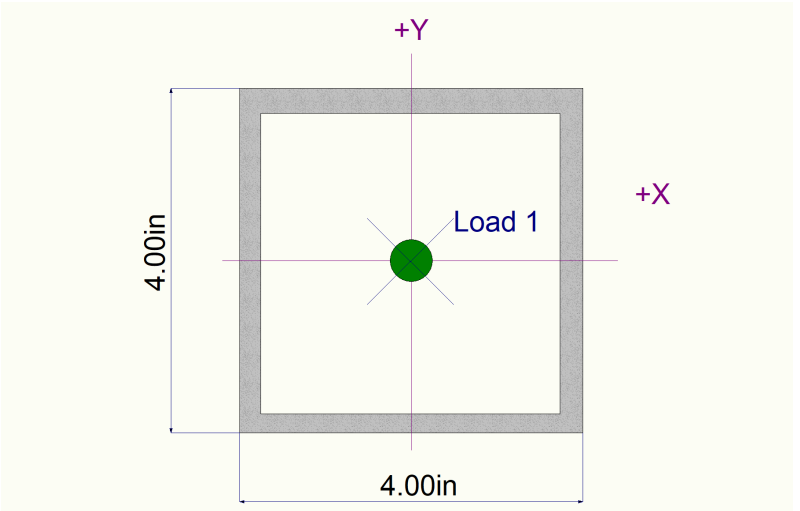
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.355	in	10.000	ft
E Only	0.0000	in	0.000	ft	0.811	in	10.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

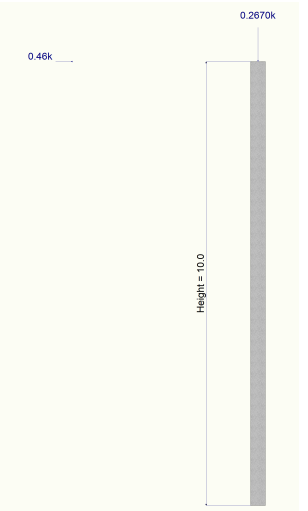
Steel Section Properties : HSS4x4x1/4

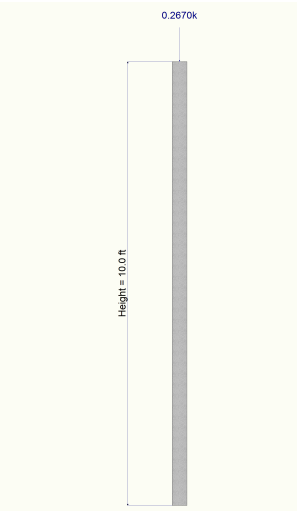
Depth	=	4.000	in	I xx	=	7.80	in^4	J	= 12.800 in^4
Design Thick	=	0.233	in	S xx	=	3.90	in^3		
Width	=	4.000	in	R xx	=	1.520	in		
Wall Thick	=	0.250	in	Zx	=	4.690	in^3		
Area	=	3.370	in^2	I yy	=	7.800	in^4	C	= 6.560 in^3
Weight	=	12.210	plf	S yy	=	3.900	in^3		
				R yy	=	1.520	in		

Ycg = 0.000 in

Sketches







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Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Pole Footing Embedded in Soil

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: Pole footing @ LINE 2

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

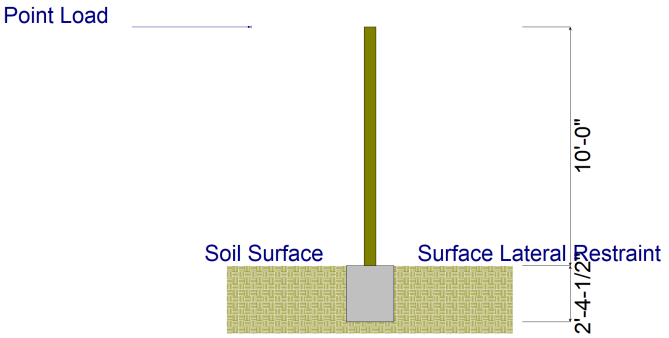
General Information

Pole Footing Shape	Rectangular
Pole Footing Width	24.0 in
Calculate Min. Depth for Allowable Pressures	
Lateral Restraint at Ground Surface	
Allow Passive	250.0 pcf
Max Passive	1,800.0 psf

Controlling Values

Governing Load Combination : +1.042D+0.70E

Lateral Load	0.2170 k
Moment	2.170 k-ft
Restraint @ Ground Surface	
Pressure at Depth	
Actual	579.79 psf
Allowable	593.75 psf
Surface Retraint Force	2,158.58 lbs
Minimum Required Depth	**2.375 ft**
Footing Base Area	4.0 ft^2
Maximum Soil Pressure	0.09725 ksf



Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)	Applied Moment (kft)	Vertical Load (k)
D : Dead Load	k	k/ft	k-ft	0.2840 k
Lr : Roof Live	k	k/ft	k-ft	0.1050 k
L : Live	k	k/ft	k-ft	k
S : Snow	k	k/ft	k-ft	k
W : Wind	0.140 k	k/ft	k-ft	k
E : Earthquake	0.310 k	k/ft	k-ft	k
H : Lateral Earth	k	k/ft	k-ft	k
Load distance above ground surface	10.0 ft	TOP of Load above ground surface: ft		
		BOTTOM of Load above ground surface: ft		

Load Combination Results

Load Combination	Forces @ Ground Surface: Loads - (k)	Forces @ Ground Surface: Moments - (ft-k)	Required Depth - (ft)	Pressure at Depth: Actual - (psf)	Pressure at Depth: Allow - (psf)	Soil Increase Factor
D Only	0.000	0.000	0.13	0.0	31.3	1.000
+D+Lr	0.000	0.000	0.13	0.0	31.3	1.000
+D+0.750Lr	0.000	0.000	0.13	0.0	31.3	1.000
+D+0.60W	0.084	0.840	1.75	413.4	437.5	1.000
+D+0.750Lr+0.450W	0.063	0.630	1.63	359.6	406.3	1.000
+D+0.450W	0.063	0.630	1.63	359.6	406.3	1.000
+0.60D+0.60W	0.084	0.840	1.75	413.4	437.5	1.000
+1.042D+0.70E	0.217	2.170	2.38	579.8	593.8	1.000
+1.032D+0.5250E	0.163	1.628	2.25	484.5	562.5	1.000

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Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Pole Footing Embedded in Soil

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: Pole footing @ LINE 2

+0.5579D+0.70E	0.217	2.170	2.38	579.8	593.8	1.000

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Project Name/Number : random
Title **8/A106**
Dsgnr: **S.W.**
Description....
8'-8" Freestanding Trash Enclosure Wall

Date: 16 JUN 2022

This Wall in File: C:\Users\Shamiek\Dropbox (Core Structure)\My PC (DESKTOP-LJOLUJQ)\Desktop\random.

Cantilevered Retaining Wall

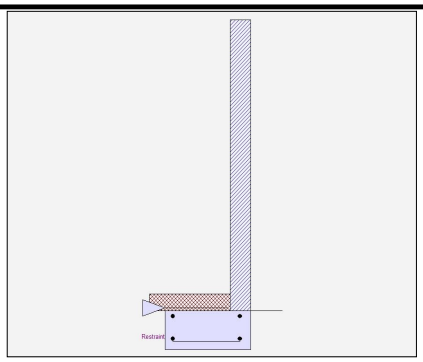
Code: CBC 2019,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	0.00 ft
Wall height above soil	=	8.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.350
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel = 100.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	100.0 lbs
Axial Live Load	=	50.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	22.4 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 102.0 lbs

Design Summary

Wall Stability Ratios
Overturning = 1.59 OK
Slab Resists All Sliding !

Total Bearing Load	=	1,359 lbs	
...resultant ecc.	=	6.67 in	
Soil Pressure @ Toe	=	1,109 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,552 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	8.6 psi	OK
Footing Shear @ Heel	=	2.5 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs
Lateral Sliding Force = 374.5 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	CBC 2019,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Bottom
Stem OK

Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	ASD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	8.00
Rebar Placed at	=	Center
Design Data		
fb/FB + fa/Fa	=	**0.834**
Total Force @ Section		
Service Level	lbs =	296.2
Strength Level	lbs =	
Moment....Actual		
Service Level	ft-# =	1,283.9
Strength Level	ft-# =	
Moment.....Allowable	=	1,618.2
Shear.....Actual		
Service Level	psi =	3.2
Strength Level	psi =	
Shear.....Allowable	psi =	46.5
Anet (Masonry)	in2 =	91.50
Rebar Depth 'd'	in =	3.75
Masonry Data		
f'm	psi =	1,500
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Wall Weight	psf =	84.0
Short Term Factor	=	1.000
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	
Fy	psi =	

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E: info@corestructure.com

Project Name/Number : random
Title 8/A106
Dsgnr: S.W.
Description....
8'-8" Freestanding Trash Enclosure Wall

This Wall in File: C:\Users\Shamiek\Dropbox (Core Structure)\My PC (DESKTOP-LJOLUJQ)\Desktop\random.

RetainPro (c) 1987-2019, Build 11.19.07.30
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License To : Core Structure

Cantilevered Retaining Wall

Code: CBC 2019,ACI 318-14,TMS 402-16

Footing Data

Toe Width	=	2.08 ft
Heel Width	=	0.67
Total Footing Width	=	2.75
Footing Thickness	=	14.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,552	0 psf
Mu' : Upward	=	28,895	0 ft-#
Mu' : Downward	=	8,313	0 ft-#
Mu: Design	=	806	0 ft-#
Actual 1-Way Shear	=	8.60	2.53 psi
Allow 1-Way Shear	=	40.00	40.00 psi

Toe Reinforcing = # 5 @ 12.00 in
Heel Reinforcing = None Spec'd
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Min footing T&S reinf Area 0.83 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		30.6	0.39	11.9	Soil Over HL (ab. water tbl)	-0.0	2.75	-0.0
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.75	-0.0
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=	47.7	0.58	27.8	Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	150.0	2.41	241.3
Added Lateral Load	=				* Axial Live Load on Stem	=	50.0	2.41	120.7
Load @ Stem Above Soil	=	194.2	5.50	1,068.5	Soil Over Toe	=		1.04	
	=				Surcharge Over Toe	=			
Seismic Stem Self Wt		102.0	5.50	560.9	Stem Weight(s)	=	728.3	2.41	1,757.6
					Earth @ Stem Transitions	=			
Total	=	374.5	**O.T.M.** =	1,669.2	Footing Weight	=	480.7	1.37	660.1
					Key Weight	=		0.50	
					Vert. Component	=			
					Total =		1,308.9 lbs	**R.M.=**	2,659.0

Resisting/Overturning Ratio = 1.59
Vertical Loads used for Soil Pressure = 1,358.9 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

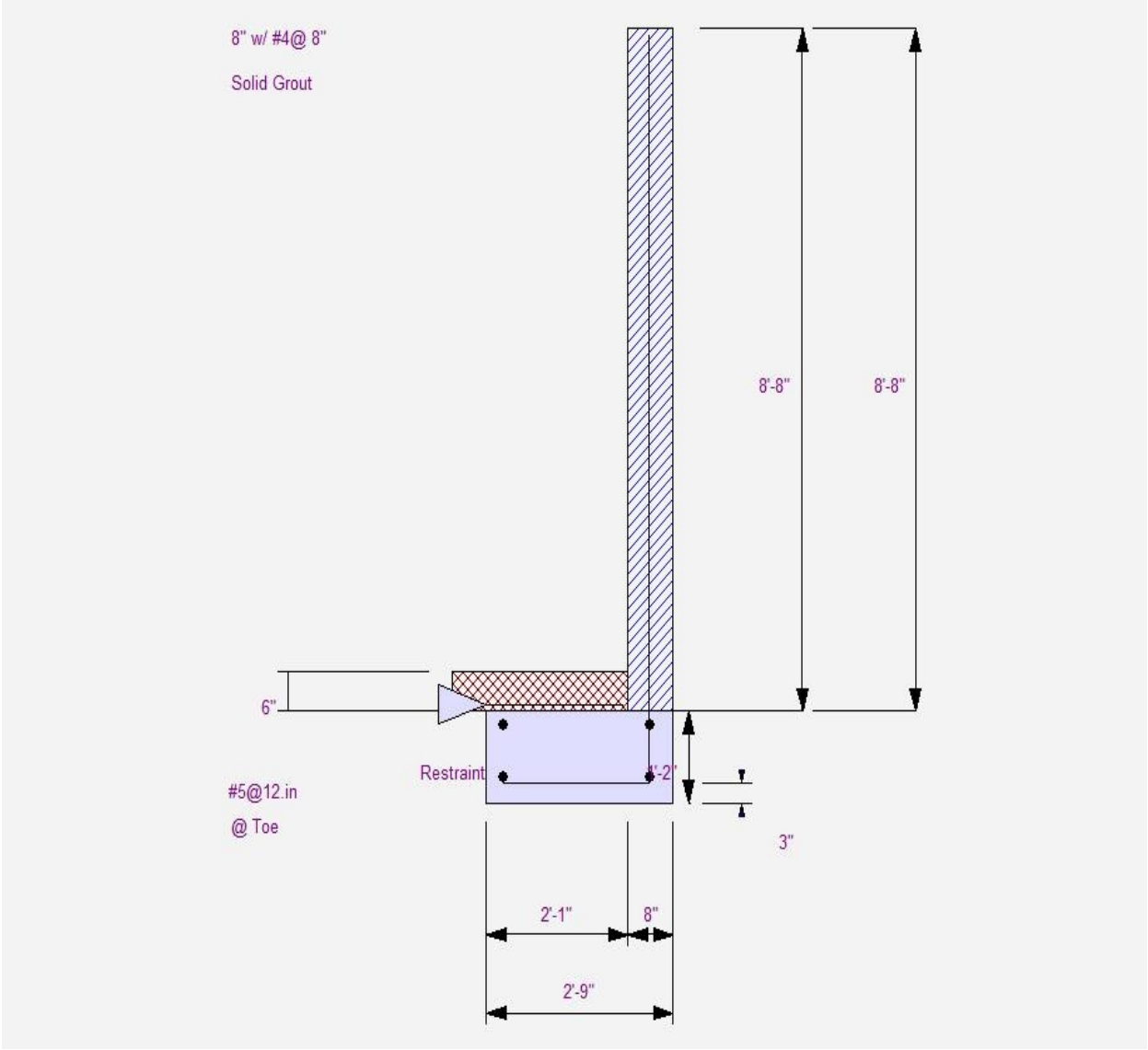
Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.097	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.


8" w/ #4@ 8"
Solid Grout
8'-8"
8'-8"
6"
Restraint
#5@12.in
@ Toe
3"
2'-1"
8"
2'-9"

Company:	CORE STRUCTURE, INC.	Date:	6/21/2022
Engineer:	SILLMAN	Page:	1/5
Project:	PALO VERDE COLLEGE		
Address:	23172 Plaza Pointe Dr. Suite 145 Laguna Hills, CA 9265		
Phone:	949.954.7244		
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description: 21070
Location: 141 S 2nd Street Blythe, CA 92225
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Cast-in-place
Material: AWS Type A
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 4.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 5.25
C_{min} (inch): 1.25
S_{min} (inch): 2.00

Base Material
Concrete: All-lightweight
Concrete thickness, h (inch): 104.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 10.00 x 8.00 x 0.25
Yield stress: 36000 psi

Profile type/size: HSS4X4X1/4

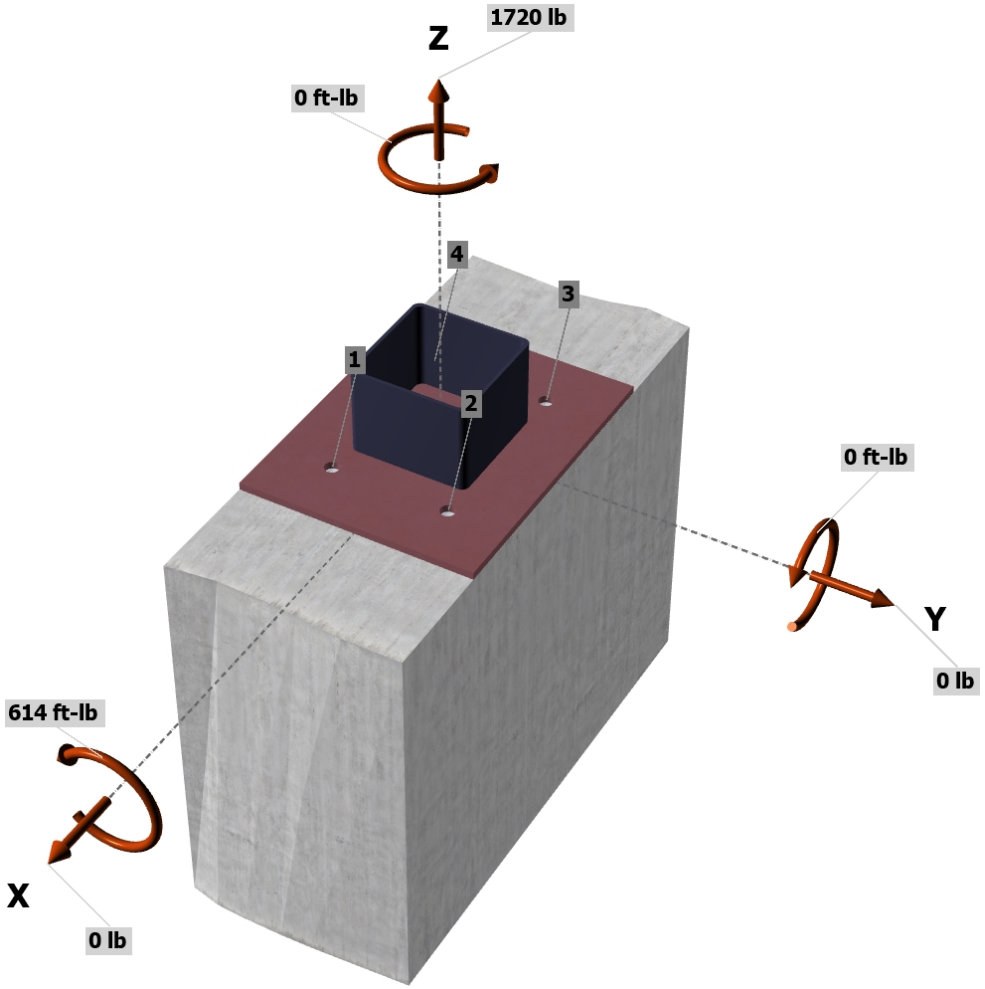
Recommended Anchor
Anchor Name: Headed Stud - 1/2"Ø AWS Type A Headed Stud

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 1720
V_{uax} [lb]: 0
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 614
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



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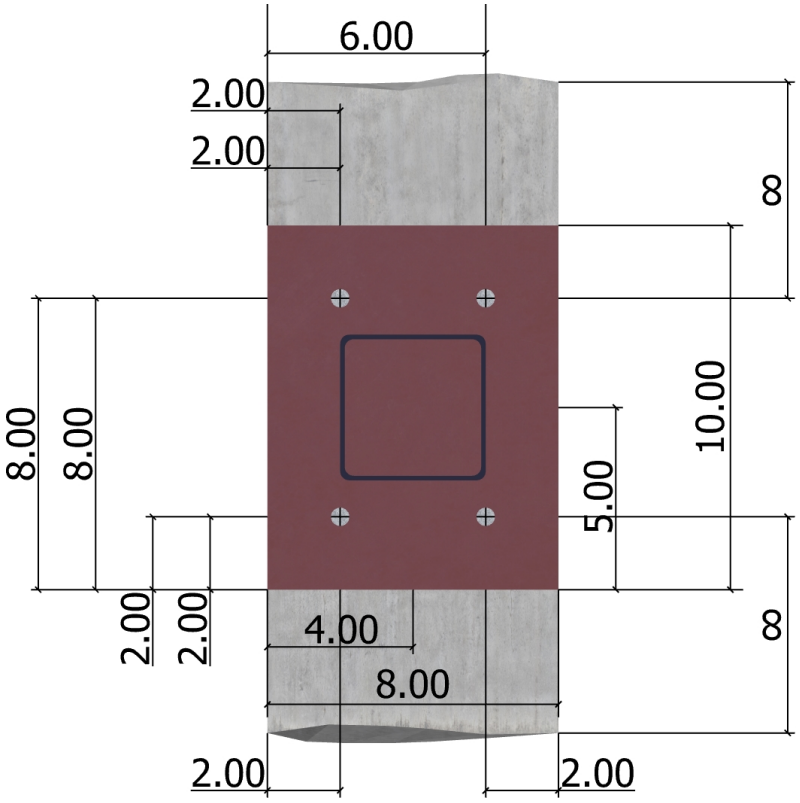
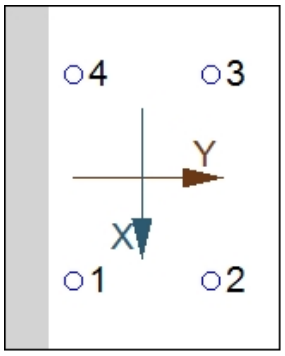


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	182.2	0.0	0.0	0.0
2	1160.1	0.0	0.0	0.0
3	1160.1	0.0	0.0	0.0
4	182.2	0.0	0.0	0.0
Sum	2684.6	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.04
Maximum concrete compression stress (psi): 154
Resultant tension force (lb): 2685
Resultant compression force (lb): 965
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 1.46
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
11975	0.75	8981

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	0.75	2500	4.000	7200

$\phi N_{cbg} = \phi \, (A_{Nc} / A_{Nco}) \, \Psi_{ec,N} \, \Psi_{ed,N} \, \Psi_{c,N} \, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
144.00	144.00	2.00	0.805	0.800	1.00	1.000	7200	0.70	3244

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in^2)	f'_c (psi)	ϕ	ϕN_{pn} (lb)
1.0	0.59	2500	0.70	8246

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1160	8981	0.13	Pass
Concrete breakout	**2685**	**3244**	**0.83**	**Pass (Governs)**
Pullout	1160	8246	0.14	Pass

1/2"Ø AWS Type A Headed Stud with hef = 4.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

Company:	CORE STRUCTURE, INC.	Date:	6/21/2022
Engineer:	SILLMAN	Page:	1/5
Project:	PALO VERDE COLLEGE		
Address:	23172 Plaza Pointe Dr. Suite 145 Laguna Hills, CA 9265		
Phone:	949.954.7244		
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

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Effective Embedment depth, h_{ef} (inch): 4.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 5.25
C_{min} (inch): 1.25
S_{min} (inch): 2.00

Base Material
Concrete: All-lightweight
Concrete thickness, h (inch): 104.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 10.00 x 10.00 x 0.25
Yield stress: 36000 psi

Profile type/size: HSS4X4X1/4

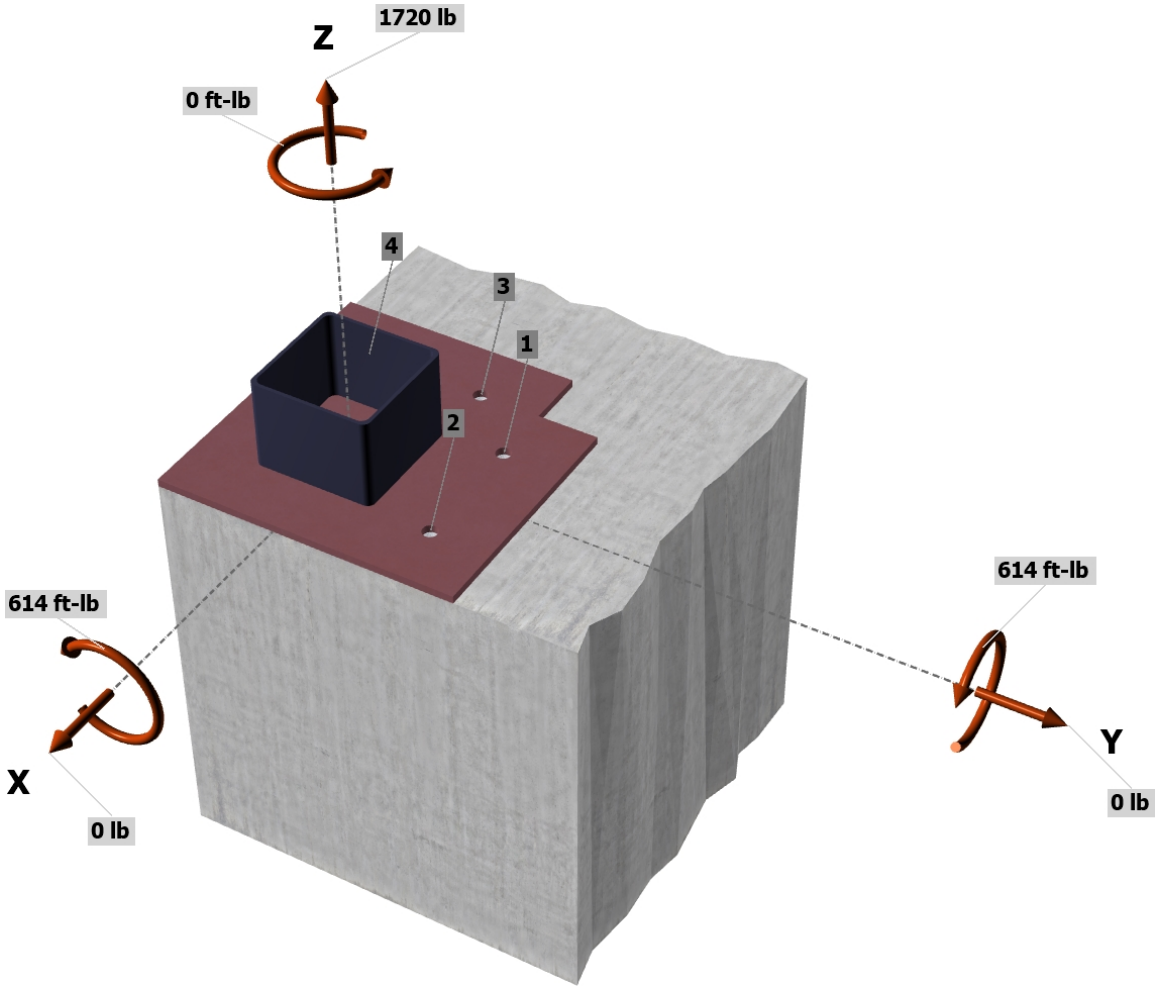
Recommended Anchor
Anchor Name: Headed Stud - 1/2"Ø AWS Type A Headed Stud

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 1720
V_{uax} [lb]: 0
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 614
M_{uy} [ft-lb]: 614
M_{uz} [ft-lb]: 0

<Figure 1>



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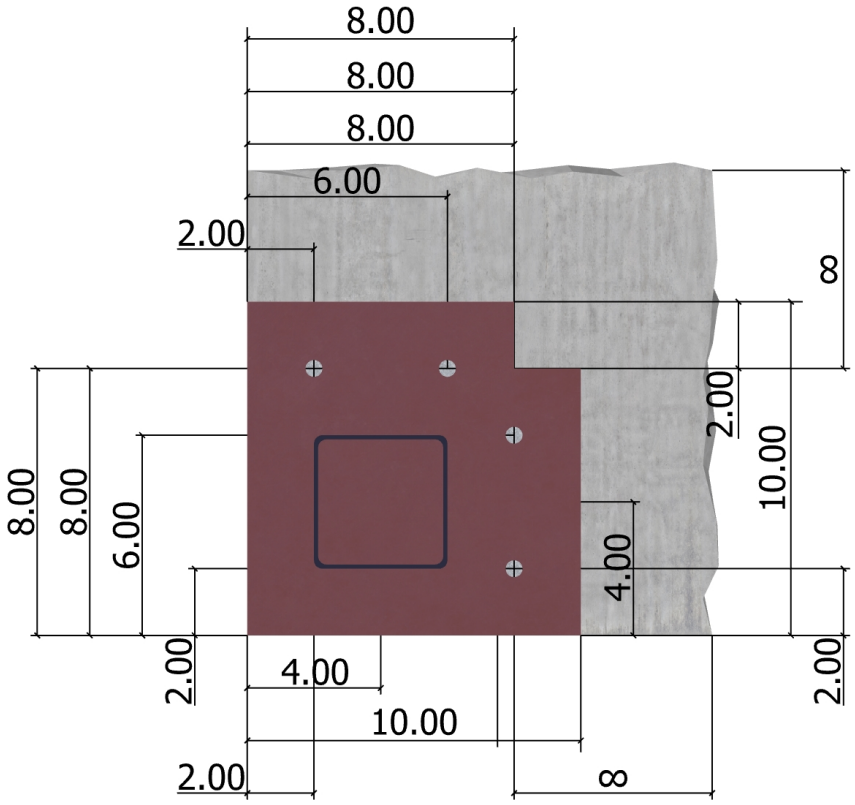
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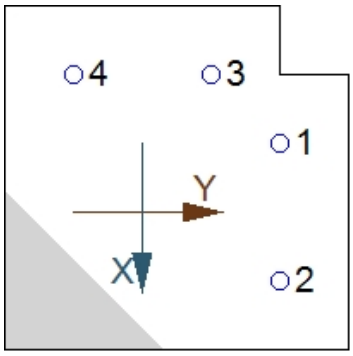
2.00
4.00
10.00
2.00
2.00
8

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	761.9	0.0	0.0	0.0
2	436.5	0.0	0.0	0.0
3	761.9	0.0	0.0	0.0
4	436.5	0.0	0.0	0.0
Sum	2396.7	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.04
Maximum concrete compression stress (psi): 189
Resultant tension force (lb): 2397
Resultant compression force (lb): 677
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.27
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.27

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
11975	0.75	8981

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	0.75	2500	4.000	7200

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
188.00	144.00	2.00	0.915	0.800	1.00	1.000	7200	0.70	4818

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in^2)	f'_c (psi)	ϕ	ϕN_{pn} (lb)
1.0	0.59	2500	0.70	8246

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	762	8981	0.08	Pass
Concrete breakout	**2397**	**4818**	**0.50**	**Pass (Governs)**
Pullout	762	8246	0.09	Pass

1/2"Ø AWS Type A Headed Stud with hef = 4.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

Structural Calculations

CHILD DEVELOPMENT CENTER

141 S 2ND STREET BLYTHE CA, 92225

Project No.: 21070
July 21, 2022

Core Structure, Inc., 23172 Plaza Pointe Dr., Suite 145, Laguna Hills, CA 92653 949-954-7244

July 21, 2022
Project: Child Development Center
Location: 141 S. 2nd Street Blythe, CA
Client: N/A

TABLE OF CONTENTS

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:08:52.469Z

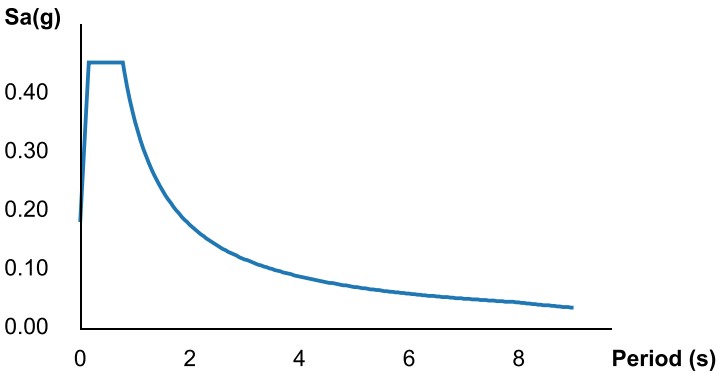
Hazard Type: Seismic

Reference Document: ASCE7-16

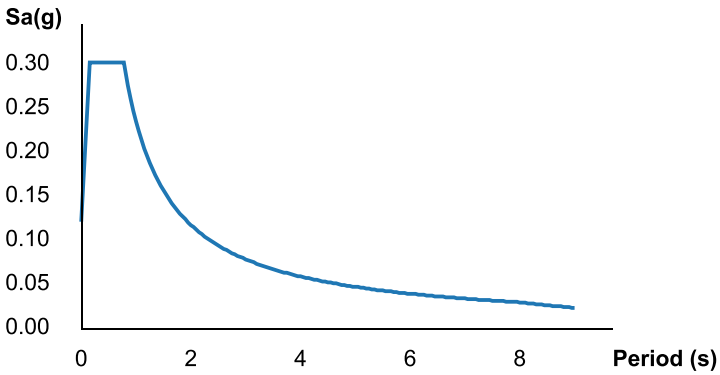
Risk Category: II

Site Class: D-default

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.288	MCE_R ground motion (period=0.2s)
S_1	0.154	MCE_R ground motion (period=1.0s)
S_{MS}	0.453	Site-modified spectral acceleration value
S_{M1}	0.352	Site-modified spectral acceleration value
S_{DS}	0.302	Numeric seismic design value at 0.2s SA
S_{D1}	0.235	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1.569	Site amplification factor at 0.2s
F_v	2.293	Site amplification factor at 1.0s

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:10:36.013Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	69 mph
MRI 25-Year	75 mph
MRI 50-Year	80 mph
MRI 100-Year	85 mph
Risk Category I	93 mph
Risk Category II	99 mph
Risk Category III	105 mph
Risk Category IV	109 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

Per ASCE 7-16 [30.11]:

p = qh(GCp) [psf]
where GCp = 1.02
$qh = .00256*K_z*K_d*K_{zt}*V_2$
= (.00256) x 0.85 x 0.85 x 1.0 x 93
= 17.20 psf
∴ p = 17.20 x 1.02 = 17.54 psf

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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CORE	Company	: Core Structure, Inc.	Designed	: A.T.
	Project	: Child Development Center	Checked	: K.V.
	Job No.	: 21070	Date	: 09/16/2021
	Plan	:	Client	: Palo Verde College

BUILDING INFORMATION

A. General:

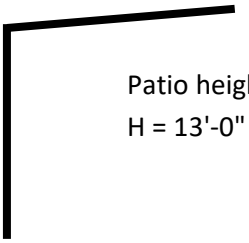
Number of stories	1
Building risk category	II
Design Code	2019 CBC
Load standard	ASCE 7-16
Design Load Combination	ASD

B. Lateral Loads Data:

WIND STANDARD	ASCE 7-16(Directional Procedure)		
Exposure	C		
Wind Speed V	99		
Enclosure	Enclosed Building		
Velocity pressure q_z	$0.00256K_zK_{zt}K_dV^2$		(27.3-1)
Velocity pressure exposure coefficient K_z	from		(27.3.1)
Directionality Factor K_d	0.85		(Table 26.6-1)
Topographic factor defined K_{zt}	1		(26.8.2)
Gust Effect Factor G	0.85		(26.9)
Pressures for MWFRS p	$qGC_p - q_i(GC_{pi})$		(27.4-1)
External pressure coefficient Cp	from		(Fig. 27.4-1)
Internal pressure coefficient (GC_{pi})	0.18		(Table 26.11-1)
SEISMIC STANDARD	ASCE 7-16(Equivalent Lateral Force Procedure)		
Seismic Design Category	D		(Table 11.6-1)
Importance factor I_e	1		(Table 1.5-2)
Soil Site Class	D-Default		(Table 20-3-1)
Response Spectral Acc. (0.2 sec) S_s	0.288		
Response Spectral Acc. (1.0 sec) S_1	0.154		
T_L (sec)	8		
Fa	1.569		(Table 11.4-1)
Fv	2.293		(Table 11.4-2)
Max. Considered earthquake acc. S_{MS}	0.453		(11.4-1)
Max. Considered earthquake acc. S_{M1}	0.352		(11.4-2)
Design spectral acc. At short period S_{DS}	0.302		(11.4-3)
Design spectral acc. at 1s period S_{D1}	0.235		(11.4-4)
Response modification coefficient R	6.5		(Table 12.2-1)
System overstrength coefficient Ω	2.5		(Table 12.2-1)
Approximate fundamental period parameters	Ct = 0.02	x = 0.75	(Table 12.8-2)
Building Height (ft)	16.25		
Building period $T=T_a$ (sec)	0.16		(12.8-7)
Base Shear Adjustment Factor	1		
Minimum Cs	0.02		(12.8.5 & 12.8-6)
Maximum Cs	0.21		(12.8-3 & 12.8-4)
Seismic response coefficient Cs	0.046		(12.8-2)
Adjusted Cs	0.046		
For allowable stress design V = CsW/1.4	0.033W		

21070_Child Development Center
Entrance Shade

1. Wind Load (ASCE 7-16, Chapter 26)



Patio height:
H = 13'-0"

Wind speed: v = 99 mph

K_z = 0.85 (Table 26-10-1)

K_{zt} = 1.0 (Section 26.8.2)

K_d = 0.85 (Table 26.6-1)

K_e = 1.0 (Section 26.9)

Velocity pressure

$q_z = 0.00256K_zK_{zt}K_dK_eV^2$ = 18.13 psf (Eq. 26.10-1)

Main Wind Force Resisting System_Roof Overhang (Sect. 27.3.3)

$$p_p = q_p(GC_{pn})(\text{lb/ft}^2) \qquad (27.3\text{-}3)$$

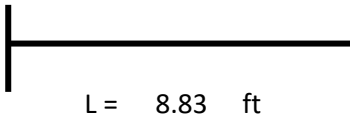
G = 0.85 (Section 26.11.1)

C_p = 0.8 (Figure 27.3-1)

p = 18.13 x 0.85 x 0.8 = 12.33 psf

2. CFS Framing Design

1) Cantilever roof joist



L = 8.83 ft

Uniform load

$W_{DL, roof}$ = 5psf x 1.33' = 6.65 plf

$W_{LL, roof}$ = 5psf x 1.33' = 6.65 plf

$W_{Wind, roof}$ = 12.33psfx1.33' = 16.39 plf

Load combination:

DL + 0.6WL = 6.65 + 0.6 x 16.39 = 16.49 plf

Use 600S162-33 Roof Joist @ 16" o.c

The bending moment:

$M = WL^2/2$ = 643 lbs-ft = 7713 lbs-in

The shear load:

V = WL = 146 lbs

The section properties of CFS joist

S_x = 0.598 in^3

Bending stress

$f_b = M/S_x$ = 7713/0.598 = 12.90 ksi

The allowable bending stress:

F_b = 0.6 x 33ksi = 19.80 ksi > 12.90 ksi **O.K**

Check Connection
Use (4) #10 Screws
Shear load on each screw
v = M/d/2/6 = 161 lbs
d = 4 in
The allowable shear load
v_{allow} = 177 lbs > 161 lbs **O.K**

Light Pole Footing Design

Wind pressure

q_z = 18.13 psf

Design Wind force for Solid Signs (Sect. 29.3)

$$F = q_h G C_f A_s \text{ (lb)} \qquad (29.3\text{-}1)$$

G = 0.85 (Section 26.11.1)

C_f = 1.85 (Fig 29.3-1)

B = 7 ft

h = 32 ft

s = 1 ft

Aspect ratio:

B/s = 7

s/h = 0.03

A_s = 7' x 1' + 32' x 0.5' = 23 SF

Wind force:

F = 18.13 x 0.85 x 1.85 x 23 = 656 lbs (@ 32'-0")

Analysis By ENERCALC: **Use 24" DIA. Conc. Pole w/min. 7'-6" Embedment**

Core Structural, Inc.
23172 Plaza Pointe Drive
Suite 145
Laguna Hills, CA 92653

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 30 NOV 2021, 11:17AM

Pole Footing Embedded in Soil

File: Light Pole Design_2021-11-29.ec6

Lic. # : KW-06010610
Core Structure, inc.

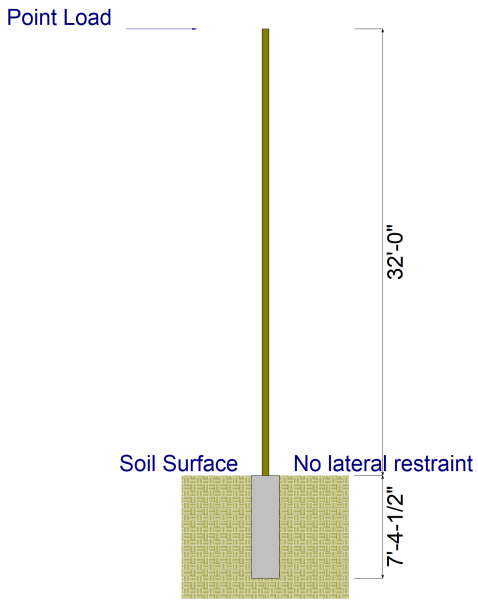
DESCRIPTION: Light Pole Footing Embedment

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	150.0 pcf
Max Passive	1,500.0 psf



Controlling Values

Governing Load Combination : +0.60W

Lateral Load	0.3936 k
Moment	12.595 k-ft

NO Ground Surface Restraint

Pressures at 1/3 Depth

Actual	364.731 psf
Allowable	364.875 psf

Minimum Required Depth	7.375 ft

Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)			Vertical Load (k)
D : Dead Load	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Lr : Roof Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
L : Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
S : Snow	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
W : Wind	0.6560 k	0.0	0.0	0.0 k/ft	0.0 k
E : Earthquake	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
H : Lateral Earth	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Load distance above ground surface	32.0 ft	TOP of Load above ground surface			
		0.0	0.0	0.0 ft	
		BOTTOM of Load above ground surface			
		0.0	0.0	0.0 ft	

Load Combination Results

Load Combination	Forces @ Ground Surface		Required	Pressure at 1/3 Depth		Soil Increase
	Loads - (k)	Moments - (ft-k)	Depth - (ft)	Actual - (psf)	Allow - (psf)	Factor
	0.000	0.000	0.13	0.0	0.0	1.000
+0.60W	0.394	12.595	7.38	364.7	364.9	1.000
+0.450W	0.295	9.446	6.63	329.1	329.9	1.000

Switch Board Anchorage Design

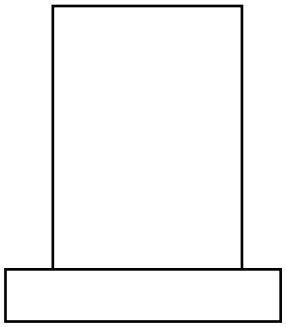
1. Wind Load

Wind pressure

q_z = 18.13 psf

Design Wind force for Solid Signs (Sect. 29.3)

$$F = q_h G C_f A_s \text{ (lb)} \qquad (29.3\text{-}1)$$



SWBD Weight

W = 1225 lbs

SWBD Heigh

h = s = 7.5 ft

SWBD Width

B = 7.5 ft

d = 2.67 ft

Aspect ratio

B/s = 1.0

s/h 1.0

G = 0.85 (Section 26.11.1)

C_f = 1.45 (Fig 29.3-1)

Wind force

F = 18.13 x 0.85 x 1.45 x 56.25 = 1257 lbs

A_s = (B)(s) = 56.25 SF

2. Seismic Load (ASCE 7-16, Section 13.3)

S_{DS} = 0.302 I = 1.0

R_p = 2.5 (ASEC 7-16, Table 13.6-1)

a_p = 1.0

Shear force

$$F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\frac{z}{h}\right) \qquad (13.3\text{-}1)$$

F = [(0.4 x 1.0 x 0.302)/(2.5/1.0)]*(1+7.5/7.5) x 1225 = 118 lbs

Therefore, wind force governs

3. Check SWBD Anchorage

1) Check Overturning

Resisting moment

$M_{res} = Wd^2/2 = 1225 \times 2.67^2/2 =$ 4366 lbs-ft

Overturning moment

Mot =(2/3)FH = 6284 lbs-ft

Uplift

$T = (Mot - M_{res})/d =$ 718 lbs > 0, Uplift

Shear load

V = 1257 lbs

Use (8) HILTI Stainless Steel KB-TZ Anchor Bolts 1/2" DIA. x 5 1/2" w/Min. 4 3/4" Embedment (ICC ESR-1917)

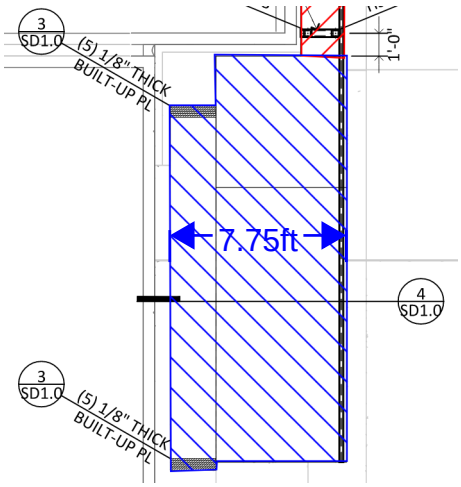
Tension load on each bolt

T = 718 /4 = 180 lbs/per bolt

Shear load on each bolt

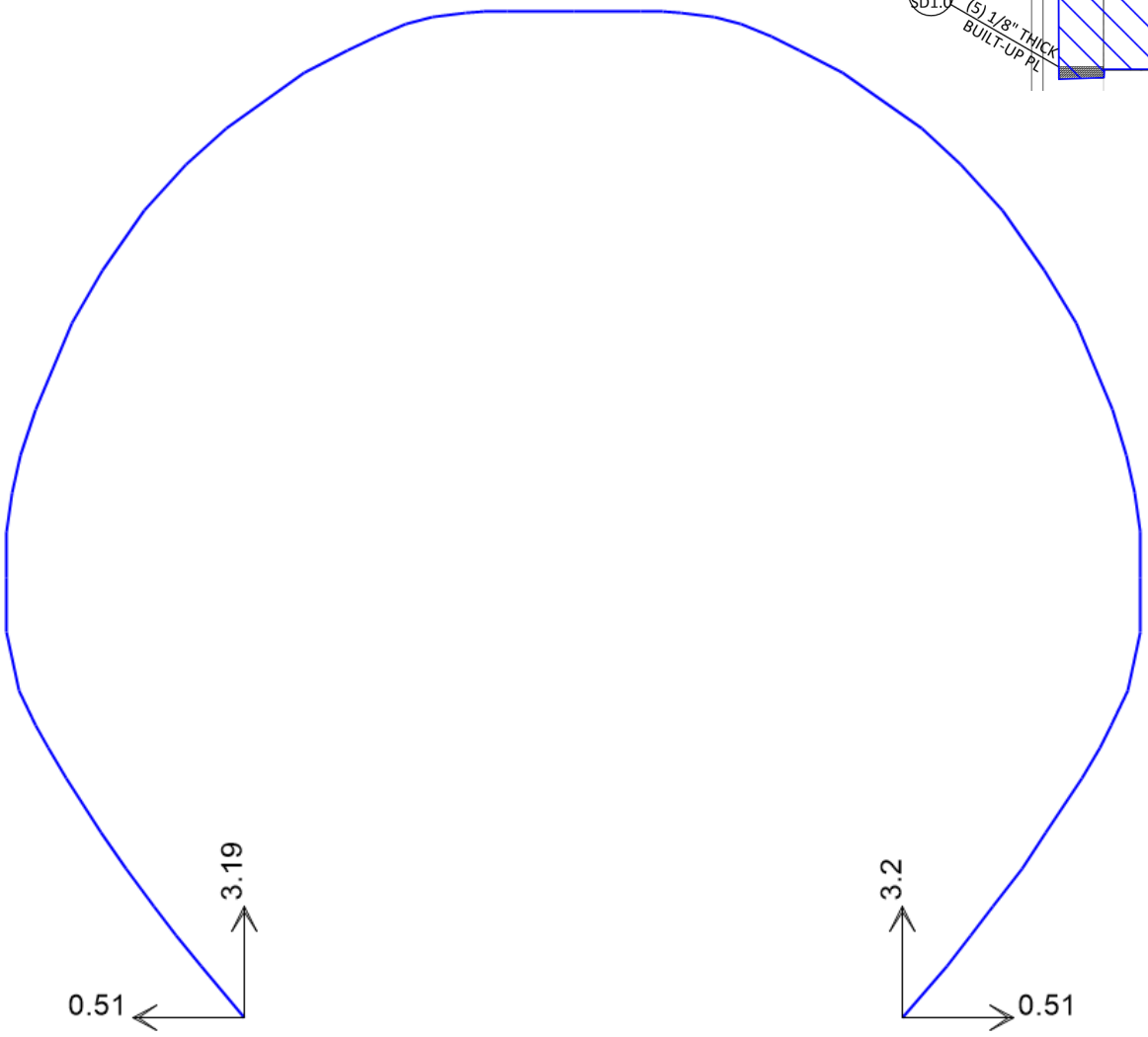
V = 1257/8 = 157 lbs/per bolt

Seismic calcs for canopy Check



Loading :
DL = 10psf, LLR = 20psf, W = 17.54psf
Tributary width = 2 + 5.75 = 7.75-ft
Vertical Seismic Load: E_V = 0.2Sds*D = 0.2*0.302*10*5 = 3.02 psf
Combinations: 1.2DL + 0.5LLR +1W
1.2DL +0.5LLR +1E

REACTION:



Base reaction
(COMBO: 1.2DL+0.5LL+1W)

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Cast-in-place
Material: F1554 Grade 55
Diameter (inch): 0.375
Effective Embedment depth, h_{ef} (inch): 8.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 9.13
C_{min} (inch): 2.25
S_{min} (inch): 2.25

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 12.00
State: Uncracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental reinforcement: No
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 28.00 x 28.00 x 0.25

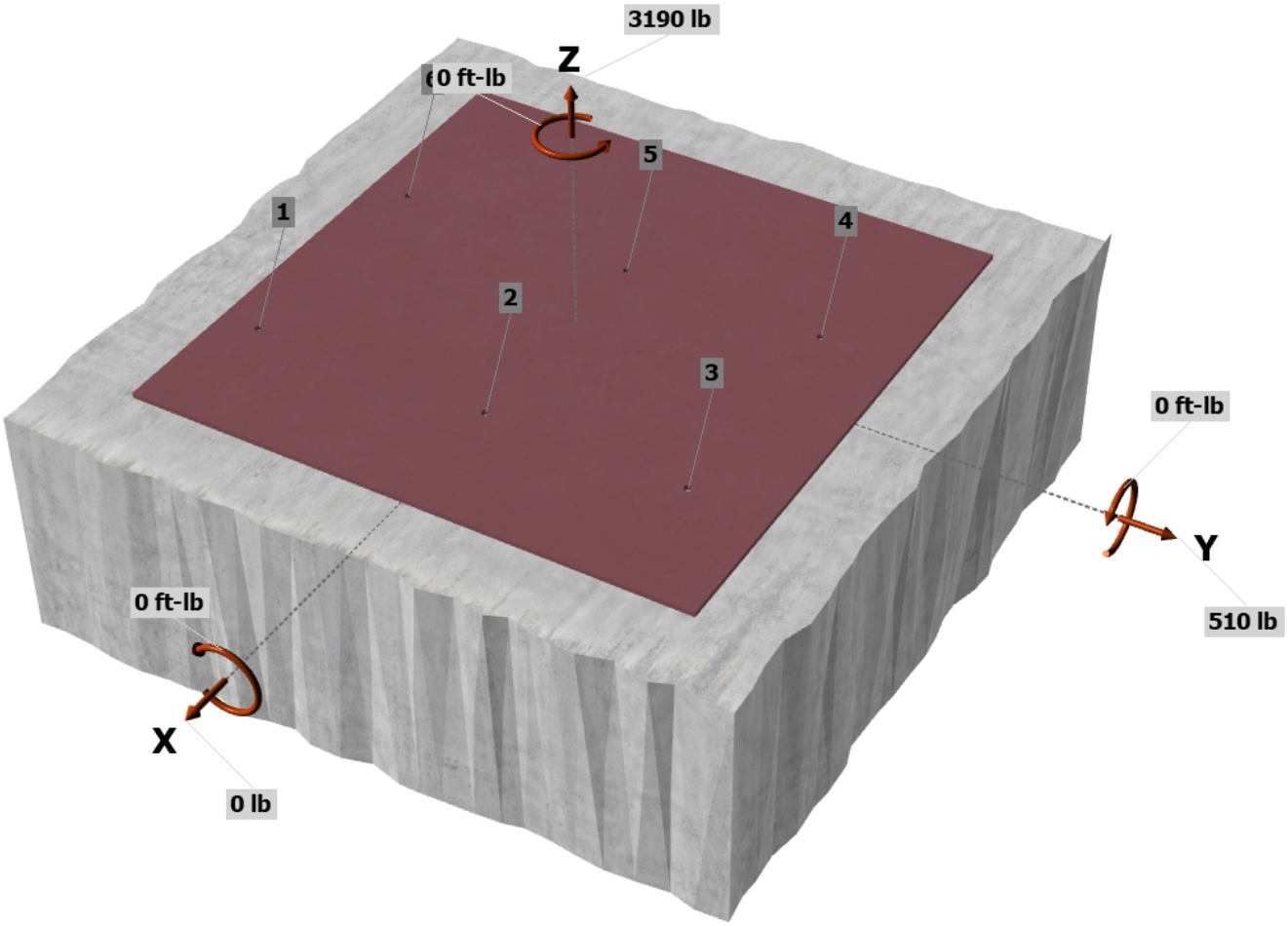
Recommended Anchor
Anchor Name: Heavy Hex Bolt - 3/8"Ø Heavy Hex Bolt, F1554 Gr. 55

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

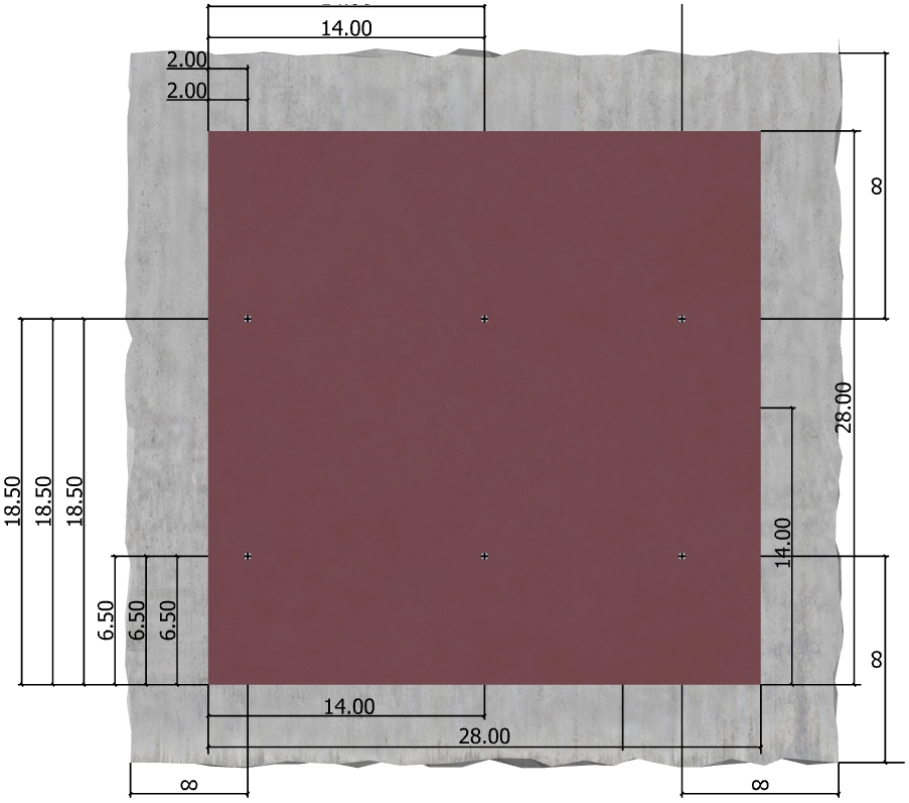
Strength level loads:

N_{ua} [lb]: 3190
V_{uax} [lb]: 0
V_{uay} [lb]: 510
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

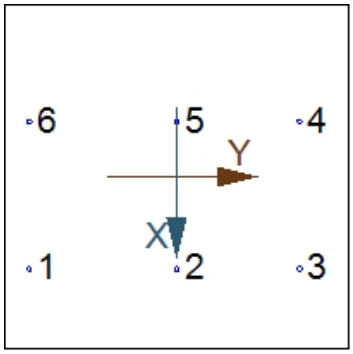

14.00
2.00
2.00
8
28.00
18.50
18.50
18.50
14.00
6.50
6.50
6.50
8
14.00
28.00
8
8

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	349.4	-12.4	78.5	79.4
2	401.9	0.7	78.5	78.5
3	445.6	11.6	78.5	79.3
4	711.0	11.6	91.5	92.3
5	667.3	0.7	91.5	91.5
6	614.8	-12.4	91.5	92.4
Sum	3190.0	0.0	510.0	513.4

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 3190
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.67
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 1.50
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
5815	0.75	4361

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	2500	8.000	27153

$\phi N_{cbg} = \phi \, (A_{Nc} / A_{Nco}) \, \Psi_{ec,N} \, \Psi_{ed,N} \, \Psi_{c,N} \, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
1656.00	576.00	-	0.842	1.000	1.25	1.000	27153	0.70	57537

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in^2)	f'_c (psi)	ϕ	ϕN_{pn} (lb)
1.4	0.30	2500	0.70	5860

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
3490	1.0	0.65	2269

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi k_{cp} N_{cb} = \phi k_{cp}(A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	198.00	576.00	1.000	1.250	1.000	27153	0.70	16334

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	**711**	**4361**	**0.16**	**Pass (Governs)**
Concrete breakout	3190	57537	0.06	Pass
Pullout	711	5860	0.12	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**92**	**2269**	**0.04**	**Pass (Governs)**
Pryout	92	16334	0.01	Pass

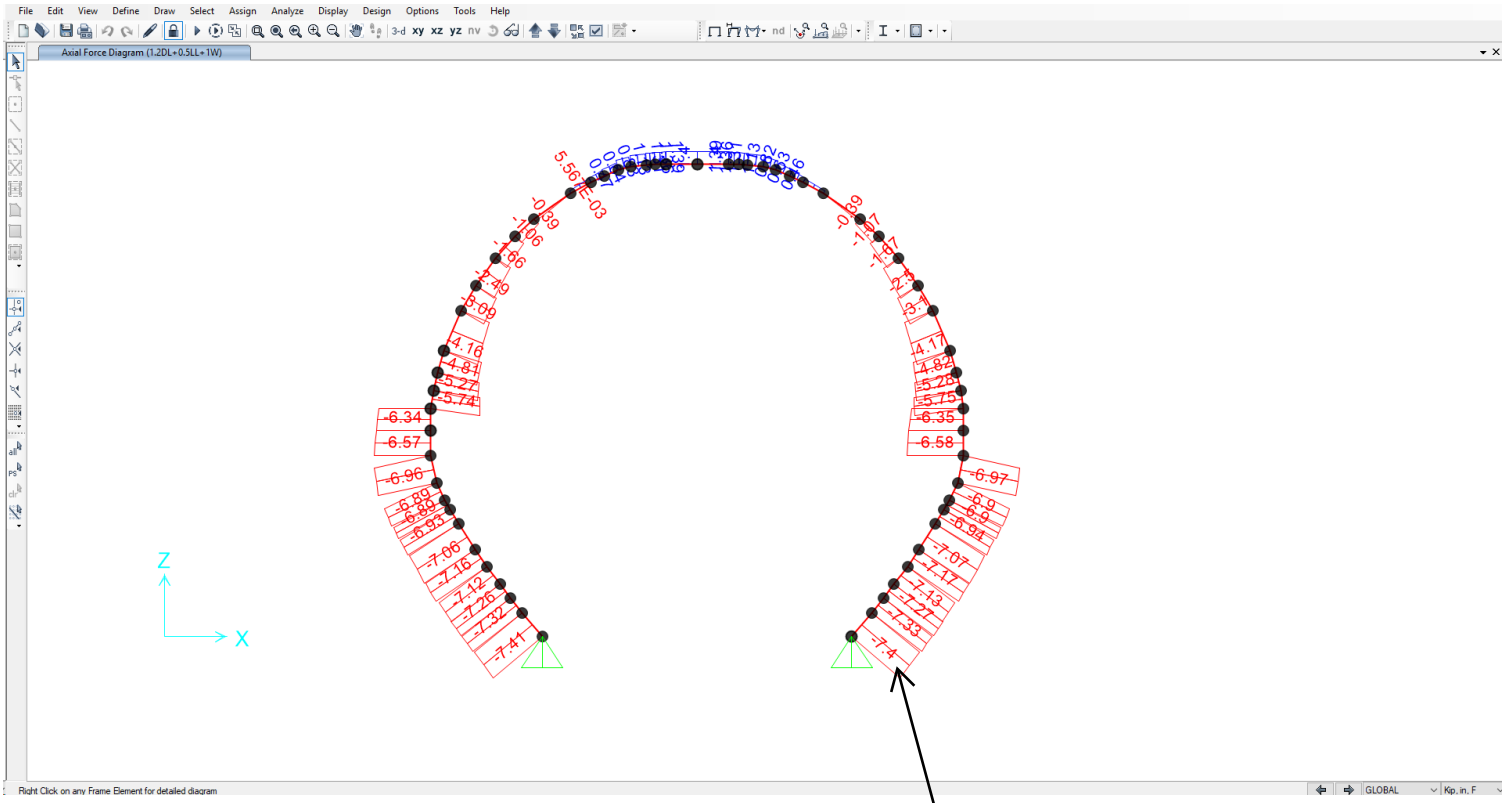
Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..1	0.16	0.00	16.3%	1.0	Pass

3/8"Ø Heavy Hex Bolt, F1554 Gr. 55 with hef = 8.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

Design compressive strength



Maximum axial force:
(Comb: 1.2DL+0.5LL+1.0W)
P = 7.4 kips

Per Chapter E, AISC 360-10:
Check: $P < \phi_c P_n = 0.9P_n$ (LRFD)

The nominal compressive strength, $P_n = F_{cr}A_g$
The critical stress F_{cr} is determined as follows:

$$F_{cr} = 0.877F_e \quad = 0.877*4663 = 4089 \text{ psi}$$

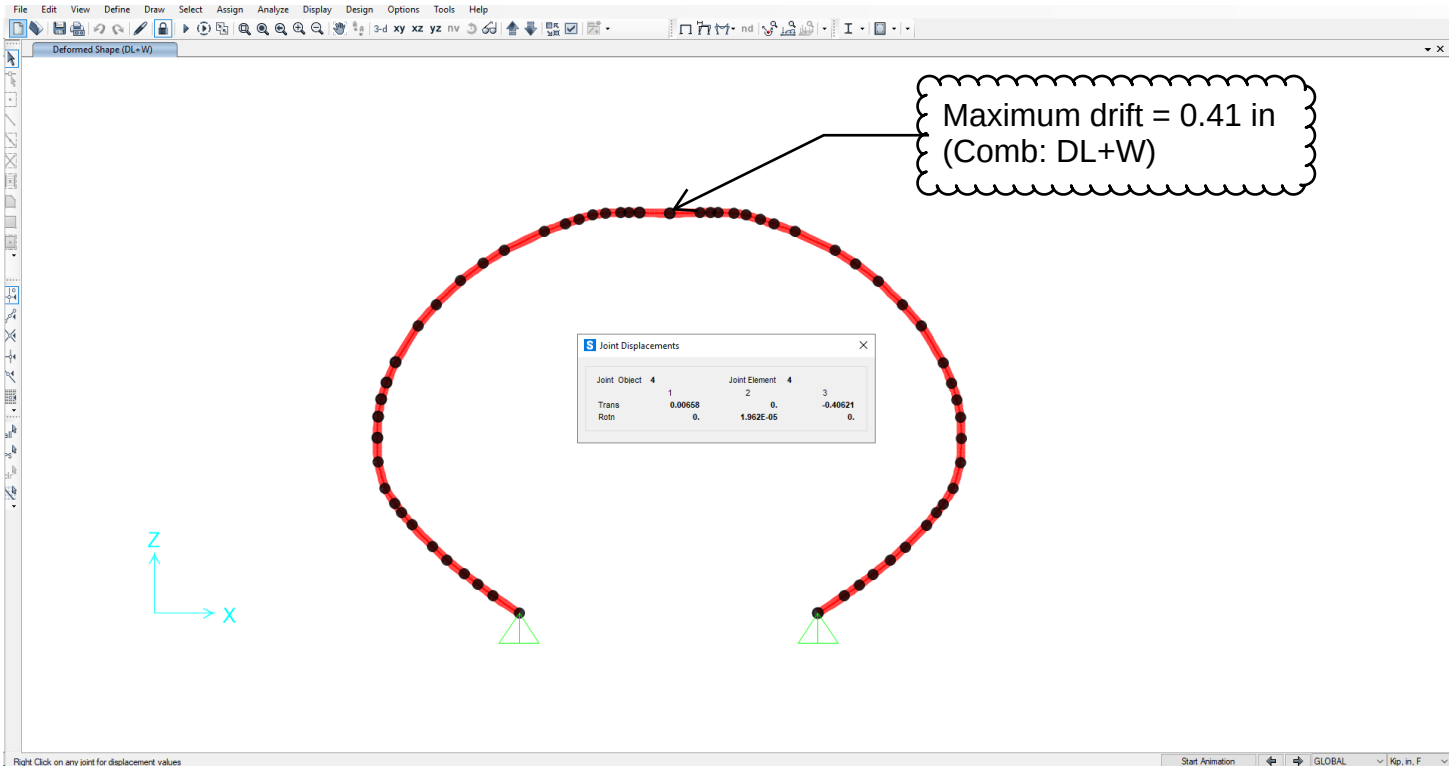
Because: KL/r > $4.71\sqrt{(E/Fy)}$
with KL/r = 0.85x12/(3.75/2) = 5.44
$4.71\sqrt{(E/F_y)}$= $4.71\sqrt{(29000/36000)}$ = 4.23
Elastic buckling stress:

$$F_e = \frac{\pi^2 E}{\left(\frac{KL}{r}\right)^2} \quad = \pi*29000/(5.44\text{^}2) = 3078 \text{ psi}$$

=> $P_n = F_{cr}A_g$ = 3078*6.25 = 19241 lbs
=> P = 7400 < 0.9*19241 = 17317 lbs

=> Therefore sastisfy the demand.

Check displacements



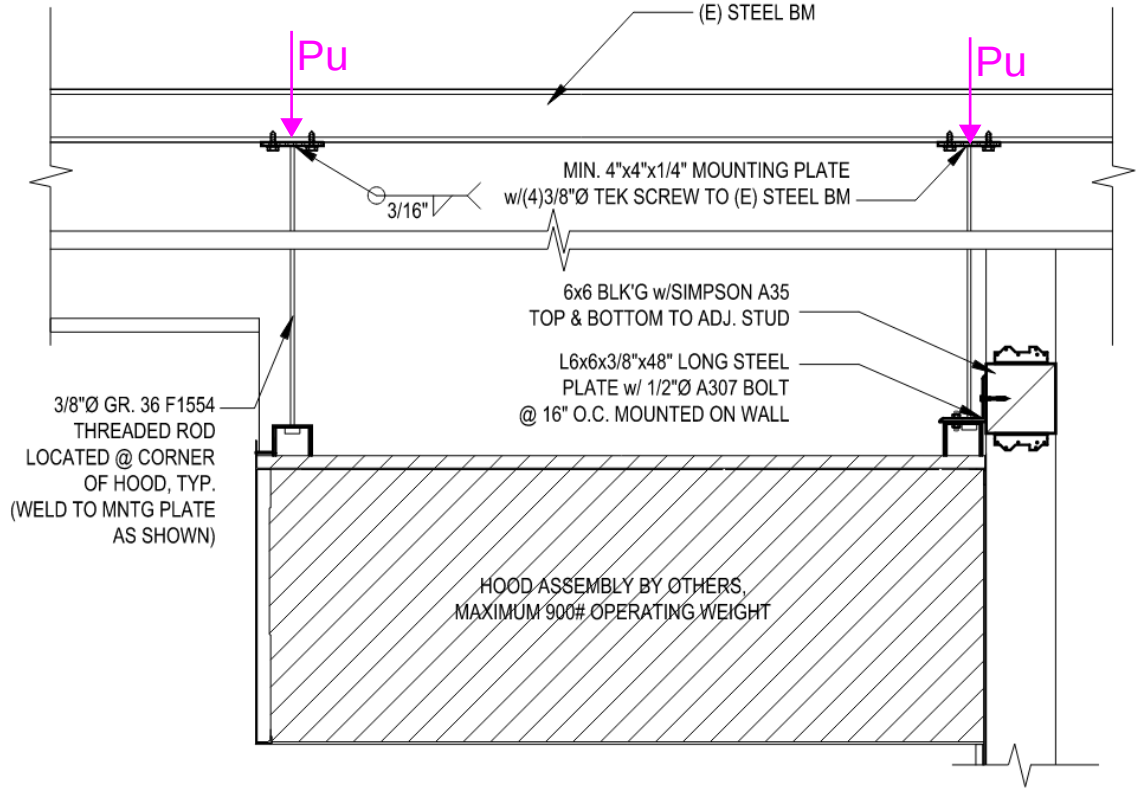
Maximum displacement = 0.41 in < L/240 = 0.8in => **OK**

HOOD ANCHORAGE DESIGN

LOAD ASSIGN:

HOOD ASSEMBLY BY OTHERS, MAXIMUM 900# OPERATING WEIGHT

=> Pu = 900/2 = 450 lbs



CHECK CONNECTION:

=> Use (4)-3/8ø TEK SCREW to (E) Steel beam with 43 mil. Min. Steel thickness

:.Demand per bolt = 450# / 4 = 112.5# < Adjusted ASD Capacity = 140#
=> Connection is adequate against pullout loading.

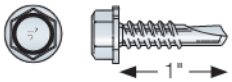
Self-Drilling E Metal Screw

Common Application:
Cold-formed steel framing

- Recommended for use with certain Simpson Strong-Tie® connectors
- #3 drill point (Max. total drilling thickness 0.35")

Codes/Standards: ASTM C1513 compliant

For more information, see p. 93, C-F-2019 Fastening Systems Catalog



Screw Strength

Size (in.)	Model No.	Nominal Strength (lb.)		Design Strength (LRFD) (lb.) $\phi = 0.5$		Allowable Strength (ASD) (lb.) $\Omega = 3.0$	
		P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}	P_{ss}/Ω	P_{ts}/Ω
#14 x 1	E1B1414	3,130	5,395	1,565	2,700	1,045	1,800

Screw-to-Cold-Formed Steel Member Connection Loads, Steel to Steel

Size (in.)	Model No.	Nominal Dia. (in.)	Washer Dia. (in.)	Load Description	Reference Shear (lb.)					Reference Pull-Over (lb.)					Reference Pull-Out (lb.)				
					Steel Thickness: [mil (ga.)]					Steel Thickness: [mil (ga.)]					Steel Thickness: [mil (ga.)]				
					33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
#14 x 1	E1B1414	0.242	0.5	ASD	200	295	605	850	1,045	390	505	920	1,160	1,655	105	140	250	320	455
				LRFD	300	445	905	1,280	1,565	585	760	1,380	1,740	2,480	160	210	380	480	680
				Nominal strength	600	890	1,810	2,555	3,130	1,170	1,520	2,760	3,475	4,960	320	415	755	955	1,360

1. Screws shall extend through the connection with a minimum of three exposed threads per AISI General Provisions Standard Section D1.3.
2. Tabulated loads are based on calculations per AISI S100 using the thinner steel member in the connection. A safety factor of $\Omega = 3.0$ and resistance factor $\phi = 0.5$ were used to determine the ASD and LRFD strength values.
3. Loads are based on cold-formed steel members with a minimum yield strength, F_y, of 33 ksi and tensile strength, F_u, of 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength of 50 ksi and tensile strength of 65 ksi for 54 mil (16 ga.) and thicker.

Structural Calculations

CHILD DEVELOPMENT CENTER

141 S 2ND STREET BLYTHE CA, 92225

Project No.: 21070
August 18, 2022

August 18, 2022
Project: Child Development Center (Trash Enclosure)
Location: 141 S. 2nd Street Blythe, CA
Client: N/A

TABLE OF CONTENTS

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:08:52.469Z

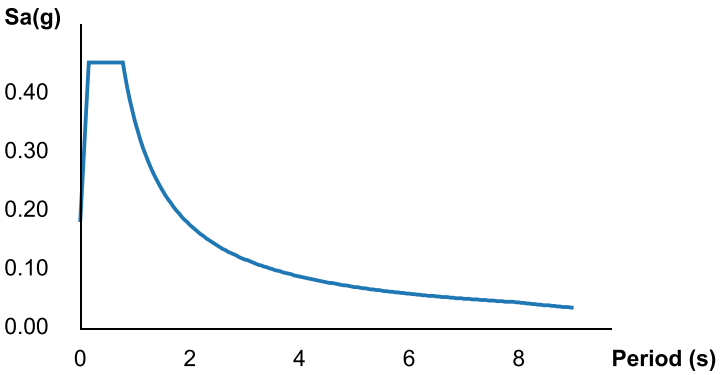
Hazard Type: Seismic

Reference Document: ASCE7-16

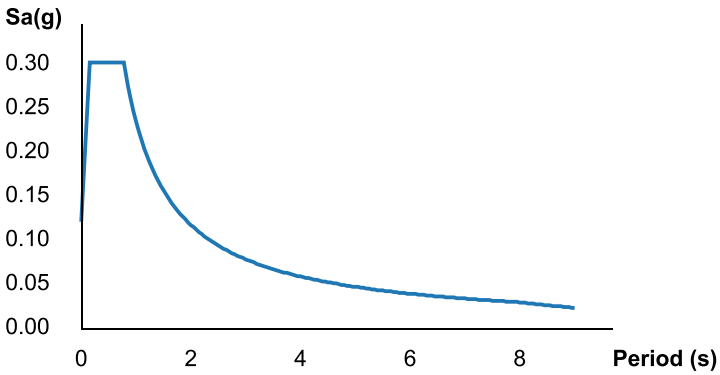
Risk Category: II

Site Class: D-default

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.288	MCE_R ground motion (period=0.2s)
S_1	0.154	MCE_R ground motion (period=1.0s)
S_{MS}	0.453	Site-modified spectral acceleration value
S_{M1}	0.352	Site-modified spectral acceleration value
S_{DS}	0.302	Numeric seismic design value at 0.2s SA
S_{D1}	0.235	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1.569	Site amplification factor at 0.2s
F_v	2.293	Site amplification factor at 1.0s

Hazards by Location

Search Information

Address: 141 S 2nd St Blythe, CA 92225

Coordinates: 33.6095431, -114.5942829

Elevation: 274 ft

Timestamp: 2021-05-03T22:10:36.013Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	69 mph
MRI 25-Year	75 mph
MRI 50-Year	80 mph
MRI 100-Year	85 mph
Risk Category I	93 mph
Risk Category II	99 mph
Risk Category III	105 mph
Risk Category IV	109 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

Per ASCE 7-16 [30.11]:

p = qh(GCp) [psf]
where GCp = 1.02
$qh = .00256*K_z*K_d*K_{zt}*V_2$
= (.00256) x 0.85 x 0.85 x 1.0 x 93
= 17.20 psf
∴ p = 17.20 x 1.02 = 17.54 psf

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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CORE	Company	: Core Structure, Inc.	Designed	: A.T.
	Project	: Child Development Center	Checked	: K.V.
	Job No.	: 21070	Date	: 09/16/2021
	Plan	:	Client	: Palo Verde College

BUILDING INFORMATION

A. General:

Number of stories	1
Building risk category	II
Design Code	2019 CBC
Load standard	ASCE 7-16
Design Load Combination	ASD

B. Lateral Loads Data:

WIND STANDARD	ASCE 7-16(Directional Procedure)		
Exposure	C		
Wind Speed V	99		
Enclosure	Enclosed Building		
Velocity pressure q_z	$0.00256K_zK_{zt}K_dV^2$		(27.3-1)
Velocity pressure exposure coefficient K_z	from		(27.3.1)
Directionality Factor K_d	0.85		(Table 26.6-1)
Topographic factor defined K_{zt}	1		(26.8.2)
Gust Effect Factor G	0.85		(26.9)
Pressures for MWFRS p	$qGC_p - q_i(GC_{pi})$		(27.4-1)
External pressure coefficient Cp	from		(Fig. 27.4-1)
Internal pressure coefficient (GC_{pi})	0.18		(Table 26.11-1)
SEISMIC STANDARD	ASCE 7-16(Equivalent Lateral Force Procedure)		
Seismic Design Category	D		(Table 11.6-1)
Importance factor I_e	1		(Table 1.5-2)
Soil Site Class	D-Default		(Table 20-3-1)
Response Spectral Acc. (0.2 sec) S_s	0.288		
Response Spectral Acc. (1.0 sec) S_1	0.154		
T_L (sec)	8		
Fa	1.569		(Table 11.4-1)
Fv	2.293		(Table 11.4-2)
Max. Considered earthquake acc. S_{MS}	0.453		(11.4-1)
Max. Considered earthquake acc. S_{M1}	0.352		(11.4-2)
Design spectral acc. At short period S_{DS}	0.302		(11.4-3)
Design spectral acc. at 1s period S_{D1}	0.235		(11.4-4)
Response modification coefficient R	6.5		(Table 12.2-1)
System overstrength coefficient Ω	2.5		(Table 12.2-1)
Approximate fundamental period parameters	Ct = 0.02	x = 0.75	(Table 12.8-2)
Building Height (ft)	16.25		
Building period $T=T_a$ (sec)	0.16		(12.8-7)
Base Shear Adjustment Factor	1		
Minimum Cs	0.02		(12.8.5 & 12.8-6)
Maximum Cs	0.21		(12.8-3 & 12.8-4)
Seismic response coefficient Cs	0.046		(12.8-2)
Adjusted Cs	0.046		
For allowable stress design V = CsW/1.4	0.033W		

Design Loads

Date: 8/18/2022

Project: 21070

Location: 141 S 2ND STREET BLYTHE, CA 92225

Roof Loads – Curved Patio

5/8" Plate	25.5 psf
Framing	2.5 psf
Misc.	2 psf
Total Dead Load	**30 psf**
Total Live Load	**20 psf**
Total Roof Load	**50 psf**

Light Pole Footing Design

Wind pressure

q_z = 18.13 psf

Design Wind force for Solid Signs (Sect. 29.3)

$$F = q_h G C_f A_s \text{ (lb)} \qquad (29.3\text{-}1)$$

G = 0.85 (Section 26.11.1)

C_f = 1.85 (Fig 29.3-1)

B = 7 ft

h = 35 ft

s = 1 ft

Aspect ratio:

B/s = 7

s/h = 0.03

A_s = 7' x 1' + 35' x 0.5' = 24.5 SF

Wind force:

F = 18.13 x 0.85 x 1.85 x 24.5 = 698 lbs (@ 35'-0")

Analysis By ENERCALC: **Use 24" DIA. Conc. Pole w/min. 7'-9" Embedment**

Core Structure, INC.
23172 Plaza Pointe Dr.
Suite #145
Laguna Hills, CA 92653

Project Title:
Engineer:
Project ID:
Project Descr:

Pole Footing Embedded in Soil

Lic. # : KW-06010610 — Core Structure, inc.

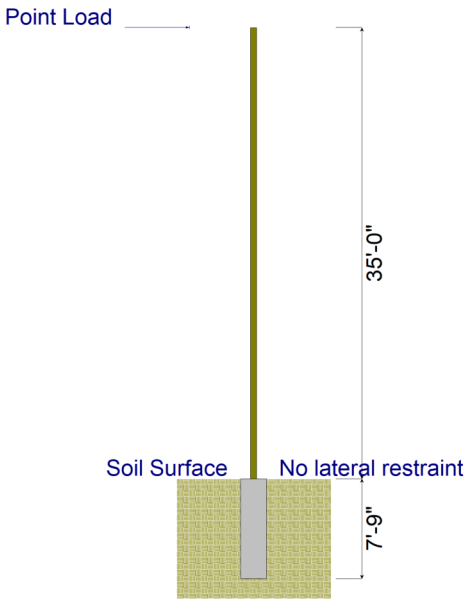
DESCRIPTION: Light Pole Footing Embedment

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	150.0 pcf
Max Passive	1,500.0 psf



Controlling Values

Governing Load Combination :	+0.60W
Lateral Load	0.4188 k
Moment	14.658 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**381.959** psf
Allowable	**383.327** psf
Minimum Required Depth	**7.750 ft**
Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (klf)		Vertical Load (k)
D : Dead Load	k		k/ft	k
Lr : Roof Live	k		k/ft	k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	0.6980 k		k/ft	k
E : Earthquake	k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	35.0 ft	TOP of Load above ground surface	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Forces @ Ground Surface Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Pressure at 1/3 Depth Allow - (psf)	Soil Increase Factor
	0.000	0.000	0.13	0.0	0.0	1.000
+0.60W	0.419	14.658	7.75	382.0	383.3	1.000
+0.450W	0.314	10.994	7.00	345.3	346.3	1.000

Switch Board Anchorage Design

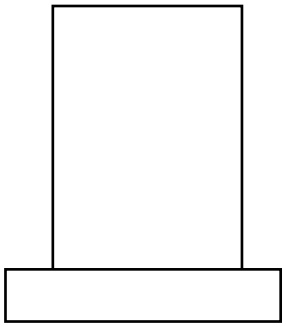
1. Wind Load

Wind pressure

q_z = 18.13 psf

Design Wind force for Solid Signs (Sect. 29.3)

$$F = q_h G C_f A_s \text{ (lb)} \qquad (29.3\text{-}1)$$



SWBD Weight

W = 1225 lbs

SWBD Heigh

h = s = 7.5 ft

SWBD Width

B = 7.5 ft

d = 2.67 ft

Aspect ratio

B/s = 1.0

s/h 1.0

G = 0.85 (Section 26.11.1)

C_f = 1.45 (Fig 29.3-1)

Wind force

F = 18.13 x 0.85 x 1.45 x 56.25 = 1257 lbs

A_s = (B)(s) = 56.25 SF

2. Seismic Load (ASCE 7-16, Section 13.3)

S_{DS} = 0.302 I = 1.0

R_p = 2.5 (ASEC 7-16, Table 13.6-1)

a_p = 1.0

Shear force

$$F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\frac{z}{h}\right) \qquad (13.3\text{-}1)$$

F = [(0.4 x 1.0 x 0.302)/(2.5/1.0)]*(1+7.5/7.5) x 1225 = 118 lbs

Therefore, wind force governs

3. Check SWBD Anchorage

1) Check Overturning

Resisting moment

$M_{res} = Wd^2/2 = 1225 \times 2.67^2/2 =$ 4366 lbs-ft

Overturning moment

Mot =(2/3)FH = 6284 lbs-ft

Uplift

$T = (Mot - M_{res})/d =$ 718 lbs > 0, Uplift

Shear load

V = 1257 lbs

Use (8) HILTI Stainless Steel KB-TZ Anchor Bolts 1/2" DIA. x 5 1/2" w/Min. 4 3/4" Embedment (ICC ESR-1917)

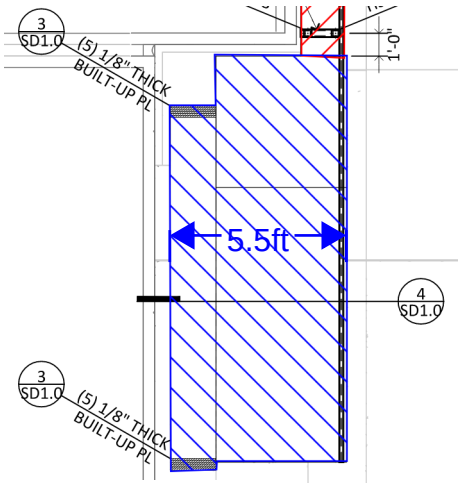
Tension load on each bolt

T = 718 /4 = 180 lbs/per bolt

Shear load on each bolt

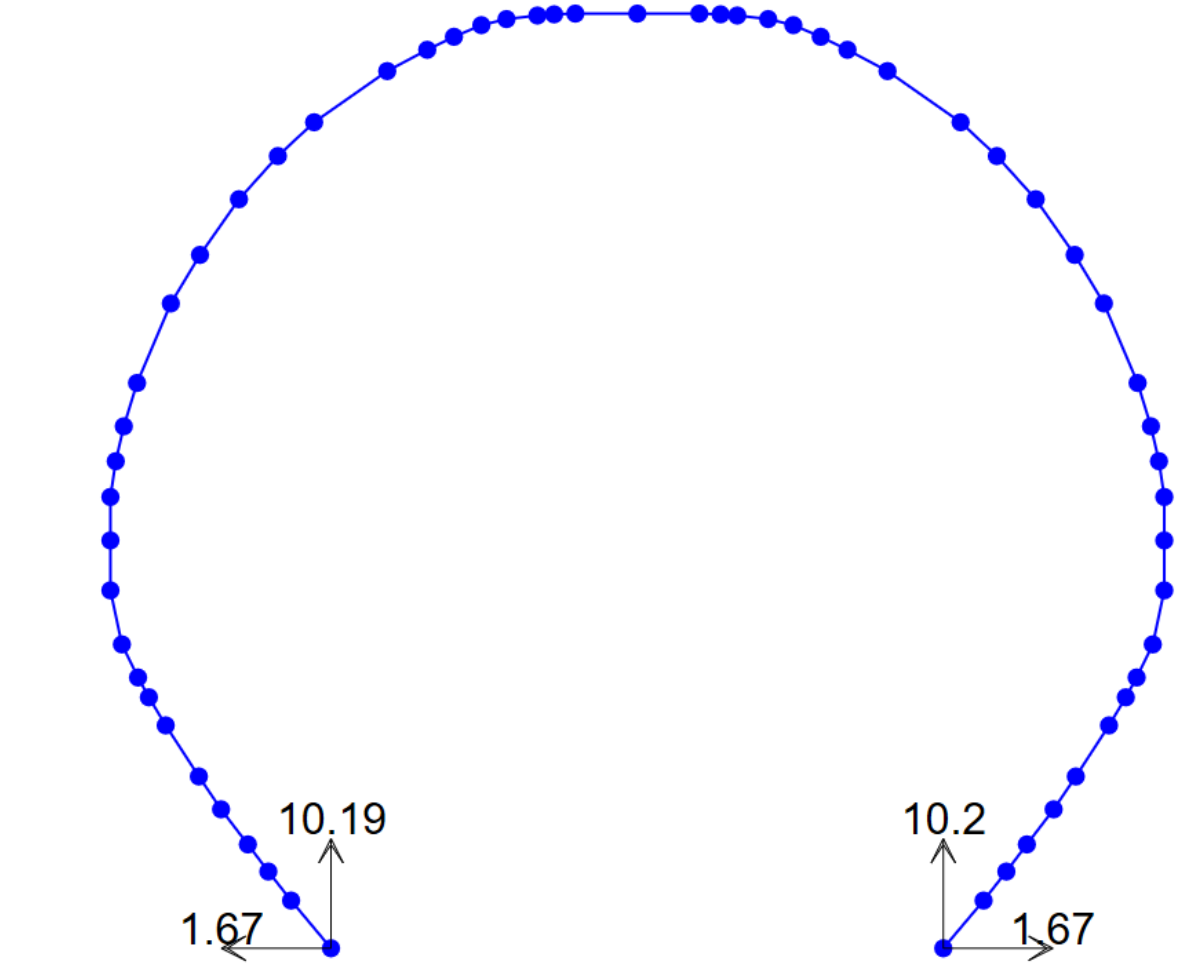
V = 1257/8 = 157 lbs/per bolt

Seismic calcs for canopy Check



Loading :
DL = 30 psf, LLR = 20 psf, W = 17.54 psf
Tributary width = 5.5-ft
Vertical Seismic Load: E_V = 0.2Sds*D = 0.2*0.42*5.5*15= 6.93 psf
Combinations: 1.2DL + 0.5LLR +1W
1.2DL +0.5LLR +1E

REACTION:



Base reaction
(COMBO: 1.2DL+0.5LL+2.5EV)

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Cast-in-place
Material: F1554 Grade 55
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 10.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 11.38
C_{min} (inch): 3.75
S_{min} (inch): 3.75

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 15.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 28.00 x 28.00 x 0.25

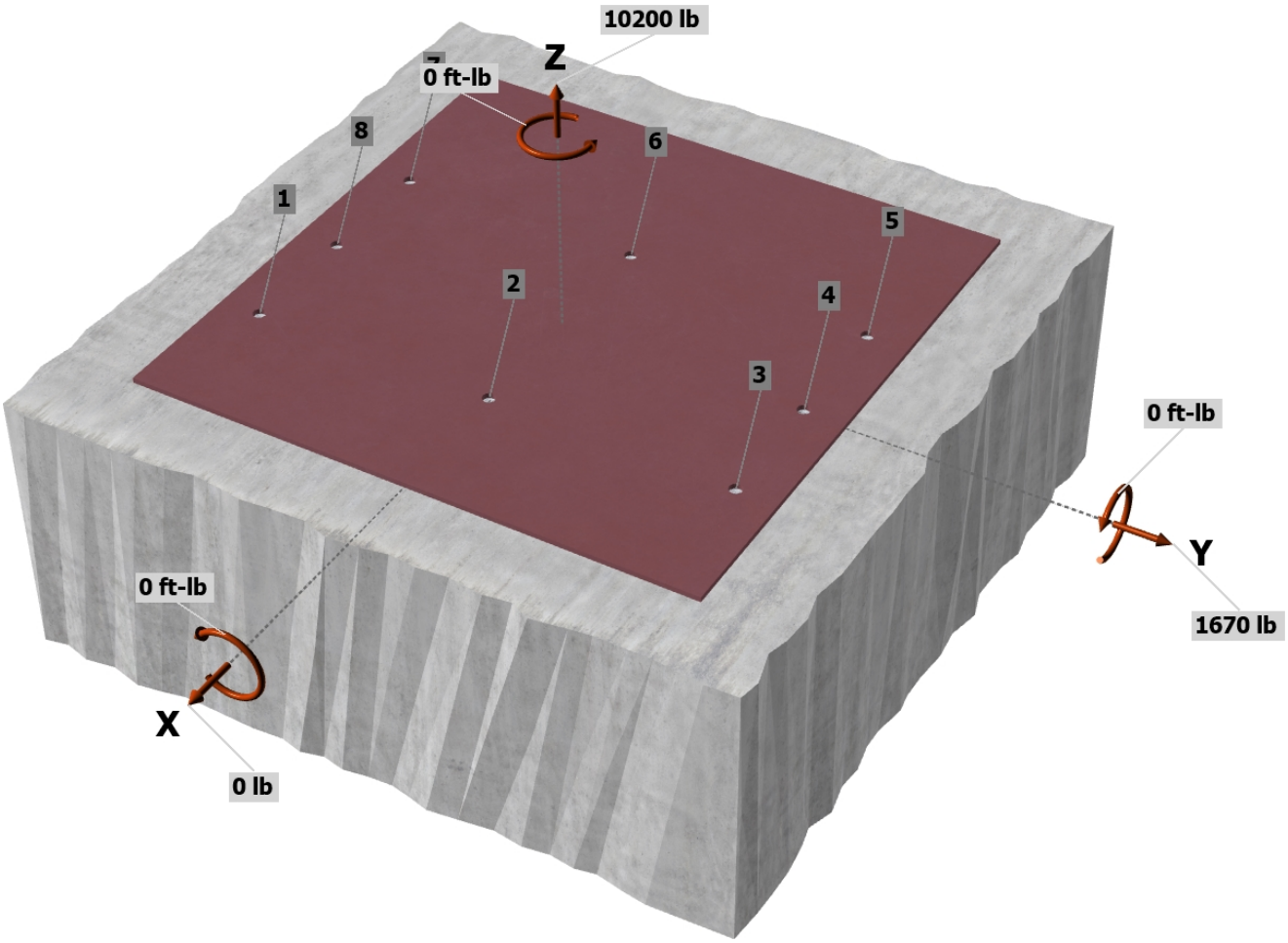
Recommended Anchor
Anchor Name: Heavy Hex Bolt - 5/8"Ø Heavy Hex Bolt, F1554 Gr. 55

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

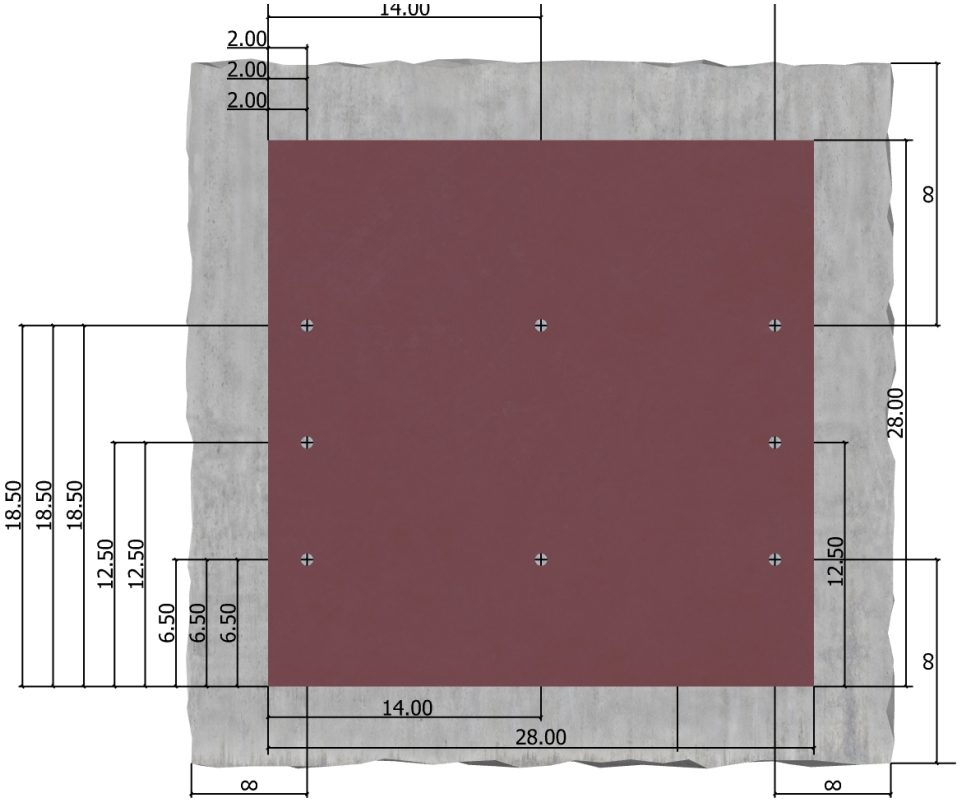
Strength level loads:

N_{ua} [lb]: 10200
V_{uax} [lb]: 0
V_{uay} [lb]: 1670
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

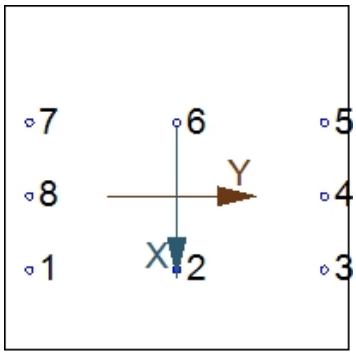

14.00
2.00
2.00
2.00
8
28.00
18.50
18.50
18.50
12.50
12.50
6.50
6.50
6.50
12.50
8
14.00
28.00
8
8

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1275.0	0.0	208.8	208.8
2	1275.0	0.0	208.8	208.8
3	1275.0	0.0	208.8	208.8
4	1275.0	0.0	208.8	208.8
5	1275.0	0.0	208.8	208.8
6	1275.0	0.0	208.8	208.8
7	1275.0	0.0	208.8	208.8
8	1275.0	0.0	208.8	208.8
Sum	10200.0	0.0	1670.0	1670.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 10200
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
16950	0.75	12713

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	2500	10.000	37947

$\phi N_{cbg} = \phi \, (A_{Nc} / A_{Nco}) \, \Psi_{ec,N} \, \Psi_{ed,N} \, \Psi_{c,N} \, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
2268.00	900.00	-	1.000	1.000	1.00	1.000	37947	0.70	66939

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in^2)	f'_c (psi)	ϕ	ϕN_{pn} (lb)
1.0	0.67	2500	0.70	9394

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
10170	1.0	0.65	6611

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cpg} = \phi k_{cp} N_{cbg} = \phi k_{cp} (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.5.3.1b)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cpg} (lb)
2.0	2268.00	900.00	1.000	1.000	1.000	1.000	37947	0.70	133878

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	1275	12713	0.10	Pass
Concrete breakout	**10200**	**66939**	**0.15**	**Pass (Governs)**
Pullout	1275	9394	0.14	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**209**	**6611**	**0.03**	**Pass (Governs)**
Pryout	1670	133878	0.01	Pass

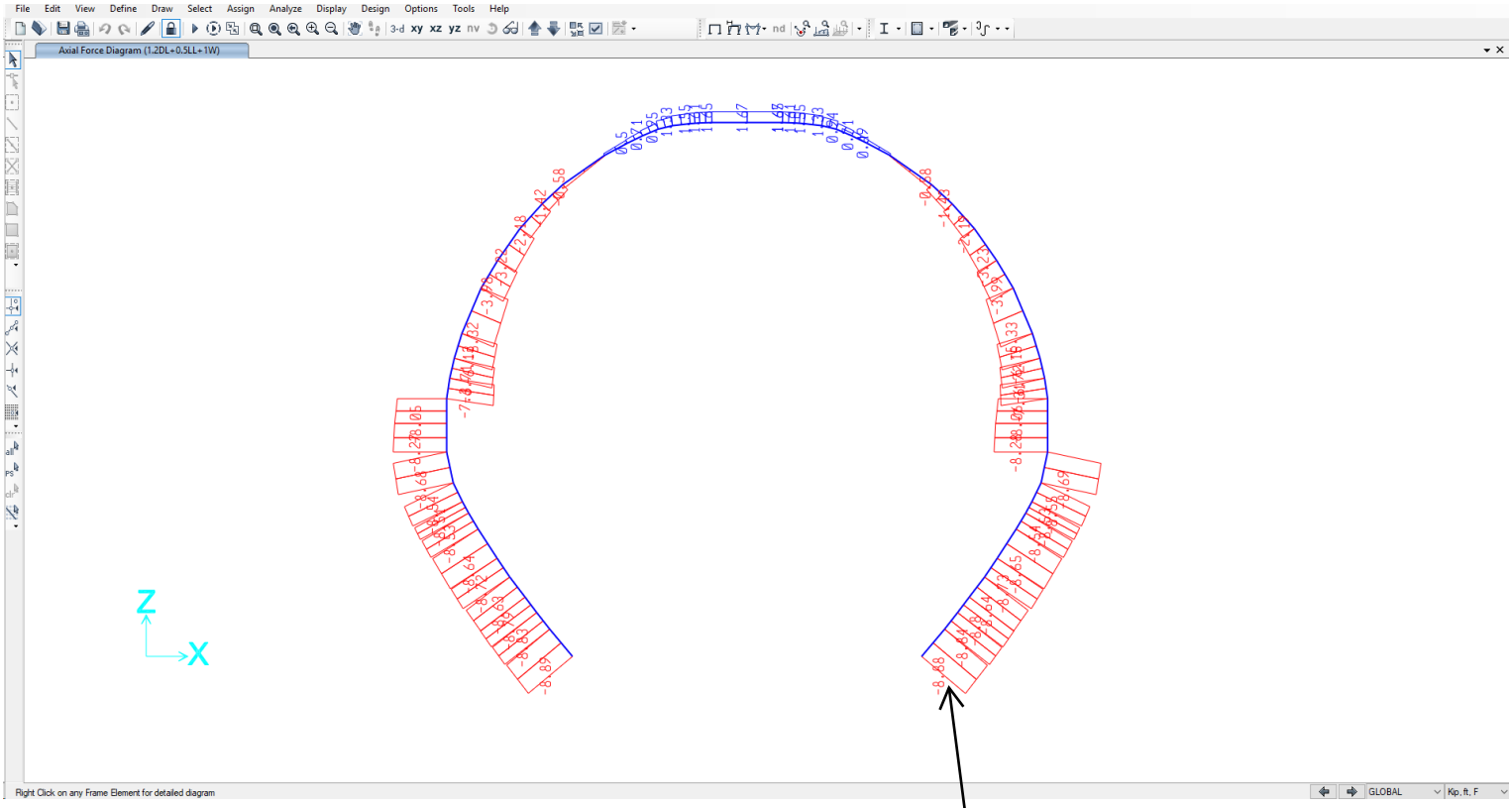
Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..1	0.15	0.00	15.2%	1.0	Pass

5/8"Ø Heavy Hex Bolt, F1554 Gr. 55 with hef = 10.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

Design compressive strength



Maximum axial force:
(Comb: 1.2DL+0.5LL+1.0W)
P = 8.88 kips

Per Chapter E, AISC 360-10:
Check: $P < \phi_c P_n = 0.9 P_n$ (LRFD)

The nominal compressive strength, $P_n = F_{cr} A_g$
The critical stress F_{cr} is determined as follows:

$$F_{cr} = 0.877 F_e \quad = 0.877*4663 = 4089 \text{ psi}$$

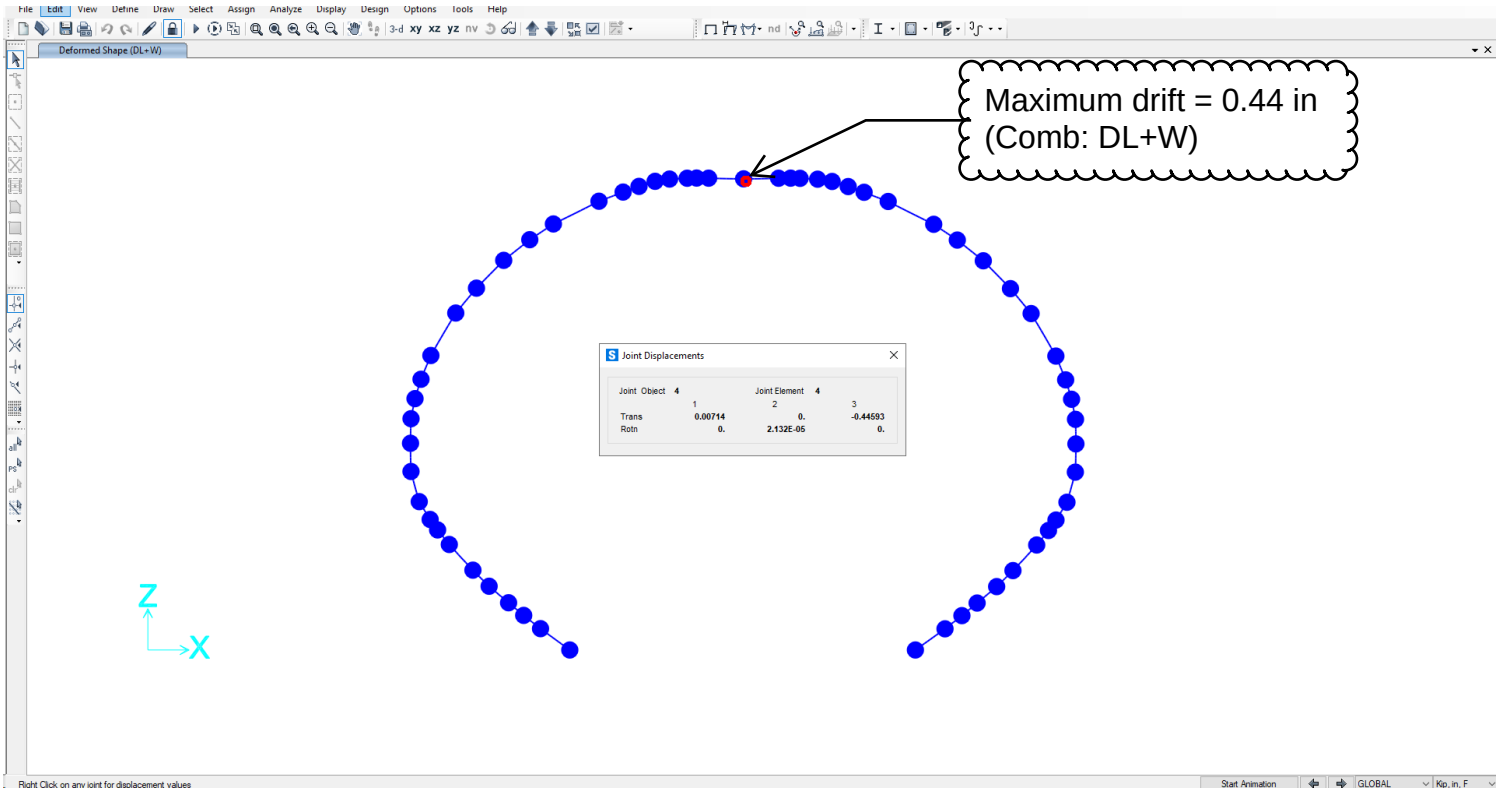
Because: KL/r > $4.71\sqrt{(E/Fy)}$
with KL/r = 0.85x12/(3.75/2) = 5.44
$4.71\sqrt{(E/F_y)}$= $4.71\sqrt{(29000/36000)}$ = 4.23
Elastic buckling stress:

$$F_e = \frac{\pi^2 E}{\left(\frac{KL}{r}\right)^2} \quad = \pi*29000/(5.44\text{^}2) = 3078 \text{ psi}$$

=> $P_n = F_{cr} A_g$ = 3078*6.25 = 19241 lbs
=> P = 8880 < 0.9*19241 = 17317 lbs

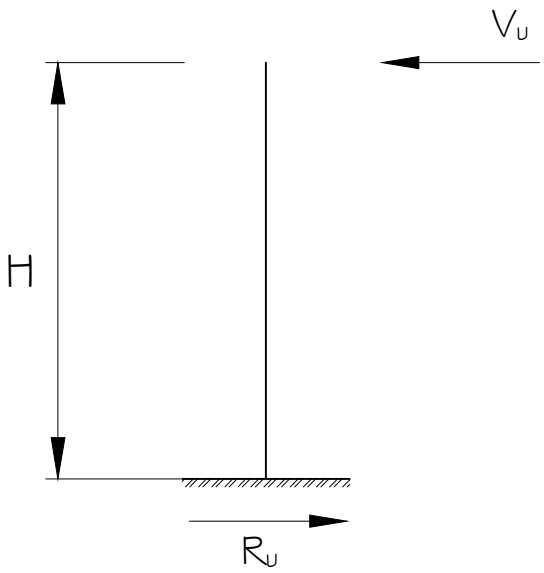
=> Therefore sastisfy the demand.

Check displacements



Maximum displacement = 0.44 in < L/240 = 0.8in => **OK**

MODEL:



H = 12 ft = 144 in

$R_u = V_u$

Mmax = V_u x H

$$\Delta max = \frac{V_u \times H^3}{3EI}$$

$Ø_b = 0.9$

USING A36 CARBON STEEL

Fy = 36 ksi

$$Cs = \frac{S_{DS}}{(R/I_e)}$$

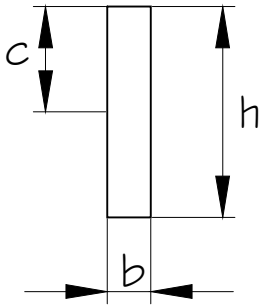
Cs = 0.442/1.25 = 0.35

↳ ØMn = 0.9 x Fy x Zx

Where $Zx = \frac{bh^4}{4}$

Zx = 18.9 in^3

ØMn = 612 kip-in



b = 0.625 in

h = 11 in

$V_u = C_S$ x W

V_u = 30 psf x [(5.5 x 15)ft^2 + ($\frac{12ft}{2}$ x 2 x 5.5)ft^2] = 4455#

V_u = 0.35 x 4455# = 1559.3# or 1.56 kips

Per column, V_u = 1.56/2 = 0.78 kips

Mmax = 0.78k x 144in = 112.3 kip-in

↳ ØMn > Mmax

Check deflection:

$$\Delta max = \frac{V_u \times H^3}{3EI}$$

$$I = \frac{bh^3}{12} = 69.3 \text{ in}^4 \qquad E = 29000 \text{ ksi} \qquad V_u = 0.78 \text{ kips}$$

$$\Delta max = \frac{0.78 \times (144 \text{in})^3}{3(29000)(69.3)} \qquad \Delta all = \frac{L}{240} = \frac{144 \text{ in}}{240} = 0.6 \text{ in}$$

Δmax = 0.39 in (towards or away from face of modular building) < Δall

→ Determine structural separation:

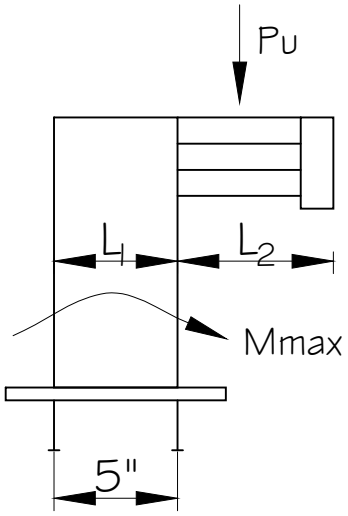
$$\delta_M = \frac{C_d \, \delta_{max}}{I} = \frac{2.0 \times 0.103 \text{ in}}{1.0}$$

δ_M = 0.206 in → compare to story drift

$\Delta_a = 0.02H = 0.02 \times 144\text{in} = 2.88$ in

→ SPECIFY MIN 3" STRUCT SEPARATION BETWEEN ENTRY CANOPY & MODULAR

CALCULATE Mmax DUE TO SELF WEIGHT:



Pu acts @ center of "L_2" span

S = 22 in, L_1 = 2A , L_2 = 3A

$$\frac{Mmax}{S} = Tu = Cu$$

$\rightarrow$ Mmax = Pu x (L_1 + L_2/2)

Considering: D_L = 30 psf

L_L = 20 psf

W = 17.54 psf

Ev = 0.2 S_{DS} W_P

Ev = 0.2 x 0.42 x 30psf = 2.52 psf

LOAD COMBOS :

1.2D_L + 0.5Lr + 1.0W (1)

1.2D_L + 0.5Lr + 1.0E (2)

(1) : (1.2 x 30) + (0.5 x 20) + 17.54

Wu = 63.54 psf

(2) : (1.2 x 30) + (0.5 x 20) + 2.52

Wu = 48.52 psf

Pu = Wu x A_T

Pu = 63.54psf x (5.5ft x 15ft)

Pu = 5242 # or 5.24 kips

=> Mmax = 5.24 kips x (24in + 18in)

Mmax = 220 kip-in

CONSIDER Mmax IN BOTH DIRECTIONS TO BE CONSERVATIVE:

$$Mmax_{(design)} = \underset{(AXIAL)}{1.0Mmax} + \underset{(LATERAL)}{0.3Mmax}$$

$$Mmax_D = 220kip\text{-}in + (0.3 \times 112.3\ kip\text{-}in)$$

$$Mmax_D = 253.69\ kip\text{-}in$$

$$Tu = \Omega \times \frac{Mmax_D}{S} \qquad \Omega = 1.25 \text{ (per Table 12.2.1)}$$

$$Tu = 1.25 \times \frac{253.69kip\text{-}in}{22in}$$

$$\Rightarrow Tu = 14.4\ kips$$
$$\Rightarrow Vu = 0.78\ kips$$
} see Simpson anchor designer output

2 ANCHOR CONDITION:

Per anchor. $Tu = 14.4\ kips/2$

$Tu = 7.21\ kips$

$Vu = 0.357\ kips/6$

$Vu = 60\ \#$

3 ANCHOR CONDITION:

$Tu = 4.8\ kips$
$Vu = 60\ \#$
} see updated detail 5/SD1.0

Company:	Core Structure Inc.	Date:	8/8/2022
Engineer:	S.W.	Page:	1/5
Project:	PVC Blythe Entry Canopy		
Address:	23172 Plaza Pointe Drive		
Phone:	949.954.7244		
E-mail:	info@corestructure.com		

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description: Base Plate Tension Anchor

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Cast-in-place
Material: F1554 Grade 36
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 10.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 11.38
C_{min} (inch): 3.75
S_{min} (inch): 3.75

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Uncracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental reinforcement: No
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

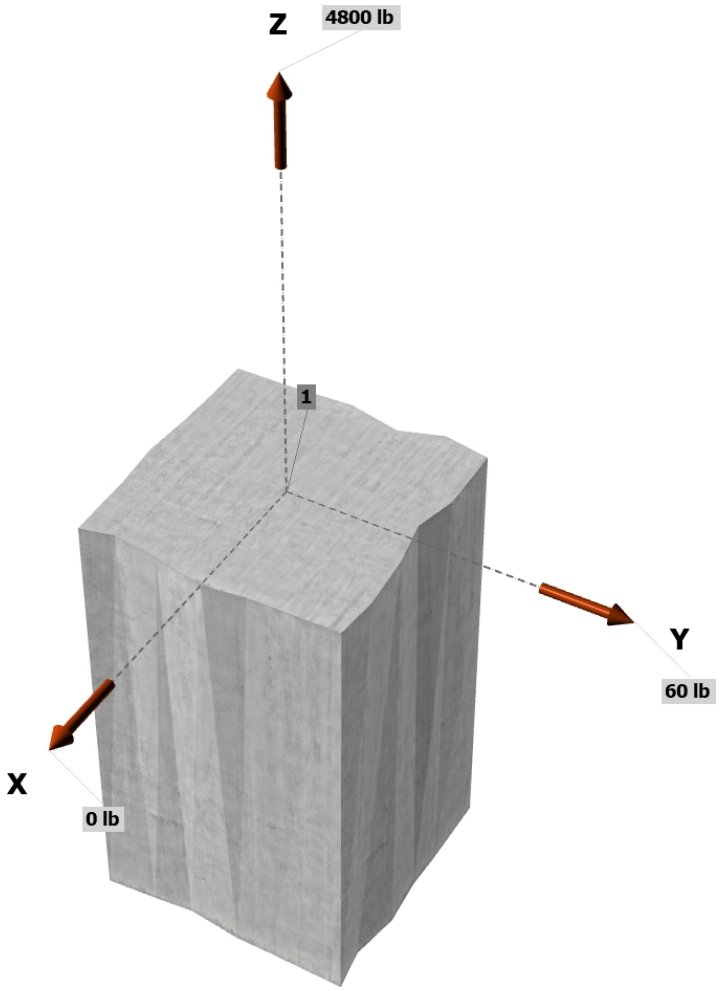
Recommended Anchor
Anchor Name: Heavy Hex Bolt - 5/8"Ø Heavy Hex Bolt, F1554 Gr. 36

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: Not applicable
Ductility section for tension: 17.2.3.4.2 not applicable
Ductility section for shear: 17.2.3.5.2 not applicable
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

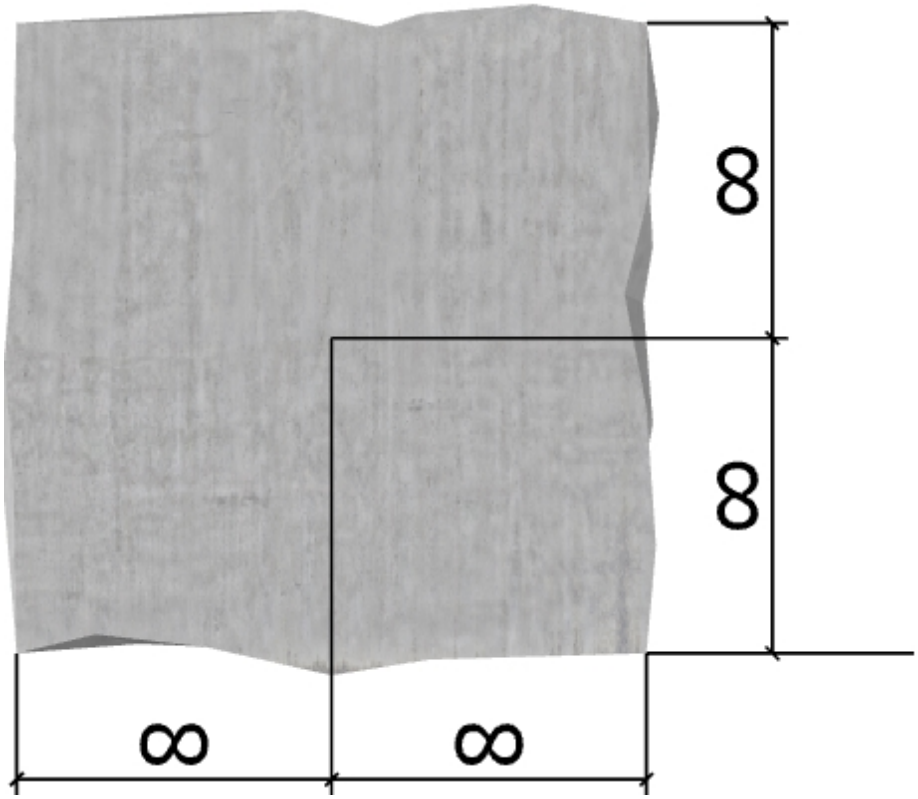
Strength level loads:

N_{ua} [lb]: 4800
V_{uax} [lb]: 0
V_{uay} [lb]: 60

<Figure 1>



<Figure 2>



3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	4800.0	0.0	60.0	60.0
Sum	4800.0	0.0	60.0	60.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4800
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13100	0.75	9825

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	2500	10.000	37947

$0.75\phi N_{cb} = 0.75\phi \left(A_{Nc} / A_{Nco}\right) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1a)

A_{Nc} (in^2)	A_{Nco} (in^2	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	$0.75\phi N_{cb}$ (lb)
900.00	900.00	-	1.000	1.25	1.000	37947	0.70	24903

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$0.75\phi N_{pn} = 0.75\phi \Psi_{c,P} N_p = 0.75\phi \Psi_{c,P} 8 A_{brg} f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in^2)	f'_c (psi)	ϕ	$0.75\phi N_{pn}$ (lb)
1.4	0.67	2500	0.70	9864

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
7865	1.0	0.65	5112

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi k_{cp} N_{cb} = \phi k_{cp}(A_{Nc} / A_{Nco})\, \Psi_{ed,N}\, \Psi_{c,N}\, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	900.00	900.00	1.000	1.250	1.000	37947	0.70	66408

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	**4800**	**9825**	**0.49**	**Pass (Governs)**
Concrete breakout	4800	24903	0.19	Pass
Pullout	4800	9864	0.49	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**60**	**5112**	**0.01**	**Pass (Governs)**
Pryout	60	66408	0.00	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..1	0.49	0.00	48.9%	1.0	Pass

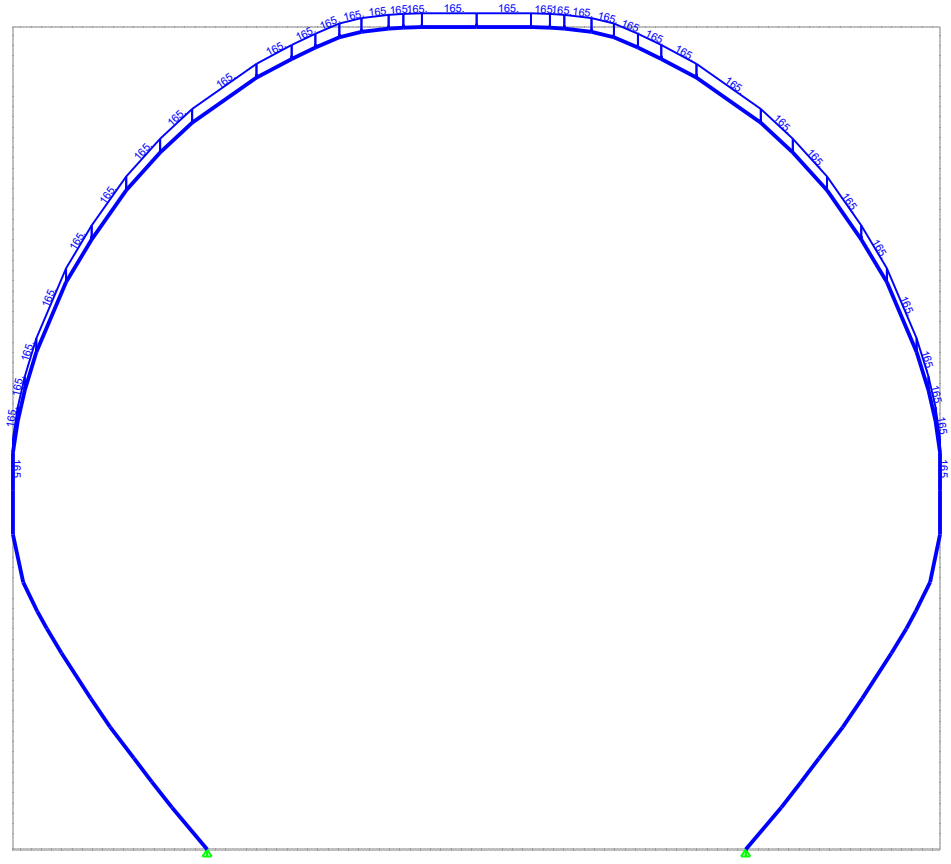
5/8"Ø Heavy Hex Bolt, F1554 Gr. 36 with hef = 10.000 inch meets the selected design criteria.

12. Warnings

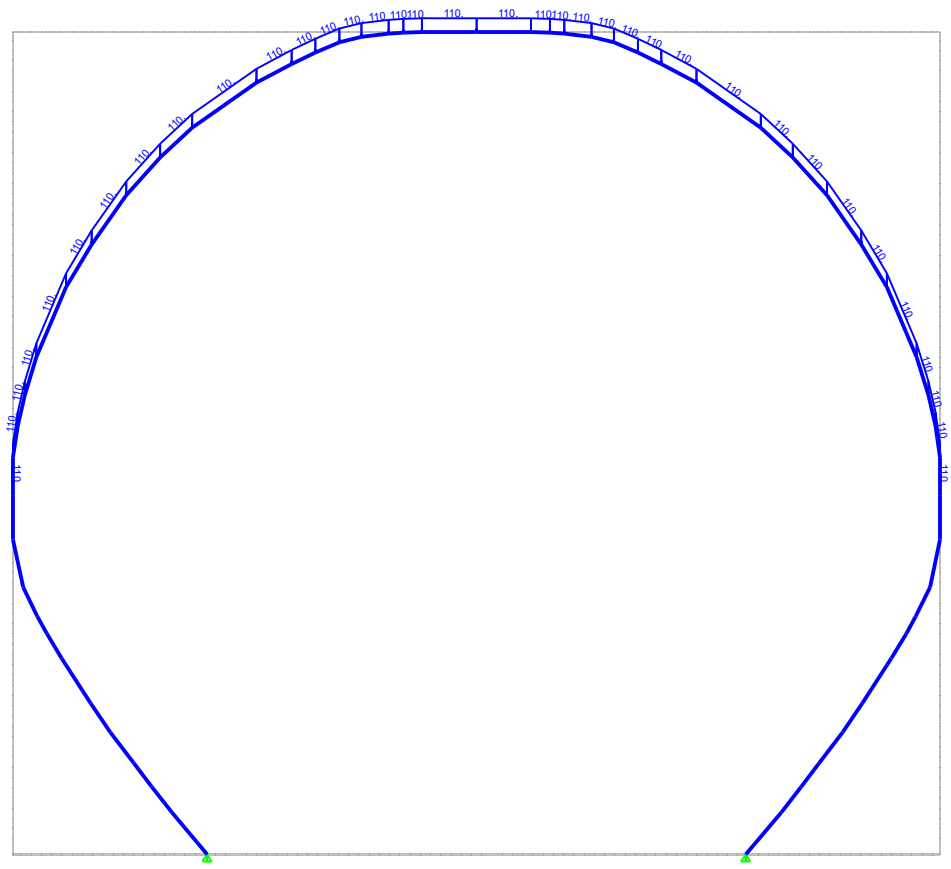
- Per designer input, the tensile component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor tensile force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.4.2 for tension need not be satisfied – designer to verify.

- Per designer input, the shear component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor shear force associated with the same load combination. Therefore the ductility requirements of ACI 318 17.2.3.5.2 for shear need not be satisfied – designer to verify.

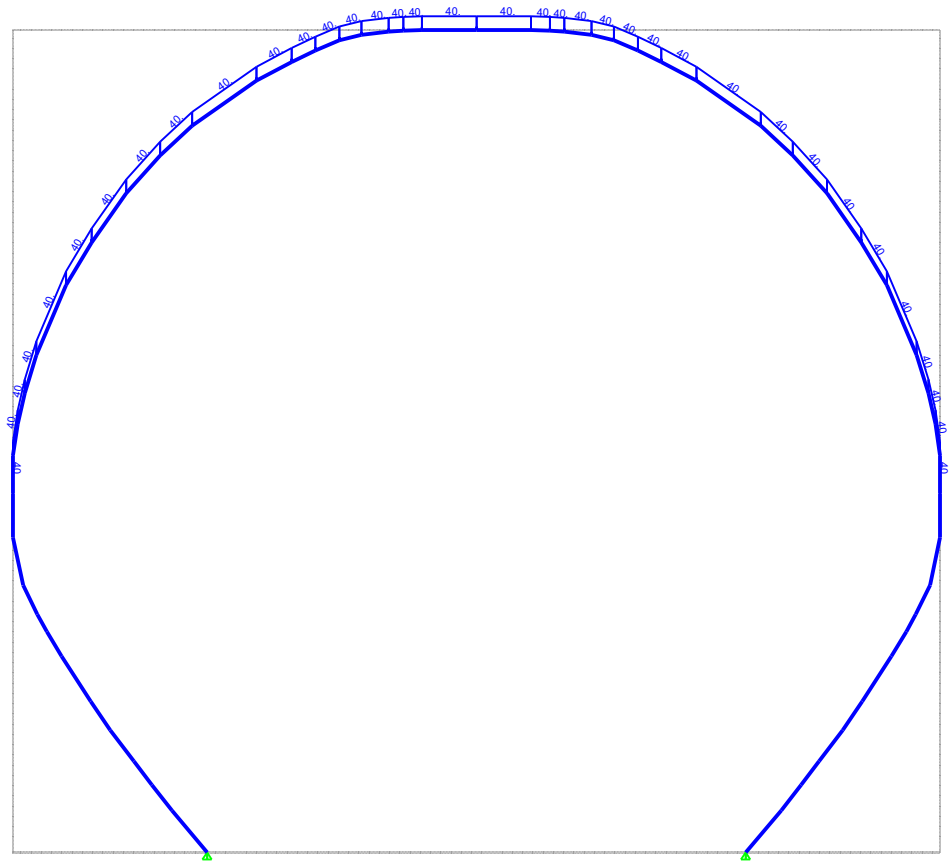
- Designer must exercise own judgement to determine if this design is suitable.



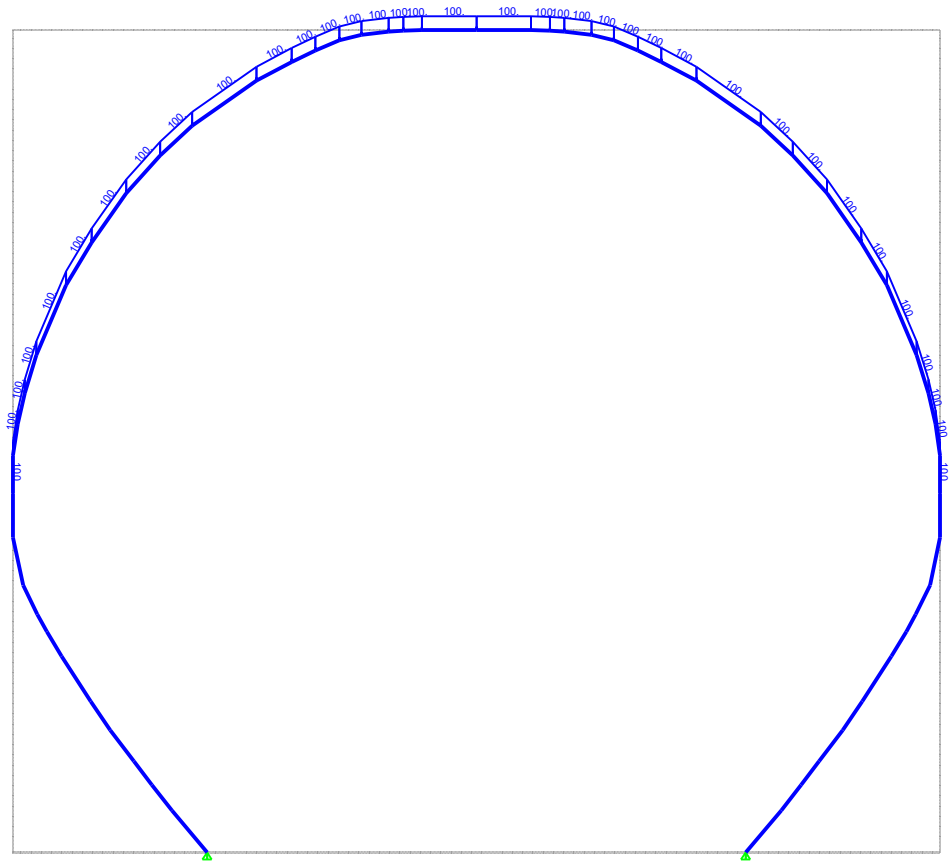
DEAD LOAD



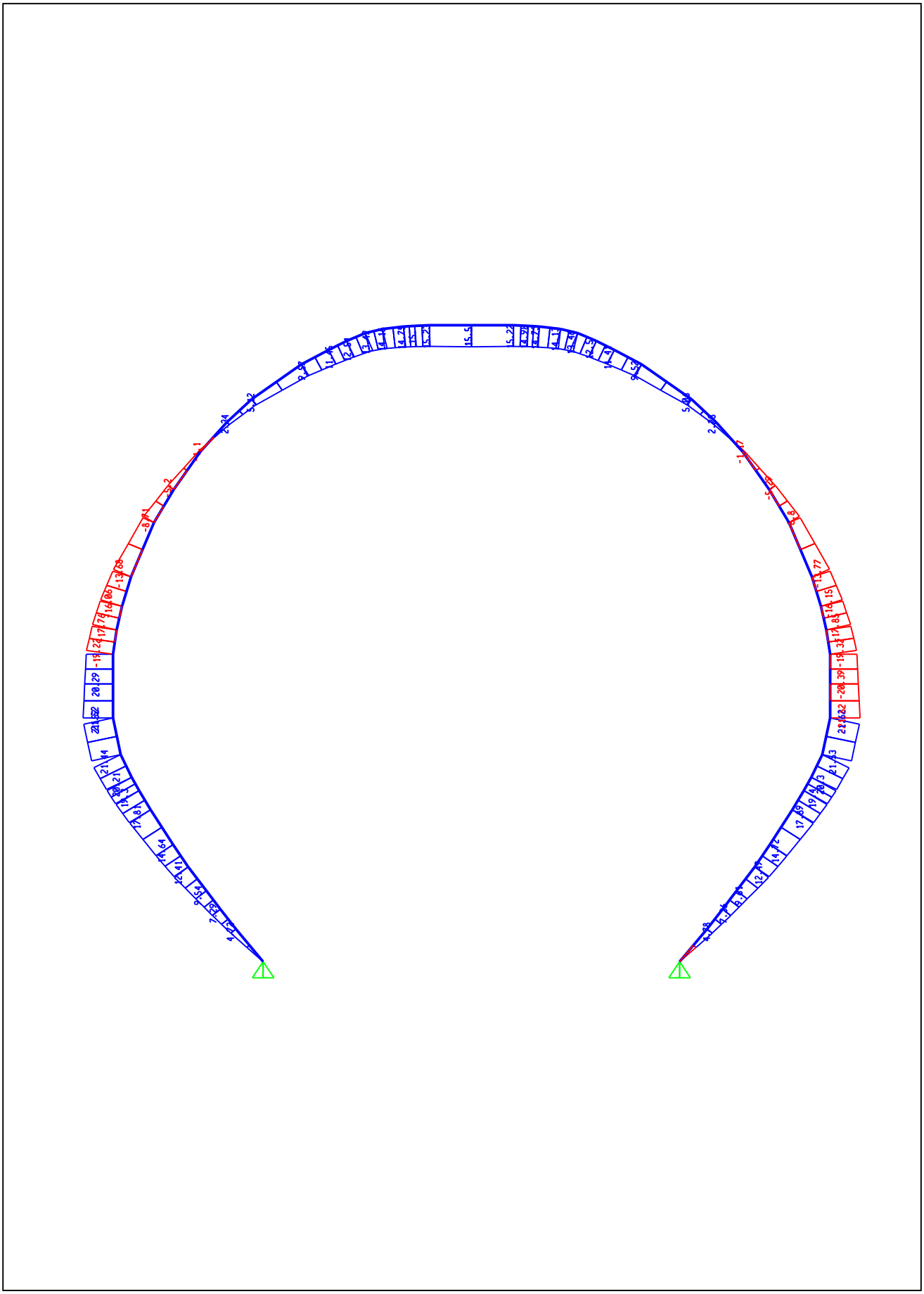
LIVE LOAD

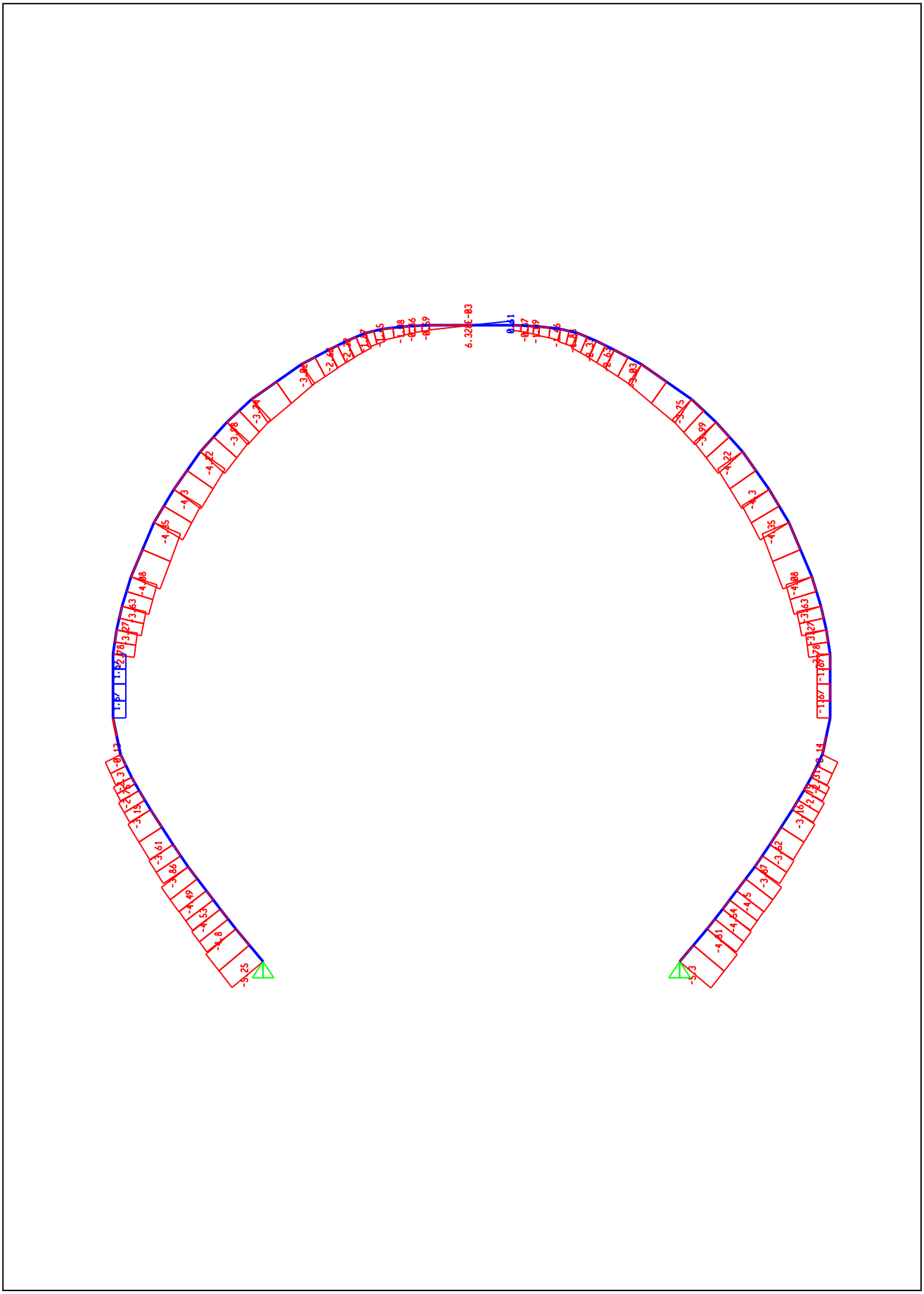


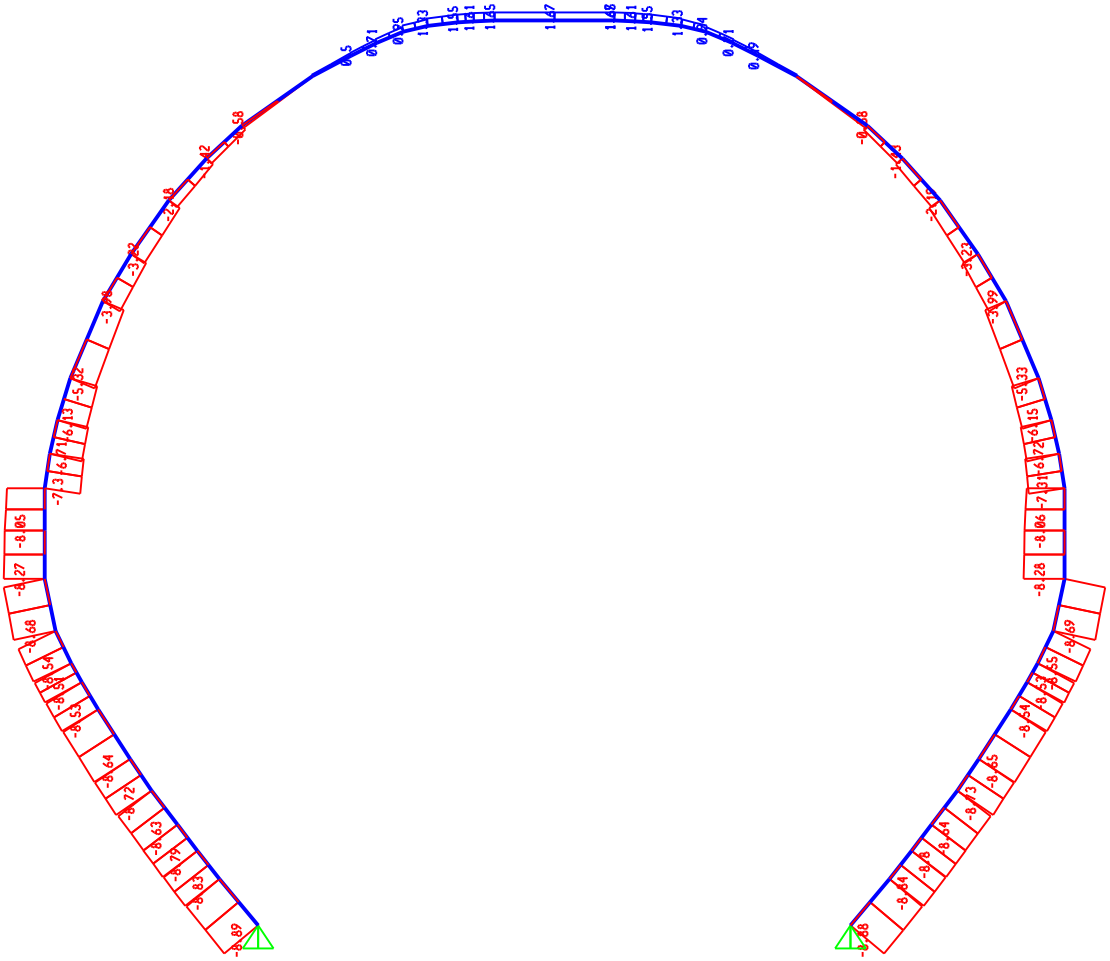
SEISMIC LOAD

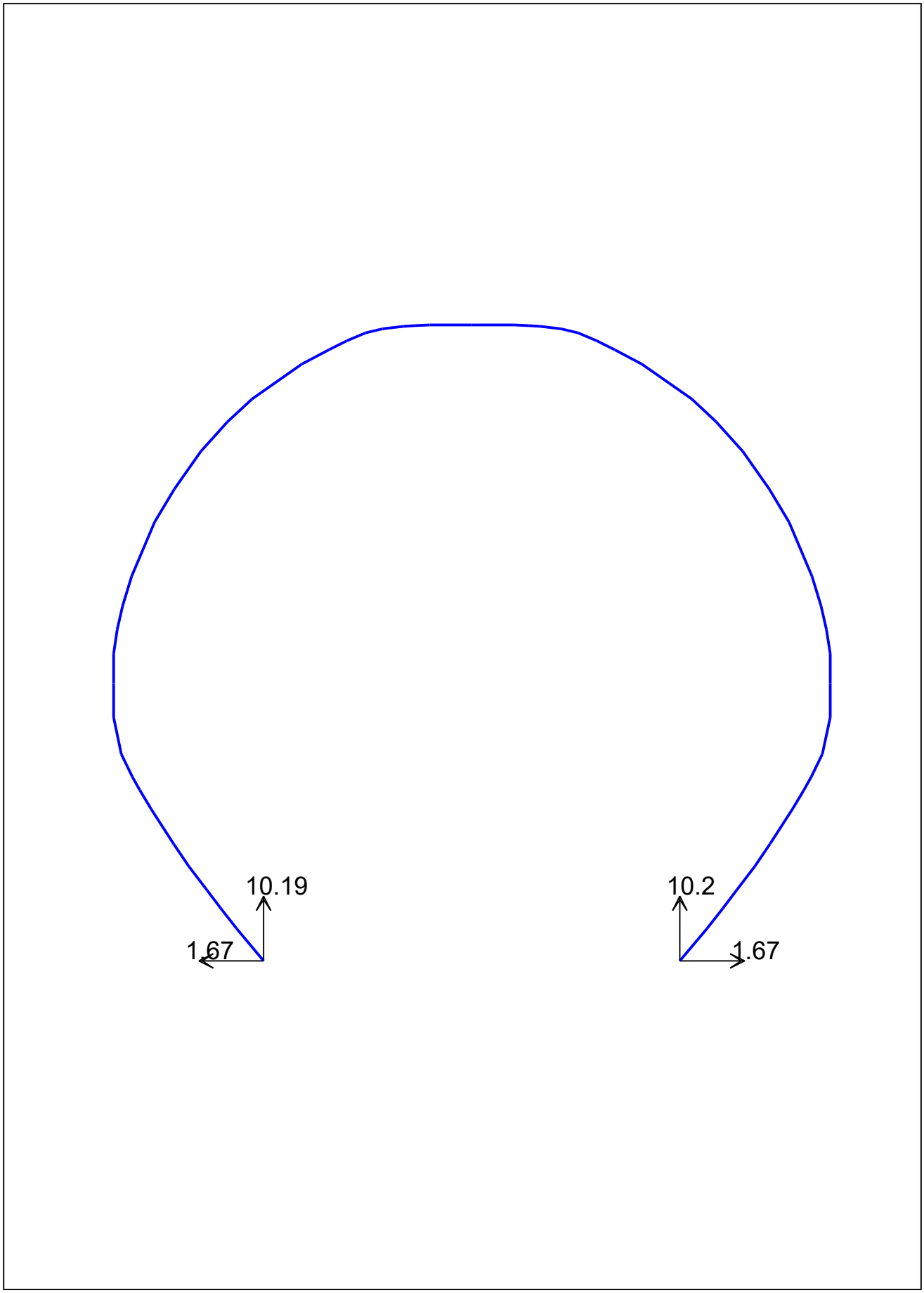


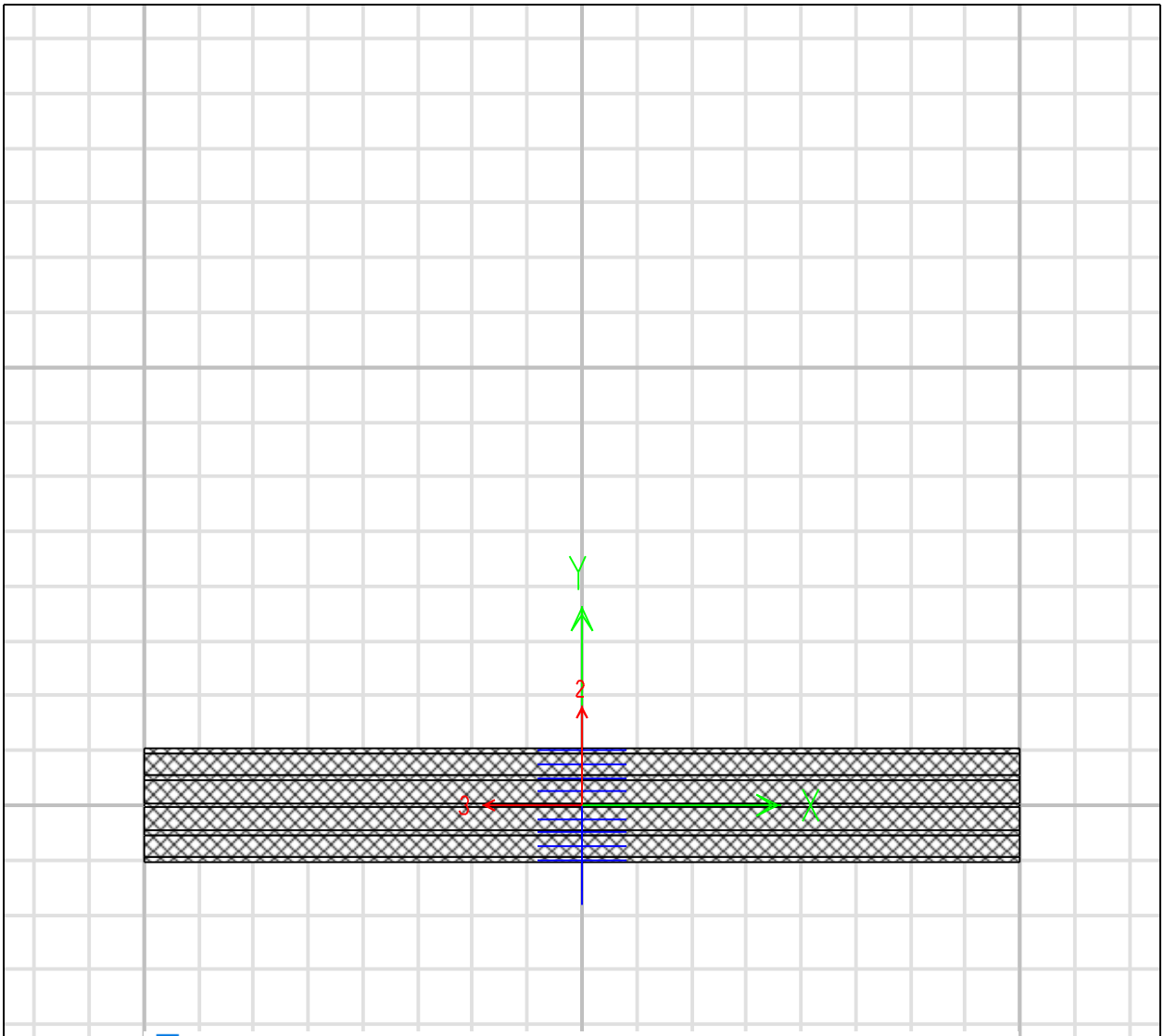
WIND LOAD








10.19
1.67
10.2
1.67



Property Data

Section Name: 5-1/8" Thick CURVED

Properties

Cross-section (axial) area	0.5208	Section modulus about 3 axis	0.0226
Moment of Inertia about 3 axis	2.943E-03	Section modulus about 2 axis	0.1736
Moment of Inertia about 2 axis	0.1736	Plastic modulus about 3 axis	0.0339
Product of Inertia about 2-3	0.	Plastic modulus about 2 axis	0.2604
Shear area in 2 direction	0.4362	Radius of Gyration about 3 axis	0.0752
Shear area in 3 direction	0.4362	Radius of Gyration about 2 axis	0.5774
Torsional constant	0.0108	Shear Center Eccentricity (x3)	0.

OK

Core Structure, INC.
23172 Plaza Pointe Dr.
Suite #145
Laguna Hills, CA 92653

Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Combined Footing

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: ENTRY SHROUD FOOTING

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength		2.50 ksi
fy : Rebar Yield		60.0 ksi
Ec : Concrete Elastic Modulus		2,850.0 ksi
Concrete Density		150.0 pcf
ϕ : Phi Values	Flexure :	0.90
	Shear :	0.750

Analysis/Design Settings

Calculate footing weight as dead load ?	Yes
Calculate Pedestal weight as dead load ?	No
Min Steel % Bending Reinf (based on 'd')	
Min Allow % Temp Reinf (based on thick)	0.00180
Min. Overturning Safety Factor	1.0: 1
Min. Sliding Safety Factor	1.0: 1

Soil Information

Allowable Soil Bearing	2.0 ksf
Increase Bearing By Footing Weight	No
Soil Passive Sliding Resistance	300.0 pcf
(Uses entry for "Footing base depth below soil surface" for force)	
Coefficient of Soil/Concrete Friction	0.350

Soil Bearing Increase

Footing base depth below soil surface	2.0 ft
Increases based on footing Depth	
Allowable pressure increase per foot	ksf
when base of footing is below	ft
Increases based on footing Width . . .	
Allowable pressure increase per foot	ksf
when maximum length or width is greater than	ft
Maximum Allowed Bearing Pressure	10.0 ksf
(A value of zero implies no limit)	
Adjusted Allowable Soil Bearing	2.0 ksf
(Allowable Soil Bearing adjusted for footing weight and depth & width increases as specified by user.)	

Dimensions & Reinforcing

Distance Left of Column #1	=	0.50 ft
Between Columns	=	15.750 ft
Distance Right of Column #2	=	0.50 ft
Total Footing Length	=	16.750 ft
Footing Width	=	3.0 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

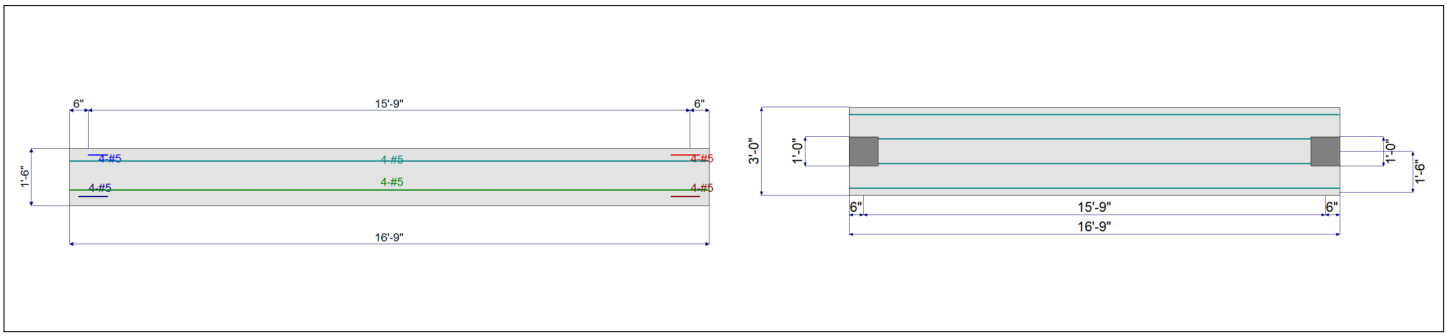
		Col #1	Col #2
Sq. Dim.	=	12.0	12.0 in
Height	=		in

Rebar Center to Concrete Edge @ Top	= 2.0 in
Rebar Center to Concrete Edge @ Bottom	= 3.0 in

Bars left of Col #1	Count	Size #	As Provided	As Req'd
Bottom Bars	4.0	5	1.240	1.166 in^2
Top Bars	4.0	5	1.240	0.0 in^2
Bars Btwn Cols				
Bottom Bars	4.0	5	1.240	1.166 in^2
Top Bars	4.0	5	1.240	1.166 in^2
Bars Right of Col #2				
Bottom Bars	4.0	5	1.240	0.0 in^2
Top Bars	4.0	5	1.240	0.0 in^2

Applied Loads

Applied @ Left Column		D	Lr	L	S	W	E	H
Axial Load Downward	=	6.910		1.340		1.220	0.490	k
Moment (+CW)	=	19.60						k-ft
Shear (+X)	=	-1.150		0.210		-0.190	-0.080	k
Applied @ Right Column								
Axial Load Downward	=	6.920		1.34		1.220	0.490	k
Moment (+CW)	=	19.60						k-ft
Shear (+X)	=	1.150		0.210		0.190	0.080	k
Overburden	=							



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Project Title:
Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Combined Footing

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: ENTRY SHROUD FOOTING

DESIGN SUMMARY

Design OK

Factor of Safety		Item	Applied	Capacity	Governing Load Combination
PASS	5.184	Overturning	40.925 k-ft	212.162 k-ft	+D+H
PASS	27.198	Sliding	0.420 k	11.423 k	+D+L+H
PASS	No Uplift	Uplift	0.0 k	0.0 k	No Uplift

Utilization Ratio		Item	Applied	Capacity	Governing Load Combination
PASS	0.4224	Soil Bearing	0.8447 ksf	2.0 ksf	+D+0.750Lr+0.750L+0.450W+H
PASS	0.2283	1-way Shear - Col #1	17.122 psi	75.0 psi	+1.20D+0.50Lr+L+W+1.60H
PASS	0.1332	1-way Shear - Col #2	9.990 psi	75.0 psi	+1.20D+0.50Lr+L+W+1.60H
PASS	0.04008	2-way Punching - Col #1	6.012 psi	150.0 psi	+1.20D+0.50Lr+L+W+1.60H
PASS	0.03116	2-way Punching - Col #2	4.674 psi	150.0 psi	+1.20D+0.50Lr+L+W+1.60H
PASS	No Bending	Flexure - Left of Col #1 - Top	0.0 k-ft	0.0 k-ft	N/A
PASS	No Bending	Flexure - Left of Col #1 - Bottom	0.0 k-ft	0.0 k-ft	N/A
PASS	0.5641	Flexure - Between Cols - Top	-48.833 k-ft	86.567 k-ft	+1.20D+0.50Lr+L+W+1.60H
PASS	0.2488	Flexure - Between Cols - Bottom	20.153 k-ft	80.987 k-ft	+1.40D+1.60H
PASS	No Bending	Flexure - Right of Col #2 - Top	0.0 k-ft	0.0 k-ft	N/A
PASS	No Bending	Flexure - Right of Col #2 - Bottom	0.0 k-ft	0.0 k-ft	N/A

Soil Bearing

Load Combination...	Total Bearing	Eccentricity from Ftg CL	Actual Soil Bearing Stress @ Left Edge	@ Right Edge	Allowable	Actual / Allow Ratio
+D+H	25.14 k	1.563 ft	0.22 ksf	0.78 ksf	2.00 ksf	0.390
+D+L+H	27.82 k	1.435 ft	0.27 ksf	0.84 ksf	2.00 ksf	0.419
+D+Lr+H	25.14 k	1.563 ft	0.22 ksf	0.78 ksf	2.00 ksf	0.390
+D+S+H	25.14 k	1.563 ft	0.22 ksf	0.78 ksf	2.00 ksf	0.390
+D+0.750Lr+0.750L+H	27.15 k	1.464 ft	0.26 ksf	0.82 ksf	2.00 ksf	0.411
+D+0.750L+0.750S+H	27.15 k	1.464 ft	0.26 ksf	0.82 ksf	2.00 ksf	0.411
+D+0.60W+H	26.60 k	1.477 ft	0.25 ksf	0.81 ksf	2.00 ksf	0.404
+D-0.60W+H	23.67 k	1.659 ft	0.19 ksf	0.75 ksf	2.00 ksf	0.375
+D+0.750Lr+0.750L+0.450W+H	28.24 k	1.407 ft	0.28 ksf	0.84 ksf	2.00 ksf	0.422
+D+0.750Lr+0.750L-0.450W+H	26.05 k	1.526 ft	0.24 ksf	0.80 ksf	2.00 ksf	0.401
+D+0.750L+0.750S+0.450W+H	28.24 k	1.407 ft	0.28 ksf	0.84 ksf	2.00 ksf	0.422
+D+0.750L+0.750S-0.450W+H	26.05 k	1.526 ft	0.24 ksf	0.80 ksf	2.00 ksf	0.401
+0.60D+0.60W+0.60H	16.55 k	1.424 ft	0.16 ksf	0.50 ksf	2.00 ksf	0.248
+0.60D-0.60W+0.60H	13.62 k	1.731 ft	0.10 ksf	0.44 ksf	2.00 ksf	0.219
+D+0.70E+0.60H	25.82 k	1.521 ft	0.23 ksf	0.79 ksf	2.00 ksf	0.397
+D-0.70E+0.60H	24.45 k	1.606 ft	0.21 ksf	0.77 ksf	2.00 ksf	0.383
+D+0.750L+0.750S+0.5250E+H	27.66 k	1.437 ft	0.27 ksf	0.83 ksf	2.00 ksf	0.417
+D+0.750L+0.750S-0.5250E+H	26.63 k	1.493 ft	0.25 ksf	0.81 ksf	2.00 ksf	0.406
+0.60D+0.70E+H	15.77 k	1.495 ft	0.15 ksf	0.48 ksf	2.00 ksf	0.241
+0.60D-0.70E+H	14.40 k	1.637 ft	0.12 ksf	0.45 ksf	2.00 ksf	0.227

Overturning Stability

Load Combination...	Moments about Left Edge k-ft Overturning	Resisting	Ratio	Moments about Right Edge k-ft Overturning	Resisting	Ratio
+D+H	1.73	251.52	145.809	40.93	212.16	5.184
+D+L+H	1.73	274.59	159.185	41.56	234.61	5.646
+D+Lr+H	1.73	251.52	145.809	40.93	212.16	5.184
+D+S+H	1.73	251.52	145.809	40.93	212.16	5.184
+D+0.750Lr+0.750L+H	1.73	268.83	155.841	41.40	229.00	5.532
+D+0.750L+0.750S+H	1.73	268.83	155.841	41.40	229.00	5.532
+D+0.60W+H	1.90	263.95	139.215	41.10	224.59	5.465
+D+0.750Lr+0.750L+0.450W+H	1.85	278.15	150.088	41.53	238.32	5.739
+D+0.750L+0.750S+0.450W+H	1.85	278.15	150.088	41.53	238.32	5.739
+0.60D+0.60W+0.60H	1.21	163.34	135.443	24.73	139.73	5.651
+D+0.70E+0.60H	1.81	257.35	142.260	41.01	217.99	5.316
+D+0.750L+0.750S+0.5250E+H	1.79	273.20	152.795	41.46	233.37	5.629
+0.60D+0.70E+H	1.12	156.74	140.073	24.64	133.13	5.403

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Engineer: Core Staff
Project ID: 21070
Project Descr: Child Development Center

Combined Footing

Lic. # : KW-06010610 — Core Structure, inc.

DESCRIPTION: ENTRY SHROUD FOOTING

Sliding Stability

Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio
+D+H	0.00 k	10.49 k	999
+D+L+H	0.42 k	11.42 k	27.198
+D+Lr+H	0.00 k	10.49 k	999
+D+S+H	0.00 k	10.49 k	999
+D+0.750Lr+0.750L+H	0.32 k	11.19 k	35.52
+D+0.750L+0.750S+H	0.32 k	11.19 k	35.52
+D+0.60W+H	0.00 k	11.00 k	999
+D+0.750Lr+0.750L+0.450W+H	0.32 k	11.57 k	36.74
+D+0.750L+0.750S+0.450W+H	0.32 k	11.57 k	36.74
+0.60D+0.60W+0.60H	0.00 k	7.48 k	999
+D+0.70E+0.60H	0.00 k	10.73 k	999
+D+0.750L+0.750S+0.5250E+H	0.32 k	11.37 k	36.091
+0.60D+0.70E+H	0.00 k	7.21 k	999

Z-Axis Footing Flexure - Maximum Values for Load Combination

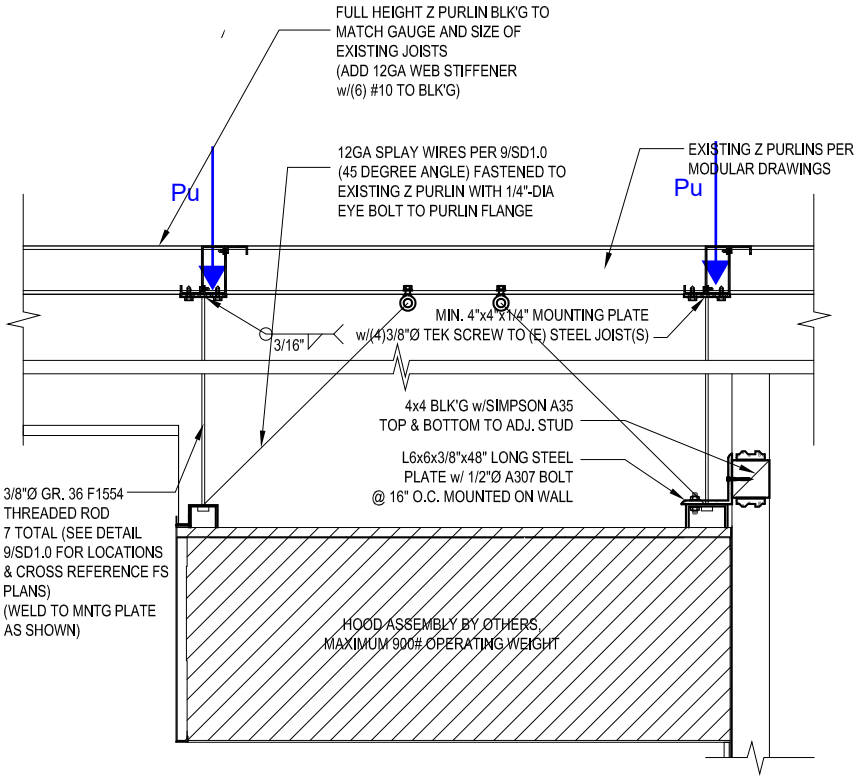
Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+0.60D+0.70E+H	0.000	0.000	0	0.000	0	0.000	0.000	0.000
+0.60D+0.70E+H	0.000	0.042	0	0.000	0	0.000	0.000	0.000
+1.20D+0.50Lr+L+W+1.60H	-0.037	0.084	Top	1.166	Min Temp %	1.240	86.567	0.000
+1.20D+0.50Lr+L+W+1.60H	-0.083	0.126	Top	1.166	Min Temp %	1.240	86.567	0.001
+1.20D+0.50Lr+L+W+1.60H	-0.148	0.168	Top	1.166	Min Temp %	1.240	86.567	0.002
+1.20D+0.50Lr+L+W+1.60H	-0.232	0.209	Top	1.166	Min Temp %	1.240	86.567	0.003
+1.20D+0.50Lr+L+W+1.60H	-0.334	0.251	Top	1.166	Min Temp %	1.240	86.567	0.004
+1.20D+0.50Lr+L+W+1.60H	-0.454	0.293	Top	1.166	Min Temp %	1.240	86.567	0.005
+1.20D+0.50Lr+L+W+1.60H	-0.593	0.335	Top	1.166	Min Temp %	1.240	86.567	0.007
+1.20D+0.50Lr+L+W+1.60H	-0.750	0.377	Top	1.166	Min Temp %	1.240	86.567	0.009
+1.20D+0.50Lr+L+W+1.60H	-0.926	0.419	Top	1.166	Min Temp %	1.240	86.567	0.011
+1.20D+0.50Lr+L+W+1.60H	-1.120	0.461	Top	1.166	Min Temp %	1.240	86.567	0.013
+1.40D+1.60H	23.804	0.503	Bottom	1.166	Min Temp %	1.240	80.987	0.294
+1.40D+1.60H	23.592	0.544	Bottom	1.166	Min Temp %	1.240	80.987	0.291
+1.40D+1.60H	23.364	0.586	Bottom	1.166	Min Temp %	1.240	80.987	0.288
+1.40D+1.60H	23.118	0.628	Bottom	1.166	Min Temp %	1.240	80.987	0.285
+1.40D+1.60H	22.856	0.670	Bottom	1.166	Min Temp %	1.240	80.987	0.282
+1.40D+1.60H	22.577	0.712	Bottom	1.166	Min Temp %	1.240	80.987	0.279
+1.40D+1.60H	22.281	0.754	Bottom	1.166	Min Temp %	1.240	80.987	0.275
+1.40D+1.60H	21.969	0.796	Bottom	1.166	Min Temp %	1.240	80.987	0.271
+1.40D+1.60H	21.639	0.838	Bottom	1.166	Min Temp %	1.240	80.987	0.267
+1.40D+1.60H	21.293	0.879	Bottom	1.166	Min Temp %	1.240	80.987	0.263
+1.40D+1.60H	20.930	0.921	Bottom	1.166	Min Temp %	1.240	80.987	0.258
+1.40D+1.60H	20.550	0.963	Bottom	1.166	Min Temp %	1.240	80.987	0.254
+1.40D+1.60H	20.153	1.005	Bottom	1.166	Min Temp %	1.240	80.987	0.249
+1.40D+1.60H	19.750	1.047	Bottom	1.166	Min Temp %	1.240	80.987	0.244
+1.40D+1.60H	19.348	1.089	Bottom	1.166	Min Temp %	1.240	80.987	0.239
+1.40D+1.60H	18.945	1.131	Bottom	1.166	Min Temp %	1.240	80.987	0.234
+1.40D+1.60H	18.543	1.173	Bottom	1.166	Min Temp %	1.240	80.987	0.229
+1.40D+1.60H	18.141	1.214	Bottom	1.166	Min Temp %	1.240	80.987	0.224
+1.40D+1.60H	17.740	1.256	Bottom	1.166	Min Temp %	1.240	80.987	0.219
+1.40D+1.60H	17.338	1.298	Bottom	1.166	Min Temp %	1.240	80.987	0.214
+1.40D+1.60H	16.937	1.340	Bottom	1.166	Min Temp %	1.240	80.987	0.209
+1.40D+1.60H	16.536	1.382	Bottom	1.166	Min Temp %	1.240	80.987	0.204
+1.40D+1.60H	16.136	1.424	Bottom	1.166	Min Temp %	1.240	80.987	0.199
+1.40D+1.60H	15.736	1.466	Bottom	1.166	Min Temp %	1.240	80.987	0.194
+1.40D+1.60H	15.336	1.508	Bottom	1.166	Min Temp %	1.240	80.987	0.189
+1.40D+1.60H	14.936	1.549	Bottom	1.166	Min Temp %	1.240	80.987	0.184
+1.40D+1.60H	14.537	1.591	Bottom	1.166	Min Temp %	1.240	80.987	0.180
+1.40D+1.60H	14.138	1.633	Bottom	1.166	Min Temp %	1.240	80.987	0.175
+1.40D+1.60H	13.740	1.675	Bottom	1.166	Min Temp %	1.240	80.987	0.170
+1.40D+1.60H	13.342	1.717	Bottom	1.166	Min Temp %	1.240	80.987	0.165
+1.40D+1.60H	12.944	1.759	Bottom	1.166	Min Temp %	1.240	80.987	0.160
+1.40D+1.60H	12.547	1.801	Bottom	1.166	Min Temp %	1.240	80.987	0.155
+1.40D+1.60H	12.150	1.843	Bottom	1.166	Min Temp %	1.240	80.987	0.150
+1.40D+1.60H	11.754	1.884	Bottom	1.166	Min Temp %	1.240	80.987	0.145
+1.40D+1.60H	11.358	1.926	Bottom	1.166	Min Temp %	1.240	80.987	0.140

HOOD ANCHORAGE DESIGN

LOAD ASSIGN:

HOOD ASSEMBLY BY OTHERS, MAXIMUM 900# OPERATING WEIGHT

=> Pu = 900/2 = 450 lbs



CHECK CONNECTION:

=> Use (4)-3/8ø TEK SCREW to (E) Steel beam with 43 mil. Min. Steel thickness

:.Demand per bolt = 450# / 4 = 112.5# < Adjusted ASD Capacity = 140#
=> Connection is adequate against pullout loading.

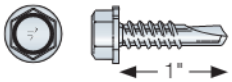
Self-Drilling E Metal Screw

Common Application:
Cold-formed steel framing

- Recommended for use with certain Simpson Strong-Tie® connectors
- #3 drill point (Max. total drilling thickness 0.35")

Codes/Standards: ASTM C1513 compliant

For more information, see p. 93, C-F-2019 Fastening Systems Catalog



Screw Strength

Size (in.)	Model No.	Nominal Strength (lb.)		Design Strength (LRFD) (lb.) $\phi = 0.5$		Allowable Strength (ASD) (lb.) $\Omega = 3.0$	
		P_{ss}	P_{ts}	ϕP_{ss}	ϕP_{ts}	P_{ss}/Ω	P_{ts}/Ω
#14 x 1	E1B1414	3,130	5,395	1,565	2,700	1,045	1,800

Screw-to-Cold-Formed Steel Member Connection Loads, Steel to Steel

Size (in.)	Model No.	Nominal Dia. (in.)	Washer Dia. (in.)	Load Description	Reference Shear (lb.)					Reference Pull-Over (lb.)					Reference Pull-Out (lb.)				
					Steel Thickness: [mil (ga.)]					Steel Thickness: [mil (ga.)]					Steel Thickness: [mil (ga.)]				
					33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)
#14 x 1	E1B1414	0.242	0.5	ASD	200	295	605	850	1,045	390	505	920	1,160	1,655	105	140	250	320	455
				LRFD	300	445	905	1,280	1,565	585	760	1,380	1,740	2,480	160	210	380	480	680
				Nominal strength	600	890	1,810	2,555	3,130	1,170	1,520	2,760	3,475	4,960	320	415	755	955	1,360

1. Screws shall extend through the connection with a minimum of three exposed threads per AISI General Provisions Standard Section D1.3.
2. Tabulated loads are based on calculations per AISI S100 using the thinner steel member in the connection. A safety factor of $\Omega = 3.0$ and resistance factor $\phi = 0.5$ were used to determine the ASD and LRFD strength values.
3. Loads are based on cold-formed steel members with a minimum yield strength, F_y, of 33 ksi and tensile strength, F_u, of 45 ksi for 43 mil (18 ga.) and thinner, and a minimum yield strength of 50 ksi and tensile strength of 65 ksi for 54 mil (16 ga.) and thicker.

Job#: **21070**

Sign Calculator: Lateral Loads

Wind Analysis Method	Design Wind Loads - Solid Freestanding Signs			ASCE 7-16 Sec. 29.3		
Basic Wind Speed (ultimate)		110.00	MPH			
Topography Factor	K_{zt} =	1.00		ASCE 7-16 Fig. 26.8-1		
Directionality Factor	K_d =	0.85		ASCE 7-16 Fig. 26.6-1		
Gust Effect Factor	G =	0.85		ASCE 7-16 Sec. 26.11-1		
Sign Height	h =	8.00	ft			
Terrain Exp. Category		C		α =	9.5	
Velocity Pressure Exp. Coefficient	K_z =	0.849		z_g =	900	
Velocity Pressure	q_z =	**22.35**	psf	$q_z = .00256 K_z K_{zt} K_d V^2$		
Sign Gross Area (normal to wind)	A_s =	8.00	ft^2			
Vertical Dimension of Sign	s =	8.00	ft			
Horizontal Dimension of Sign	B =	1.00	ft	.2B =	0.20	ft
Clearance Ratio of Sign	s/h =	1.00				
Aspect Ratio of Sign	B/s =	0.13				
Force Coefficient for Sign	$C_{f,sign}$ =	1.69		ASCE 7-16 Fig. 29.3-1		
Wind Load on Sign (Strength Level)	Fsign =	256	lbs	$F = q_z G C_f A_s$		
				=> qzGCf =	32	(psf)
ASD Wind Load on Sign	$F_{ASD,sign}$ =	**154**	**lbs**	(Case A & Case B)		

Case A: Resultant force acts normal to the face of the sign through the geometric center.

Case B: Resultant force acts normal to the face of the sign at a distance from the geometric center toward the windward edge equal to 0.2 times the average width of the sign.

Case C: Resultant forces act normal to the face of the sign through the geometric center of each region. See Figure 29.4-1 for details.

Cases C Requirement: **Case C not required since B/h < 2**

Core Structure, Inc.
23172 Plaza Pointe Drive
Suite 145
Laguna Hills, CA 92653
949-954-7244

Project Name/Number : 21070
Title **8" CMU Design**
Dsgnr: **A.T.**
Description....

Date: 26 JUL 2022

This Wall in File: g:\@core projects\@2021\21070\02-structural engineering\03-eng-calculations\01-mo

Cantilevered Retaining Wall

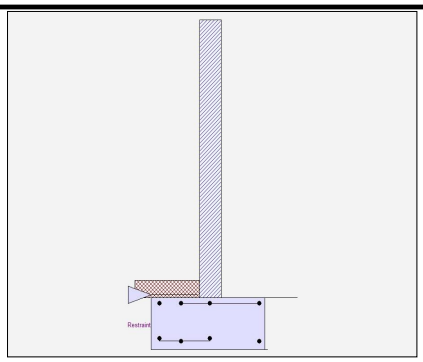
Code: CBC 2019,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	0.00 ft
Wall height above soil	=	8.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,667.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	30.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.300
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	32.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.100 g

Added seismic base force 43.7 lbs

Design Summary

Wall Stability Ratios

Overturning	=	1.55	OK
Slab Resists All Sliding !			
Total Bearing Load	=	1,428 lbs	
...resultant ecc.	=	13.23 in	
Soil Pressure @ Toe	=	1,454 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,667 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,035 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	7.7 psi	OK
Footing Shear @ Heel	=	2.1 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	333.4 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	CBC 2019,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

Bottom

Stem OK

Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	ASD
Thickness	=	8.00
Rebar Size	=	# 5
Rebar Spacing	=	16.00
Rebar Placed at	=	Center
Design Data		
fb/FB + fa/Fa	=	**0.942**
Total Force @ Section		
Service Level	lbs =	299.7
Strength Level	lbs =	
Moment....Actual		
Service Level	ft-# =	1,198.7
Strength Level	ft-# =	
Moment.....Allowable	=	1,272.4
Shear.....Actual		
Service Level	psi =	3.3
Strength Level	psi =	
Shear.....Allowable	psi =	45.6
Anet (Masonry)	in2 =	91.50
Rebar Depth 'd'	in =	3.75
Masonry Data		
f'm	psi =	1,500
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Wall Weight	psf =	78.0
Short Term Factor	=	1.000
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	
Fy	psi =	

Core Structure, Inc.
23172 Plaza Pointe Drive
Suite 145
Laguna Hills, CA 92653
949-954-7244

This Wall in File: g:\@core projects\@2021\21070\02-structural engineering\03-eng-calculations\01-mo

RetainPro (c) 1987-2019, Build 11.20.03.31
License : KW-06060947
License To : Core Structure

Cantilevered Retaining Wall

Code: CBC 2019,ACI 318-14,TMS 402-16

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	2.00
Total Footing Width	=	3.50
Footing Thickness	=	18.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,035	0 psf
Mu' : Upward	=	20,400	0 ft-#
Mu' : Downward	=	5,544	335 ft-#
Mu: Design	=	1,238	335 ft-#
Actual 1-Way Shear	=	7.68	2.07 psi
Allow 1-Way Shear	=	75.00	75.00 psi

Toe Reinforcing = # 5 @ 8.00 in
Heel Reinforcing = # 5 @ 8.00 in
Key Reinforcing = # 5 @ 14.35 in
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.
Heel: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.
Key: No key defined

Min footing T&S reinf Area	1.36	in2
Min footing T&S reinf Area per foot	0.39	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		33.8	0.50	16.9	Soil Over HL (ab. water tbl)	0.0	2.83	0.0
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.83	0.0
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=	256.0	5.50	1,408.0	Soil Over Toe	=	0.75	
	=				Surcharge Over Toe	=		
Seismic Stem Self Wt		43.7	5.50	240.2	Stem Weight(s)	=	624.0	1.83	1,144.0
					Earth @ Stem Transitions	=			
Total	=	333.4	**O.T.M.** =	1,665.1	Footing Weight	=	787.5	1.75	1,378.1
					Key Weight	=		3.08	
					Vert. Component	=	16.2	3.50	56.8
					Total =		1,427.7 lbs	**R.M.=**	2,578.9

Resisting/Overturning Ratio = **1.55**
Vertical Loads used for Soil Pressure = 1,427.7 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

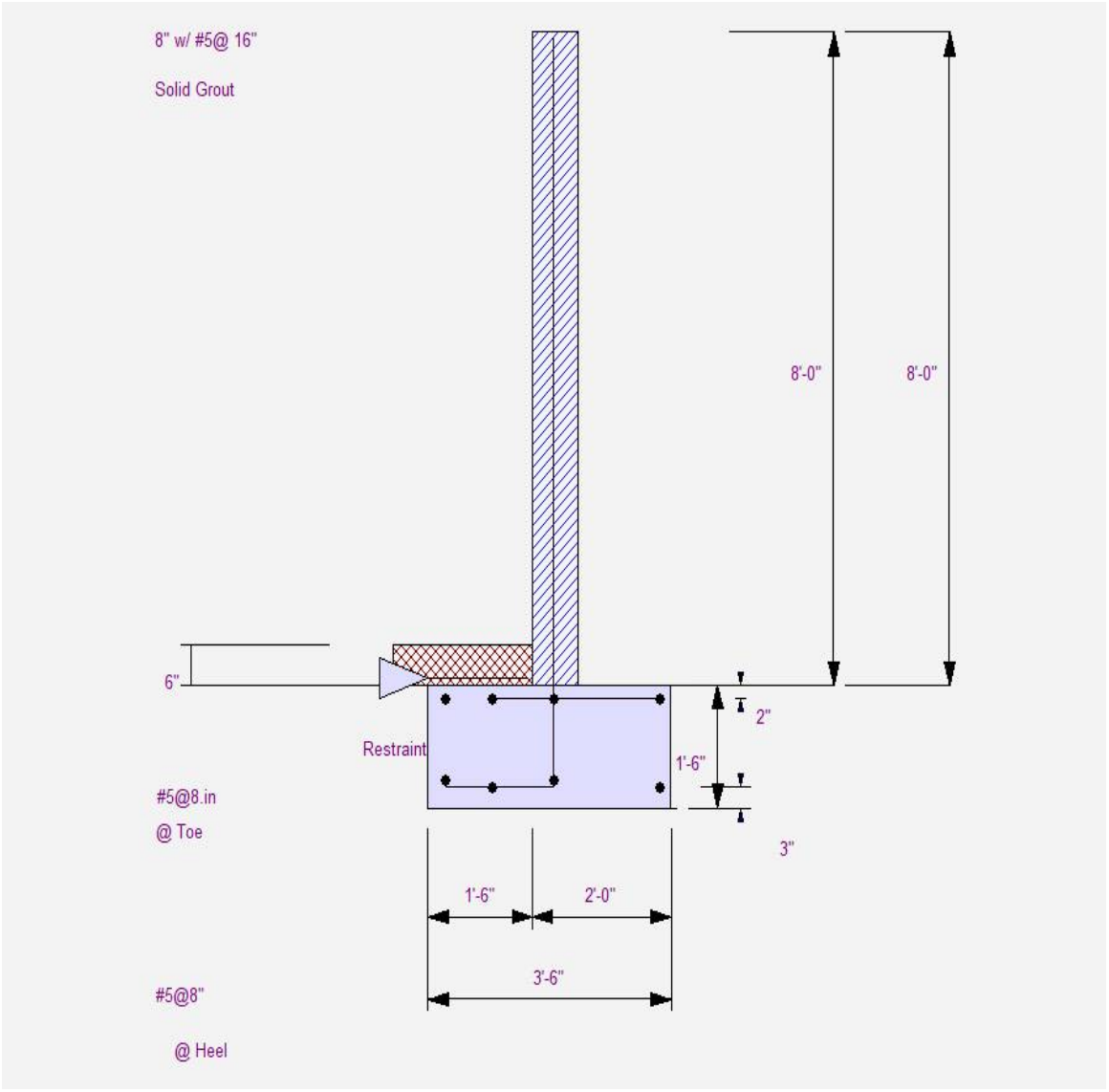
Tilt

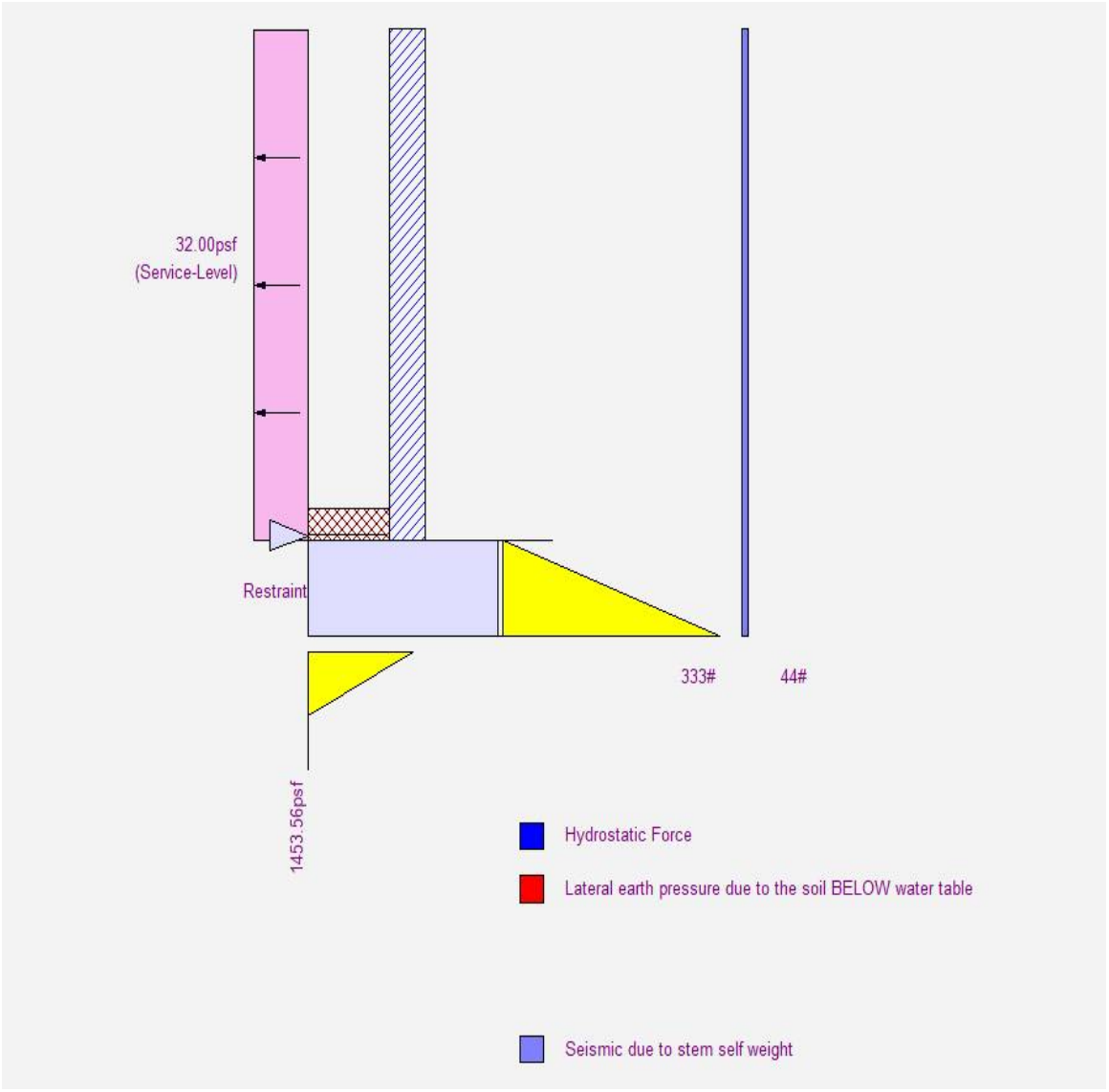
Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.092	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.


8" w/ #5@ 16"
Solid Grout
8'-0"
8'-0"
6"
2"
Restraint
1'-6"
#5@8.in
@ Toe
3"
1'-6"
2'-0"
3'-6"
#5@8"
@ Heel


32.00psf
(Service-Level)
Restraint
333#
44#
1453.56psf
Hydrostatic Force
Lateral earth pressure due to the soil BELOW water table
Seismic due to stem self weight

Unit Report For 3-Ton PHP (Design Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 04:05PM

Unit Parameters

Unit Model: **50VT-C36---5**
Unit Size: **36 (3 Tons)**
Volts-Phase-Hertz: **208-3-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **4' 0.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Total Operating Weight: **387** lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

Ordering Information

Part Number	Description	Quantity
50VT-C36---5	Rooftop Unit	1
Accessories		
CPLOUVER017A00	Louvered Metal Outdoor Coil Grilles	1
CPHEATER055B00	3.8/5.0 kW, 208/230-3-60 volt, Electric Heater	1

Performance Summary For 3-Ton PHP (Design Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 04:05PM

Part Number:50VT-C36---5

ARI SEER:	**14.00**	

Base Unit Dimensions

Unit Length:	**48.3**	in
Unit Width:	**44.2**	in
Unit Height:	**48.8**	in
Total Operating Weight:	**387**	lb

Unit

Unit Voltage-Phase-Hertz:	**208-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1233**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**105.0**	F
Evaporator Entering Air DB:	**78.8**	F
Evaporator Entering Air WB:	**62.8**	F
Entering Air Enthalpy:	**28.29**	BTU/lb
Evaporator Leaving Air DB:	**58.9**	F
Evaporator Leaving Air WB:	**54.8**	F
Evaporator Leaving Air Enthalpy:	**23.05**	BTU/lb
Unit Discharge Air DB:	**58.9**	F
Unit Discharge Air WB:	**54.8**	F
Unit Discharge Air Enthalpy:	**23.05**	BTU/lb
Net Cooling Capacity:	**29.06**	MBH
Net Sensible Capacity:	**26.51**	MBH
Total Unit Power Input:	**3.35**	kW
Coil Bypass Factor:	**0.052**	

Mixed Air

Outdoor Air Airflow:	**120**	CFM
Outdoor Air DB:	**105.0**	F
Outdoor Air WB:	**70.0**	F
Outdoor Air Htg. Temp.:	**37.0**	F
Return Air DB:	**76.0**	F
Return Air WB:	**62.0**	F
Return Air Htg. Temp.:	**70.0**	F

Heating Performance

Outdoor Ambient Temperature:	**37.0**	F
Entering Air Indoor Coil DB:	**66.8**	F
Leaving Air Indoor Coil DB:	**88.8**	F
Total Heating Capacity:	**29.24**	MBH
Integrated Heating Capacity:	**28.29**	MBH
Heating Power Input:	**2.54**	kW
Electric Heating Capacity:	**3.80**	kW
Unit Leaving Air Temp:	**98.5**	F

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Electric Heaters:	**0.11**	in wg
Wet Coil:	**0.10**	in wg
Total Application Static (ESP + Unit Opts/Acc.):	**0.71**	in wg
Fan Power:	**0.51**	BHP
Fan Motor Size, hp:	**3/4**	

Performance Summary For 3-Ton PHP (Design Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 04:05PM

NOTE: **High Motor Speed, Vert**

Electrical Data

Minimum Voltage:	**197**
Maximum Voltage:	**253**
Compressor RLA:	**10.4**
Compressor LRA:	**73**
Actual Electric Heater kW:	**3.8**
Electric Heater FLA:	**10.4**
Outdoor Fan FLA (ea):	**1**
Indoor Fan Motor FLA:	**6**
Power Supply MCA:	**31.2**
Power Supply MOCP (Fuse or HACR):	**35**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

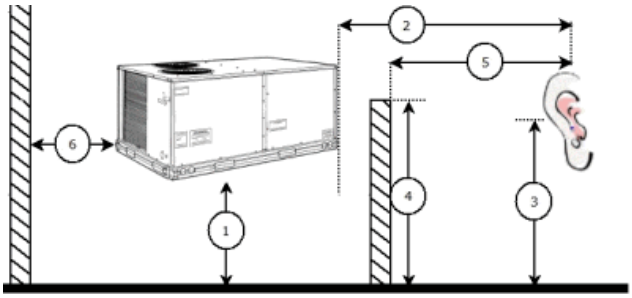
Acoustics

Sound Rating: **74.0** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	61.9
250 Hz	NA	NA	63.3
500 Hz	NA	NA	58.9
1000 Hz	NA	NA	59.9
2000 Hz	NA	NA	58.7
4000 Hz	NA	NA	56.2
8000 Hz	NA	NA	52.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground:	**30.0**	ft
2. Horizontal distance from unit to receiver:	**50.0**	ft
3. Receiver height above ground:	**5.7**	ft
4. Height of obstruction:	**0.0**	ft
5. Horizontal distance from obstruction to receiver:	**0.0**	ft
6. Horizontal distance from unit to obstruction:	**0.0**	ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	61.9	63.3	58.9	59.9	58.7	56.2	52.4	68.3 Lw

B	-26.2	45.8	54.7	55.7	59.9	59.9	57.2	51.3	65.2 LwA
C	0.0	29.5	30.9	26.5	27.5	26.3	23.8	20.0	35.9 Lp
D	-26.2	13.4	22.3	23.3	27.5	27.5	24.8	18.9	32.8 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

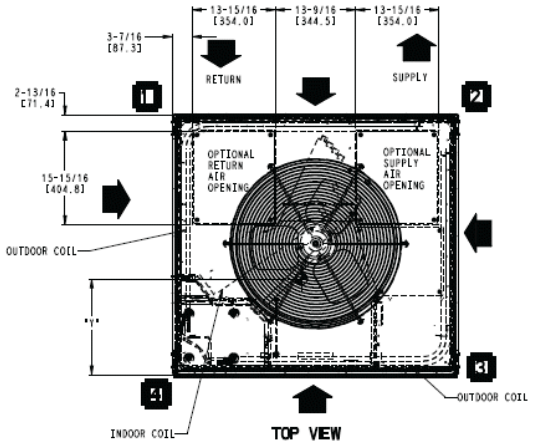
Certified Drawing for 3-Ton PHP (Design Conditions)

Project: Palo Verde CDC Kitchen
Prepared By:

07/19/2022
04:05PM

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT. LB	UNIT WT. KG	UNIT HEIGHT IN/MM "A"		CENTER OF GRAVITY IN/MM X		Y		Z	
50VT-C36---(3/5/6)0	208/230-1-60, 208/230-3-60, 460-3-60	387	176.0	48-3/4	1238	20-1/2	521	17-1/2	445	17-3/8	441
50VT-C42---(3/5/6)0	208/230-1-60, 208/230-3-60, 460-3-60	435	197.0	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
50VT-C48---(3/5/6)0	208/230-1-60, 208/230-3-60, 460-3-60	456	207.0	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
50VT-C60---(3/5/6)0	208/230-1-60, 208/230-3-60, 460-3-60	487	221.0	48-3/4	1238	20-1/2	521	17-1/2	445	18	457

UNIT	VOLTAGE	CORNER WEIGHTS LB/KG "1"		"2"		"3"		"4"	
36	208/230/460	58.1	26.3	77.4	35.1	116.1	52.7	135.5	61.4
42	208/230/460	65.3	29.6	87.0	39.5	130.5	59.2	152.3	69.1
48	208/230/460	68.4	31.0	91.2	41.4	136.8	62.1	159.6	72.4
60	208/230/460	73.1	33.1	97.4	44.2	146.1	66.3	170.5	77.3



REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

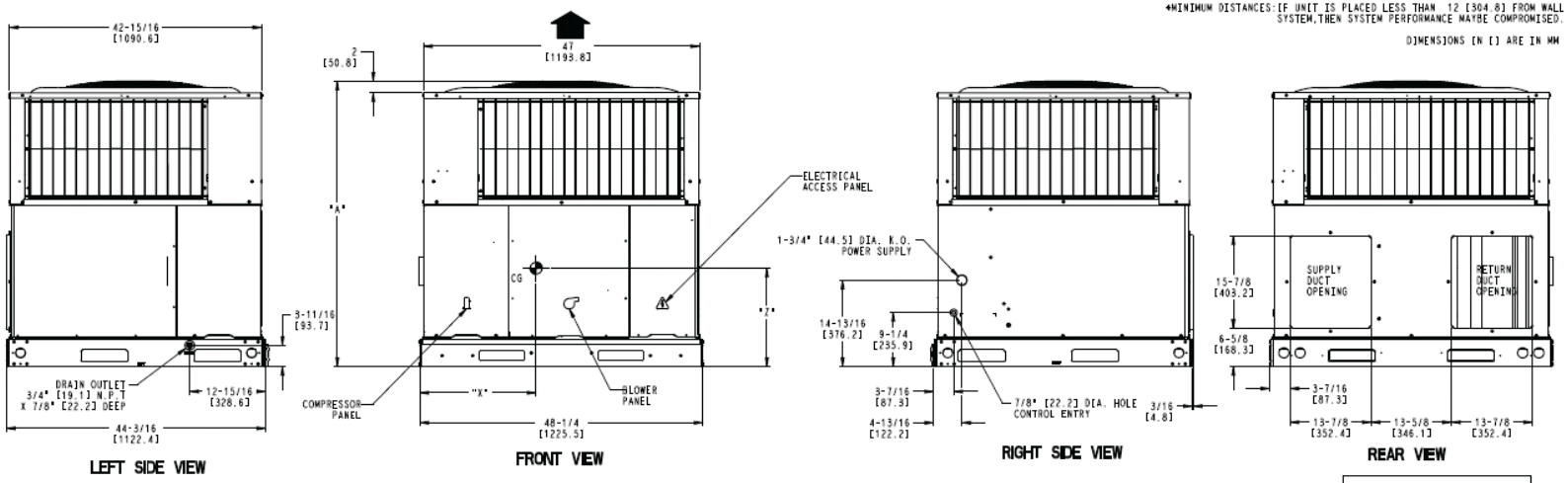
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [] ARE IN MM



50VT500411

Packaged Rooftop Builder 1.56

Unit Report For 3-Ton PHP (MUA Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 03:46PM

Unit Parameters

Unit Model: **50VT-C36---5**
Unit Size: **36 (3 Tons)**
Volts-Phase-Hertz: **208-3-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **4' 0.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Total Operating Weight: **387** lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

Ordering Information

Part Number	Description	Quantity
50VT-C36---5	Rooftop Unit	1
Accessories		
CPLOUVER017A00	Louvered Metal Outdoor Coil Grilles	1
CPHEATER056B00	7.5/10.0 kW, 208/230-3-60 volt, Electric Heater	1

Performance Summary For 3-Ton PHP (MUA Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 03:46PM

Part Number:50VT-C36---5

ARI SEER:	**14.00**	

Base Unit Dimensions

Unit Length:	**48.3**	in
Unit Width:	**44.2**	in
Unit Height:	**48.8**	in
Total Operating Weight:	**387**	lb

Unit

Unit Voltage-Phase-Hertz:	**208-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1233**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**105.0**	F
Evaporator Entering Air DB:	**89.2**	F
Evaporator Entering Air WB:	**65.8**	F
Entering Air Enthalpy:	**30.43**	BTU/lb
Evaporator Leaving Air DB:	**61.1**	F
Evaporator Leaving Air WB:	**55.9**	F
Evaporator Leaving Air Enthalpy:	**23.69**	BTU/lb
Unit Discharge Air DB:	**61.1**	F
Unit Discharge Air WB:	**55.9**	F
Unit Discharge Air Enthalpy:	**23.69**	BTU/lb
Net Cooling Capacity:	**37.38**	MBH
Net Sensible Capacity:	**37.38**	MBH
Total Unit Power Input:	**3.36**	kW
Coil Bypass Factor:	**0.052**	

Mixed Air

Outdoor Air Airflow:	**560**	CFM
Outdoor Air DB:	**105.0**	F
Outdoor Air WB:	**70.0**	F
Outdoor Air Htg. Temp.:	**37.0**	F
Return Air DB:	**76.0**	F
Return Air WB:	**62.0**	F
Return Air Htg. Temp.:	**70.0**	F

Heating Performance

Outdoor Ambient Temperature:	**37.0**	F
Entering Air Indoor Coil DB:	**55.0**	F
Leaving Air Indoor Coil DB:	**77.9**	F
Total Heating Capacity:	**30.54**	MBH
Integrated Heating Capacity:	**29.51**	MBH
Heating Power Input:	**2.26**	kW
Electric Heating Capacity:	**7.50**	kW
Unit Leaving Air Temp:	**97.2**	F

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Electric Heaters:	**0.11**	in wg
Wet Coil:	**0.10**	in wg
Total Application Static (ESP + Unit Opts/Acc.):	**0.71**	in wg
Fan Power:	**0.51**	BHP
Fan Motor Size, hp:	**3/4**	

Performance Summary For 3-Ton PHP (MUA Conditions)

Project: Palo Verde CDC Kitchen 07/19/2022
Prepared By: 03:46PM

NOTE: **High Motor Speed, Vert**

Electrical Data

Minimum Voltage:	**197**
Maximum Voltage:	**253**
Compressor RLA:	**10.4**
Compressor LRA:	**73**
Actual Electric Heater kW:	**7.5**
Electric Heater FLA:	**20.8**
Outdoor Fan FLA (ea):	**1**
Indoor Fan Motor FLA:	**6**
Power Supply MCA:	**44.2**
Power Supply MOCP (Fuse or HACR):	**45**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

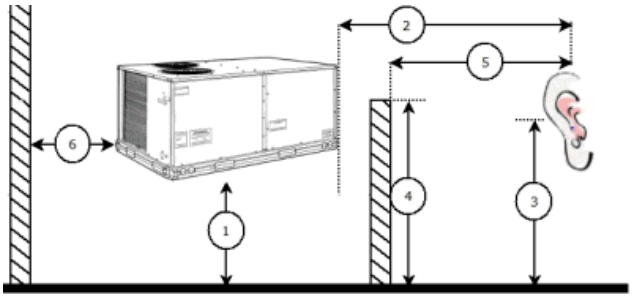
Acoustics

Sound Rating: **74.0** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	61.9
250 Hz	NA	NA	63.3
500 Hz	NA	NA	58.9
1000 Hz	NA	NA	59.9
2000 Hz	NA	NA	58.7
4000 Hz	NA	NA	56.2
8000 Hz	NA	NA	52.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	61.9	63.3	58.9	59.9	58.7	56.2	52.4	68.3 Lw

B	-26.2	45.8	54.7	55.7	59.9	59.9	57.2	51.3	65.2 LwA
C	0.0	29.5	30.9	26.5	27.5	26.3	23.8	20.0	35.9 Lp
D	-26.2	13.4	22.3	23.3	27.5	27.5	24.8	18.9	32.8 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

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UNIT	VOLTAGE	CORNER WEIGHTS LB/KG "1"		"2"		"3"		"4"	
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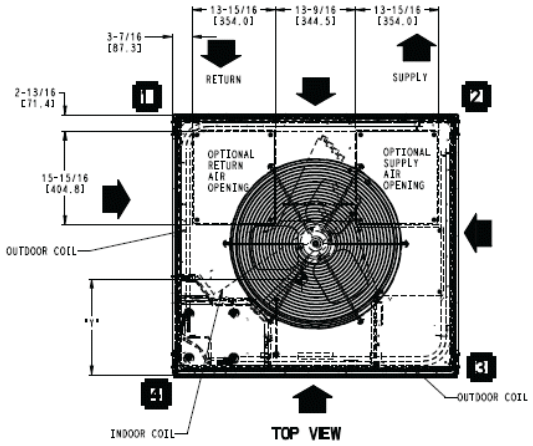


TOP VIEW

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

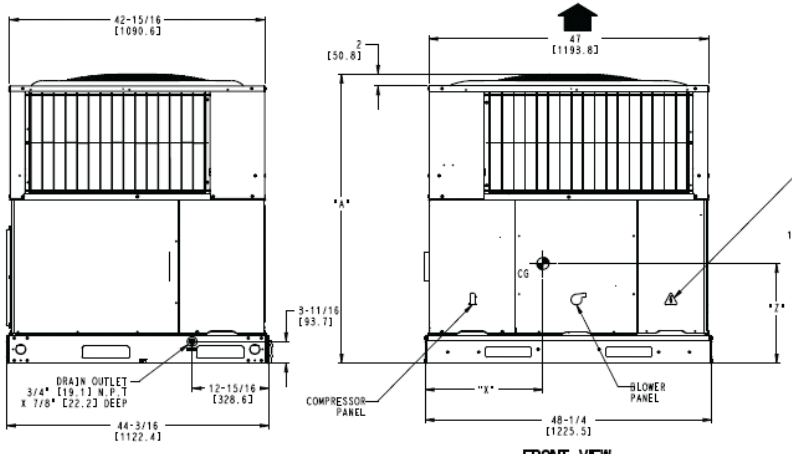
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE (EXCEPT FOR NEC REQUIREMENTS)	42 [1066.8]
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

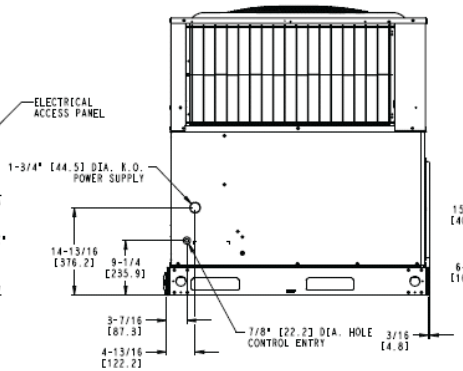
*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [] ARE IN MM

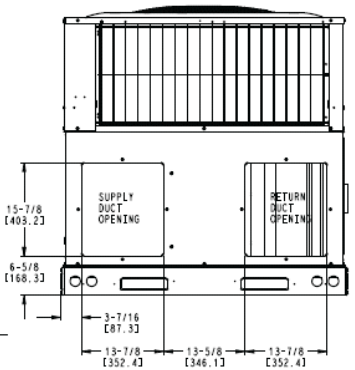


LEFT SIDE VIEW

FRONT VIEW



RIGHT SIDE VIEW



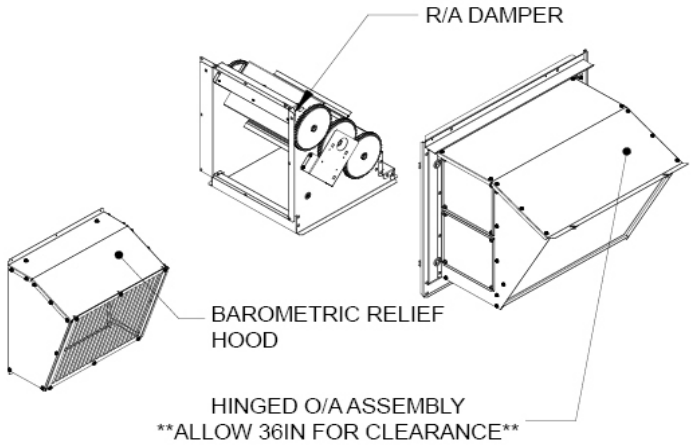
REAR VIEW

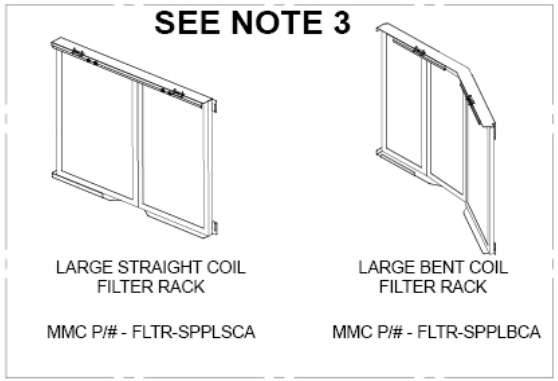
50VT500411

MicroMetl	Date:	Weight: 89lbs (US) 40.37kg (Metric)	Part Number: ECC-SPPLGCA-DYDB-1
	RTU:		
Submitted to:		Approved by:	Notes:

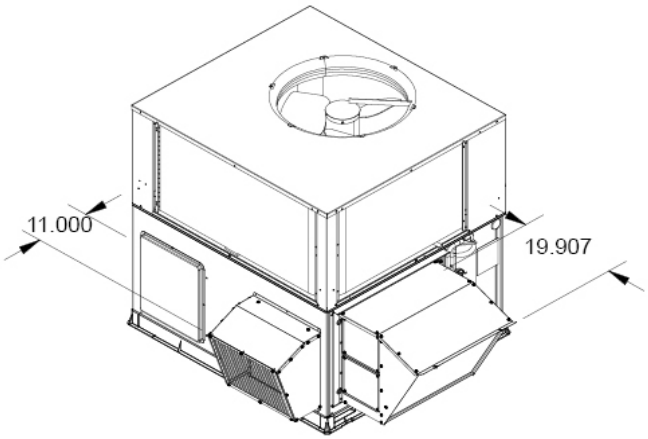
Economizer - Economizer - Ultra Low Leak Economizer, Convertible Orientation, Belimo Zip Single Speed Electromechanical Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included. For Differential Return Air Dry Bulb Sensor Please Order 9901-1619 Sensor and a 1002-PRC-RA_B Harness.

MicroMetl Corporation certifies that the models GR1 and NS1 shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

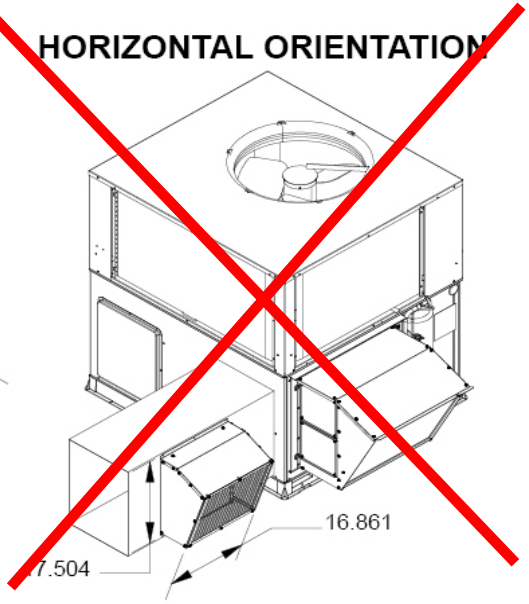




VERTICAL ORIENTATION



HORIZONTAL ORIENTATION



NOTES:

1. For single phase and single speed units the extension harness (1002-0867) will need to be ordered as a separate line item.
2. For heat pump applications a field supplied and installed 24VAC- SPST normally open relay will be needed.
   - If purchased through MicroMetl you'll need:
   (1) Relay - 9901-5030
   (4) Wire Leads - 9901-0134
3. **Filter racks are not included, will be a separate sales order item.**

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MicroMetl	Date:	Weight: 89lbs (US) 40.37kg (Metric)	Part Number: ECC-SPPLGCA-DYDB-1
	RTU:		
Submitted to:		Approved by:	Notes:

Economizer - Economizer - Ultra Low Leak Economizer, Convertible Orientation, Belimo Zip Single Speed Electromechanical Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included. For Differential Return Air Dry Bulb Sensor Please Order 9901-1619 Sensor and a 1002-PRC-RA_B Harness.

Compliant Economizer:

1. **Title 24:** Economizers meet California Energy Commission Title 24-2013 / 2016 prescriptive section 140.4 (damper leakage etc.), and mandatory section 120.2.i for Fault Detection and Diagnostic controls (Zip Economizer BZE1245).
2. **ASHRAE 90.1:** Economizers meet ASHRAE 90.1-2013 / 2016 damper leakage requirements, and meet 2016 Fault Detection and Diagnosis requirements.
3. **IECC:** Economizers meet IECC 2012, IECC 2015, and IECC 2018 for outside air, return air, and relief damper (when provided) leakage requirements, and IECC 2015 and IECC 2018 for Fault Detection and Diagnostic requirements. Note: IECC 2015 and IECC 2018 requires differential return air sensor, which is included in some models (i.e. -DYXB) and must be ordered separately on others (i.e. -DYDB, -DYEB).
4. **AMCA:** Outside air and return air (volume) dampers are AMCA Class 1A rated at 1" w.g. Refer to MicroMetl NS1 catalog sheet on web site for details. Relief air dampers (when provided) are also AMCA rated. Refer to GR1 series catalog sheet on web site for details.

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