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LAWRENCE R. PILON, PE

**STRUCTURAL STEEL CALCULATIONS
FOR**

SHEETZ

**24' / 34' x 150' (12) COLUMN FUEL ISLAND CANOPY
WITH RADIUS FRONT
CAMERON, NC**

McGee Job # 59914

DESIGN LOADS:

Risk Category II

Roof Live Load: 20 psf

Flat Roof Snow Load: 10 psf

Ground Snow Load: 10 psf

Design Wind Loads

120 mph, Exposure "B" – Ultimate (3) Second Gust Wind Speed

Lateral on Fascia: 25 psf (Using 0.6W for ASD)

Uplift on Deck: 20 psf (Using 0.6W for ASD)

Seismic Design:

Sds = 0.224g (Ss = 0.21, Fa = 1.6), Sd1 = 0.152g (S1 = 0.095, Fv = 2.4)

Site Class "D" Assumed

Risk Category II, Design Category "B", I = 1.0

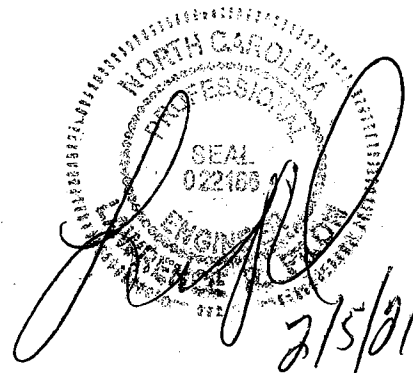
R=2 (Inverted Pendulum / Cantilevered Column – Non-building)

Cs = 0.086, Ve = 0.086*W (Equivalent Lateral Force Procedure)

Allow. Soil Brg.:2500 PSF Per Geotechnologies Rpt # 1-20-0483-EA dtd August 5, 2020

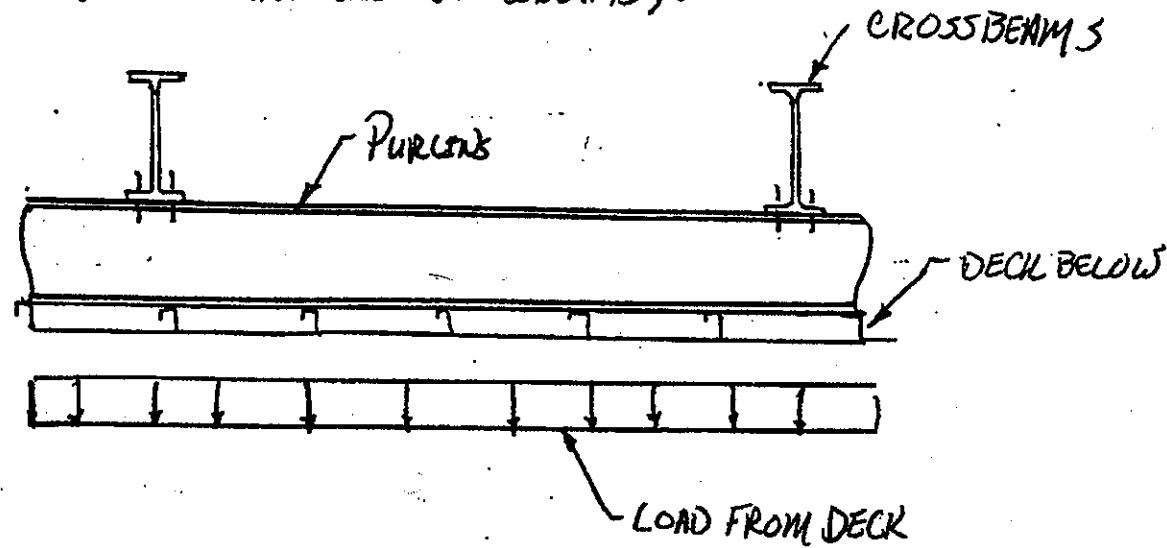
Calculations By:

**Lawrence R. Pilon, PE
51 Mapleview Drive
Pennellville, NY 13132
License # 022186**

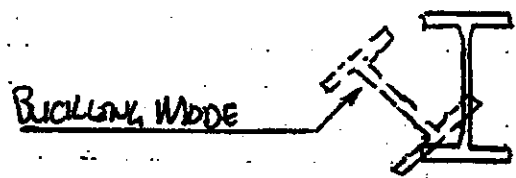


PURLIN DESIGN NOTES:

- PURLINS (BEAMS SUPPORTING DECK) ARE DESIGNED AS "HUNG" BEAMS, SUPPORTED BY MAIN GIRDERS (CROSSBEAMS):

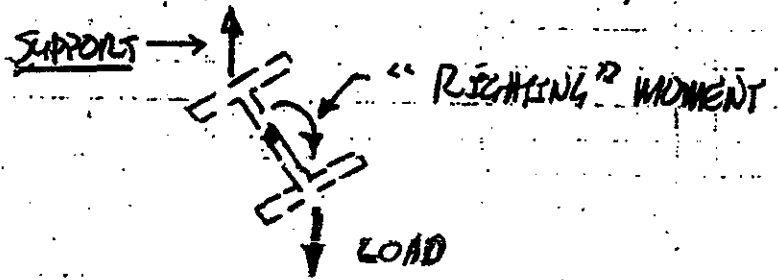


- LATERAL TORSIONAL BUCKLING (LTB) OCCURS WHEN THE COMPRESSION FLANGE (TOP FLANGE BTW SPANS HERE) "BUCKLES" AND CAUSES BEAM TO TWIST AND "TIP" OVER:



- ADEQUATE BRACING IS REQ'D TO PREVENT TWISTING IN NORMAL CONSTRUCTION.

- HOWEVER, WITH "HUNG" BEAM, LOADED AT BOTTOM FLANGE, A "RIGHTING" MOMENT IS INTRODUCED, WHICH PROHIBITS LATERAL BUCKLING:



DESIGN PURLINS USING COMPACT SECTIONS ALLOWABLE STRENGTH ($L_B = 2'$)
(FOR ANALYSIS)

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
CAMFAD

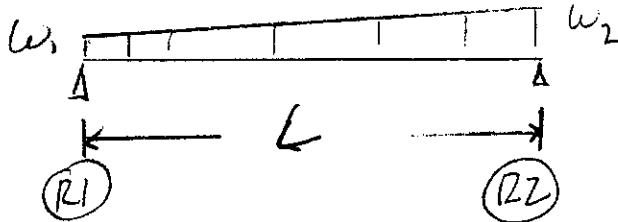
SHEET 24/34, w/ RADIUS (26' C-C COL SPACING)

3/96

(25 PSF)

PURLINS @ RADIUS EDGE

MIN LEVEL LOAD = 25 PSF



(NOTE: FOR ① END SPAN, CONSERV NEGLECT SMALL OVERHANG. W2 WILL BE ACCOUNTED FOR IN "STRAIGHT" AREA PURLINS)

① END SPANS $L = 26.4'$ W_1 EFFECTIVE LOAD AREA = $\left(\frac{2.2}{2} + 3.5\right) = 4.6'$

W_2 EFFECTIVE LOAD AREA = $\frac{6.33}{2} + 3.5 = 6.7'$
 ↓ FASCIA

$W_{1D} = 5 \text{ PSF} (4.6) + 20 \text{ PLF} + \text{SELF} = \underline{43 \text{ PLF} + \text{SELF}}$

$W_{1L} = 25 \text{ PSF} (4.6) = \underline{115 \text{ PLF}}$

$W_{2D} = 5 \text{ PSF} (6.7) + 20 \text{ PLF} + \text{SELF} = \underline{54 \text{ PLF} + \text{SELF}}$

$W_{2L} = 25 \text{ PSF} (6.7) = \underline{168 \text{ PLF}}$

② 1ST INTERIOR SPANS $L = 26.2'$ W_1 EFF. LOAD AREA = $\frac{6.33}{2} + 7.5 = 7'$

W_2 EFF. LOAD AREA = $\frac{9.75}{2} + 7.5 = 8.2'$

$W_{1D} = 5 \text{ PSF} (7) + 20 \text{ PLF} + \text{SELF} = \underline{55 \text{ PLF} + \text{SELF}}$

$W_{1L} = 25 \text{ PSF} (7) = \underline{175 \text{ PLF}}$

$W_{2D} = 5 \text{ PSF} (8.2) + 20 \text{ PLF} + \text{SELF} = \underline{61 \text{ PLF} + \text{SELF}}$

$W_{2L} = 25 \text{ PSF} (8.2) = \underline{205 \text{ PLF}}$

③ CENTER SPANS $L = 26'$ $W_1 = W_2$ EFFECTIVE LOAD AREA = $\frac{9.75}{2} + 3.5 = 8.4'$

$W_D = 5 \text{ PSF} (8.4) + 20 \text{ PLF} + \text{SELF} = \underline{62 \text{ PLF} + \text{SELF}}$
 ↓ FASCIA

$W_L = 25 \text{ PSF} (8.4) = \underline{210 \text{ PLF}}$

CONTROLS

SHEETZ 24'/34' W/RADIUS (20' c-c COL SPACING) (25 PSF) 4/36

PURLINS @ RADIUS EDGE - ANALYSIS RESULTS

① END SPANS

	D	L
R1	.8	18
R2	.9	2

USE W12x16

OK BY COMPARISON TO CENTER SPANS

(R1 IS SMALLER LOAD END)

② 1ST INTERIOR SPANS

	D	L
R1	0.95	2.4
R2	1.0	2.6

USE W12x16

OK BY COMPARISON TO CENTER SPANS

③ CENTER SPANS

✓ CONTROLS

USE W12x16

	D	L
R1	1	2.8 ^K
R2	1	2.8 ^K

SEE RESULTS ON FOLLOWING SHEETS

$U_{MIN}K = 0.67 < 1.0$ (OK) $L_{17} = 9.67'$ (SEE PG 2)

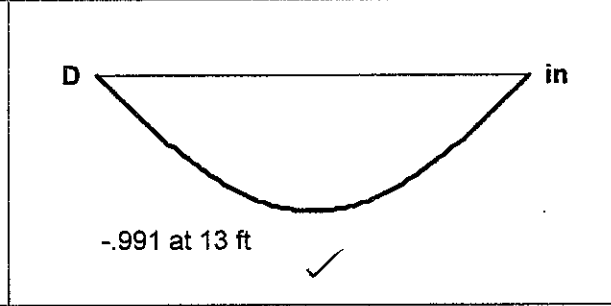
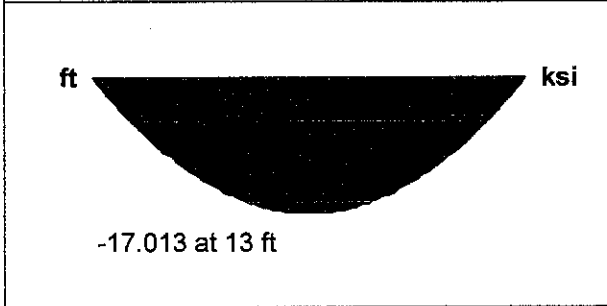
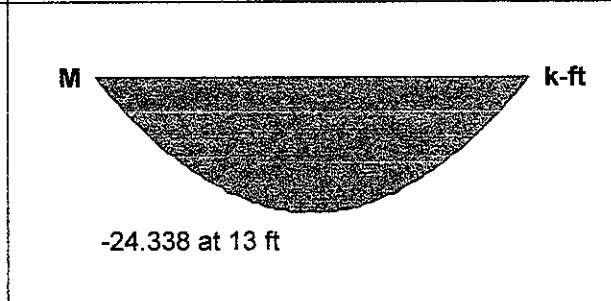
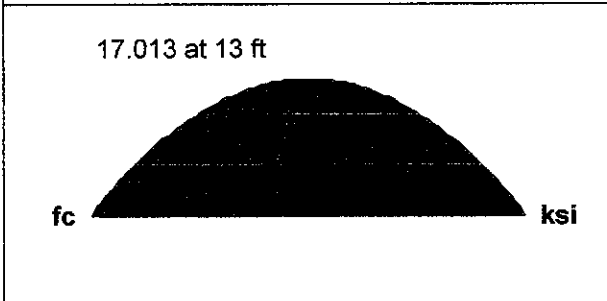
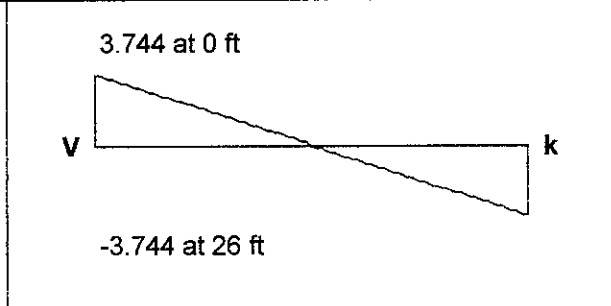
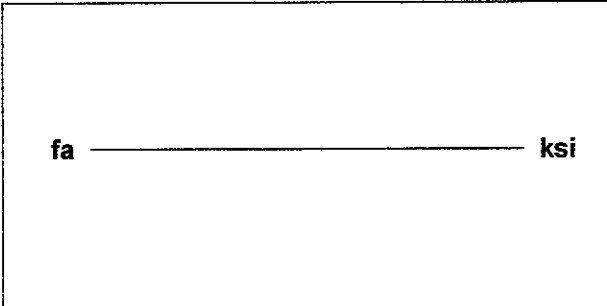
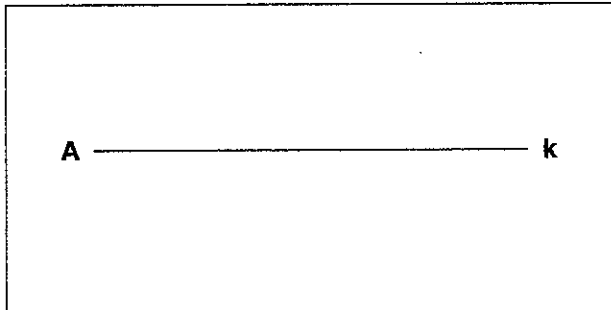
$M = 24.4K'$ $C_b = 1.4$

$\Delta SPAN = 1''$ (L/315)

PURVIS ALONG RADIUS - CTR SPANS

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Beam: **M1**
 Shape: **W12x16**
 Material: **HR_STL** ✓
 Length: **26 ft**
 I Joint: **N1**
 J Joint: **N2**
 LC 3: d+l
 Code Check: **0.662 (bending)**
 Report Based On 97 Sections



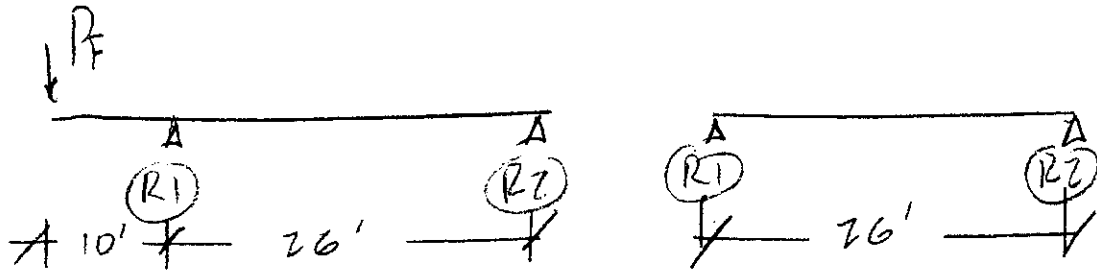
AISC 14th(360-10): ASD Code Check

Direct Analysis Method			
Max Bending Check	0.662	Max Shear Check	0.071 ✓
Location	13 ft	Location	0 ft
Equation	H1-1b	Max Defl Ratio	L/315 ✓
Bending Flange	Compact	Compression Flange	Non-Slender Qs=1
Bending Web	Compact	Compression Web	Slender Qa=1
Fy	50 ksi	Out Plane	In Plane
Pnc/om	17.417 k	Lb	13 ft ✓
Pnt/om	141.018 k	KL/r	201.609 66.719
Mn/om	36.749 k-ft	L Comp Flange	8.67 ft ✓
Vn/om	52.8 k	Tau_b	1 ✓
Cb	1.4		

SHEET 24/34 RADIOS CANOPY (26' c-c COUSPACING)
(25 PSF)

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PURLINS IN "STRAIGHT" AREA OF CANOPY



OUTER @ STRAIGHT EDGE

WD = 5 PSF (3' + 9/2) + 20 PLF + SELF = 58 PLF + SELF ↓ FASCIA
 WL = 25 PSF (7.5') = 190 PLF
 P_f = 20 PLF (7.5') = 150 LBS (END PURLIN ONLY)

CENTRAL

WD = 5 PSF (9') + SELF = 45 PLF + SELF
 WL = 25 PSF (9') = 225 PLF
 P_f = 20 PLF (9') = 180 LBS (END PURLIN ONLY) } CENTRALS FOR OVERHANGS

OUTER ADJ. TO RADIUS AREA

ENDSPAN W/ OVERHANG

WD = 5 PSF ($\frac{9' + 6.5'}{2}$) + 20 PLF + SELF = 59 PLF + SELF
 WL = 25 PSF (7.75') = 195 PLF
 P_f = 20 PSF (7.75') = 160 LBS

TWOBK SPANS

WD = 5 PSF ($\frac{9' + 9.5'}{2}$) + SELF = 47 PLF + SELF } CENTRALS FOR SPANS
 WL = 25 PSF (9.25') = 235 PLF

SNEFTZ 24'x34' RADIUS CANOPY (26' C-C SPACING)
(25 D3F)

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PURLINS IN "STRAIGHT" AREA - ANALYSIS RESULTS

OUTER @ STRAIGHT EDGE

SPAN W/ OVERHANG

W12x14

	D	L	1/2 L OH
R1	2.1	4.8	-
R2	0.8	2.1	2.3

OK BY COMPARISONS TO CENTER PURLINS

SPAN

W12x14

$R_D = 1''$
 $R_L = 2.5''$

SPAN OK BY COMPARISONS TO PURLIN ADJ TO RADIUS

CENTER PURLINS (CONTROLS FOR OVERHANG)

SPAN W/ OVERHANG

W12x14

	D	L	1/2 L OH
R1	1.8	9.6	-
R2	0.6	2.5	2.8

$M_{MAX} = 16$ K'
 $U = 0.69 < 1.0$ OK
 $\Delta = 0.18''$

$C_b = 1.4$
 $L_b = 10'$
(SEE PG 9)

SPAN

W12x14

$R_D = 0.8''$
 $R_L = 3.0''$

SPAN OK BY COMPARISON TO PURLIN ADJ TO RADIUS AREA

PURLIN ADJ TO RADIUS AREA (CONTROLS FOR SPAN)

SPAN W/ OVERHANG

W12x14

$C_b = 1.4$
 $L_b = 8.67'$

OK BY COMPARISON TO CENTER PURLIN

	D	L	1/2 L OH
R1	2.1	4.9	-
R2	0.8	2.2	2.4

SPAN

W12x14

$C_b = 1.4$
 $L_b = 8.67'$

$M_{MAX} = 25$ K' OK

$U = 0.84 < 1.0$

$\Delta_{SPAN} = 1.19''$
(L/263)

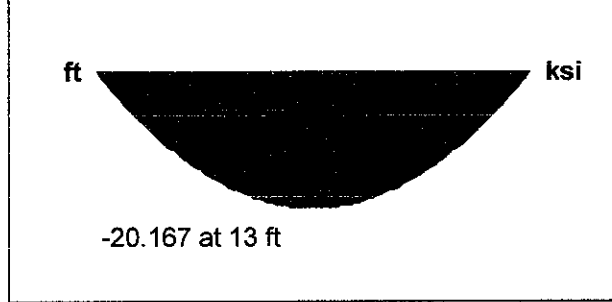
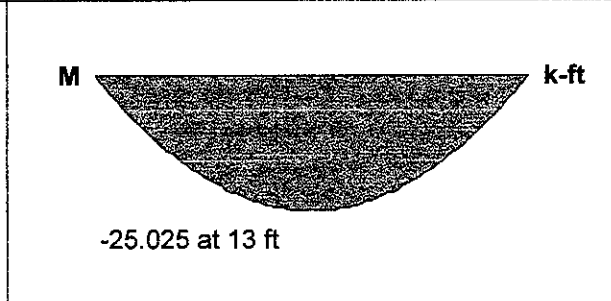
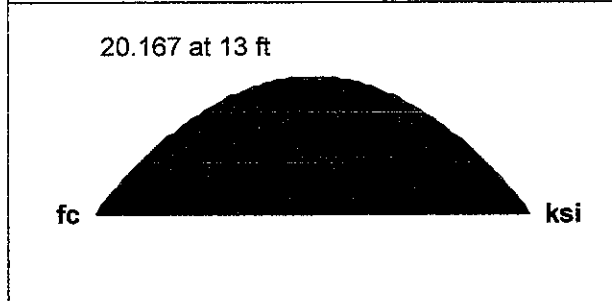
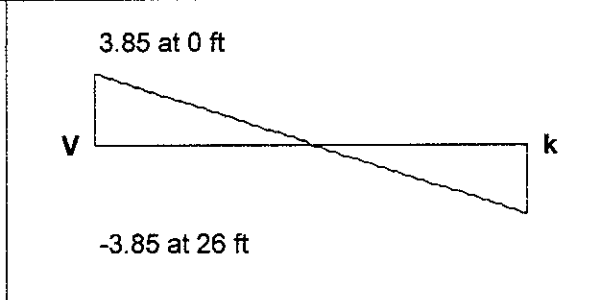
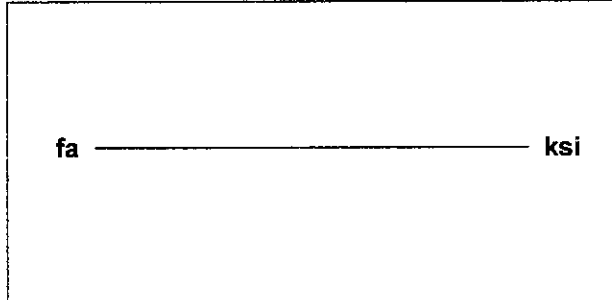
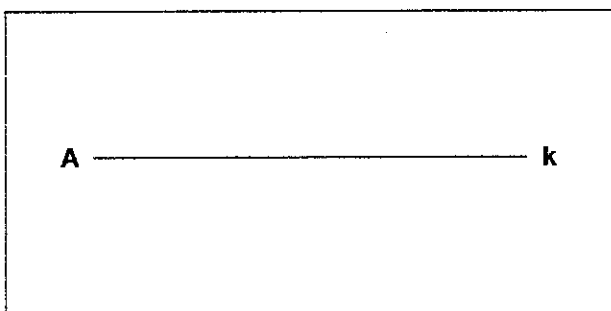
$R_D = 0.8''$
 $R_L = 3.1''$

SEE RESULTS PG 8

OUTGR STRAIGHT PURLIN ADD TO RADIUS (SPAN ONLY)

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Beam: **M1**
 Shape: **W12x14** ✓
 Material: **HR_STL**
 Length: **26 ft** ✓
 I Joint: **N1**
 J Joint: **N2**
 LC 3: d+l
 Code Check: **0.840 (bending)** ✓
 Report Based On 97 Sections



AISC 14th(360-10): ASD Code Check

Direct Analysis Method

Max Bending Check **0.840** ✓
 Location **13 ft**
 Equation **H1-1b**

Max Shear Check **0.090**
 Location **0 ft**
 Max Defl Ratio **L/263** ✓

Bending Flange **Compact**
 Bending Web **Compact**

Compression Flange **Non-Slender** Qs=1
 Compression Web **Slender** Qa=1

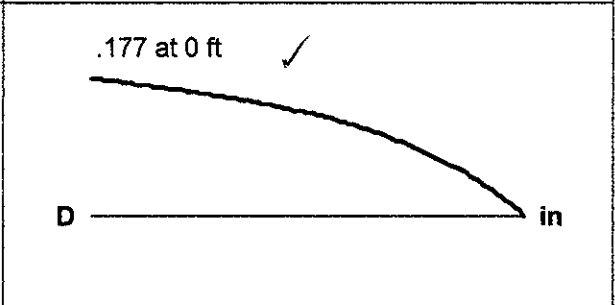
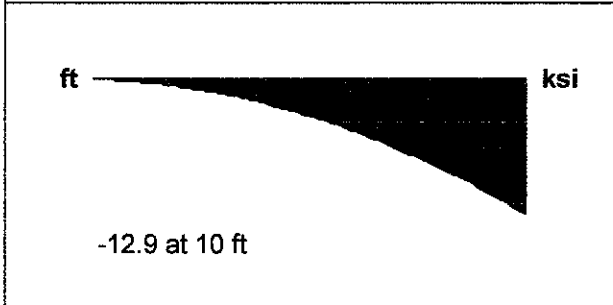
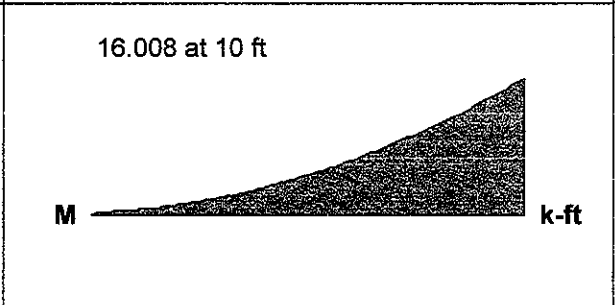
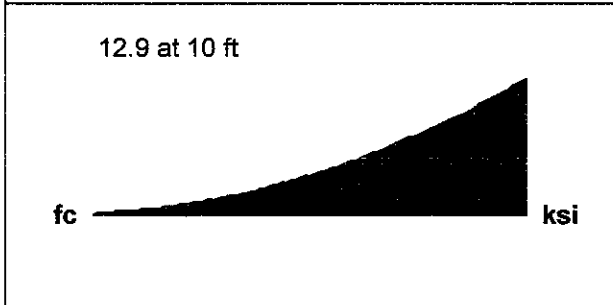
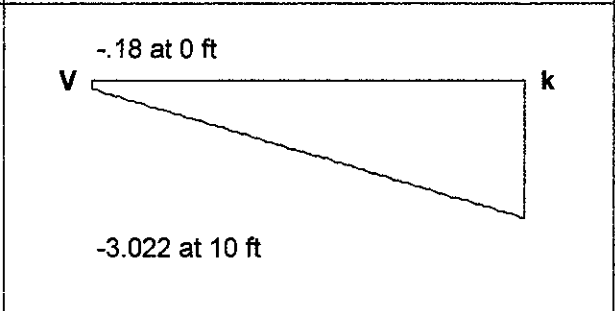
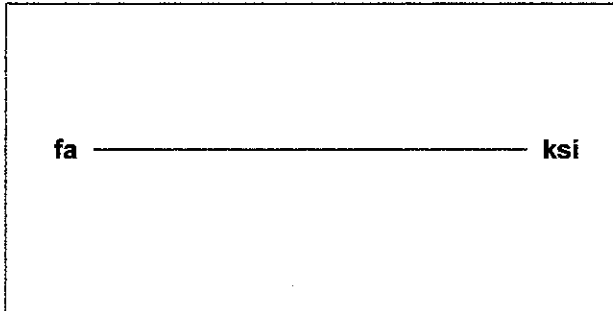
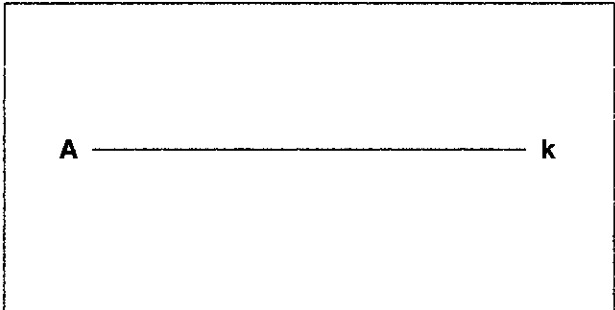
Fy **50 ksi**
 Pnc/om **14.576 k**
 Pnt/om **124.551 k**
 Mn/om **29.779 k-ft**
 Vn/om **42.754 k**
 Cb **1.4** ✓

Out Plane In Plane
 Lb **13 ft** **26 ft**
 KL/r **207.117** **67.606**
 L Comp Flange **8.67 ft** ✓
 Tau_b **1**

STEINENT AREA PURLIN - COVER PURLIN LONG w/ OVERHANG

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Beam: **M1**
 Shape: **W12x14** ✓
 Material: **HR_STL** ✓
 Length: **10 ft** ✓
 I Joint: **N1** ✓
 J Joint: **N2**
 LC 3: d+l
 Code Check: **0.685 (bending)** ✓
 Report Based On 97 Sections



AISC 14th(360-10): ASD Code Check

Direct Analysis Method

Max Bending Check **0.685** ✓
 Location **10 ft**
 Equation **H1-1b**

Max Shear Check **0.071**
 Location **10 ft**
 Max Defl Ratio **L/2649**

Bending Flange **Compact**
 Bending Web **Compact**

Compression Flange **Non-Slender** **Qs=1**
 Compression Web **Slender** **Qa=1**

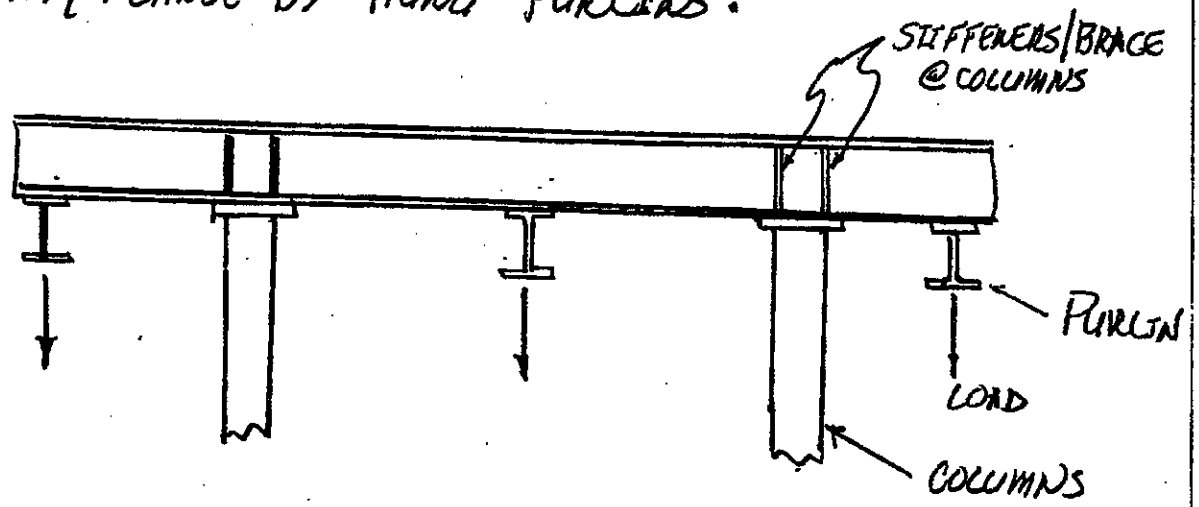
Fy **50 ksi**
 Pnc/om **24.634 k**
 Pnt/om **124.551 k**
 Mn/om **23.361 k-ft**
 Vn/om **42.754 k**
 Cb **1.4** ✓

Out Plane **10 ft**
 In Plane **10 ft**
 Lb **159.321**
 KL/r **26.002**

L Comp Flange **10 ft** ✓
 Tau_b **1**

CROSSBEAM (MAIN GIRDER) DESIGN NOTES:

- CROSSBEAMS ARE SUPPORTED ON TOP OF COLUMNS & LOADED AT BOTTOM FLANGE BY "HUNG" PURLINS:



SINCE BEAMS ARE LOADED @ BOTTOM FLANGE A MODIFIED C_b^* VALUE CAN BE USED

$$C_b^* = C_b (B) \quad (\text{SSRC 4TH EDITION / ALSO YURA-HELLWIG LECTURE SERIES - 1996})$$

$B = 1.4$ FOR BOTTOM FLANGE LOADS

$B = 1.0$ FOR BEAMS LOADED @ CENTROIDS

$B = 0.7$ FOR BEAMS LOADED @ TOP FLANGE

FOR CONSERVATISM ASSUME $C_b = 1.0$ (AISC)

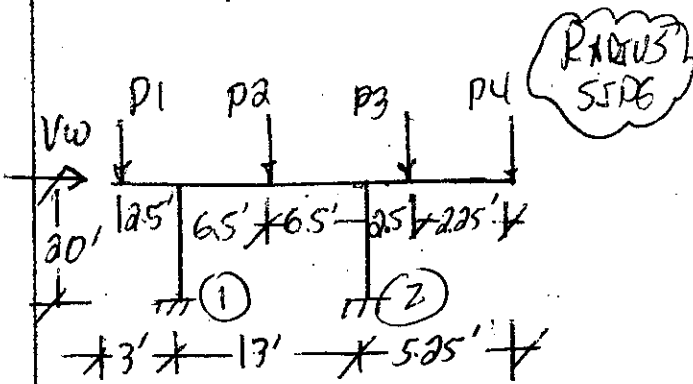
$$\therefore C_b^* = 1.4(1) = 1.4 \quad (\text{FOR TYPICAL CANOPY DESIGN})$$

(CROSSBEAMS & PURLINS)

- CROSSBEAMS CONSIDERED BRACED AT COLUMN SUPPORTS ONLY, UNLESS OTHER SPECIFICALLY DESIGNATED BRACE POINTS ARE IDENTIFIED, CONSERVATIVE AS PURLINS WILL PROVIDE SOME BRACING.
- FOR TOP DECK CANORIES $C_b^* = 0.7 C_b$ / INLINE FRAMING $C_b^* = C_b$

MAIN BEAM / COLUMN FRAME ANALYSIS

OUTER FRAME



	D	L (25 PSF)
P1	2.1	4.8
P2	1.8	5.6
P3	2.1	4.9
P4	0.8	1.8

$V_w = 25 \text{ PSF} (10' + \frac{20'}{2}) (4') (1.5)$

$V_w = 3.5 \text{ K/FRAME}$

ANALYSIS PER AISC DIRECT ANAL. METHOD

Crossbeam W14x22 $C_b = 1.4$ (BOTTOM FLOOR LOAD)
 $L_b = 13'$ (SPAN) / $5.25'$ (OVERHANG)

D+L $M_{OH} = 30.2 \text{ K}'$

$u = 0.51 < 1.0$ (OK)

$\Delta_{end} = 0.19''$ (L/990)

D+.75(L+WLAT) $u_{min} = 0.69 < 1.0$ (OK)

Columns HSS10x10x3/16"

SEE RESULTS ON FOLLOWING SHEETS

D+L $u_{min} = 0.18 < 1.0$ (OK)

D+.75(L+WLAT) $u_{min} = 0.45 < 1.0$ (OK)
 $\Delta_{LAT} = 0.65''$ (L/369)

REACTIONS

TOP PLATE LOADS:

	D	L	WLAT
P1	3	7	±2.6
M1	2	3	17
P2	4.4	10.2	±2.6
M2	2	3.5	17

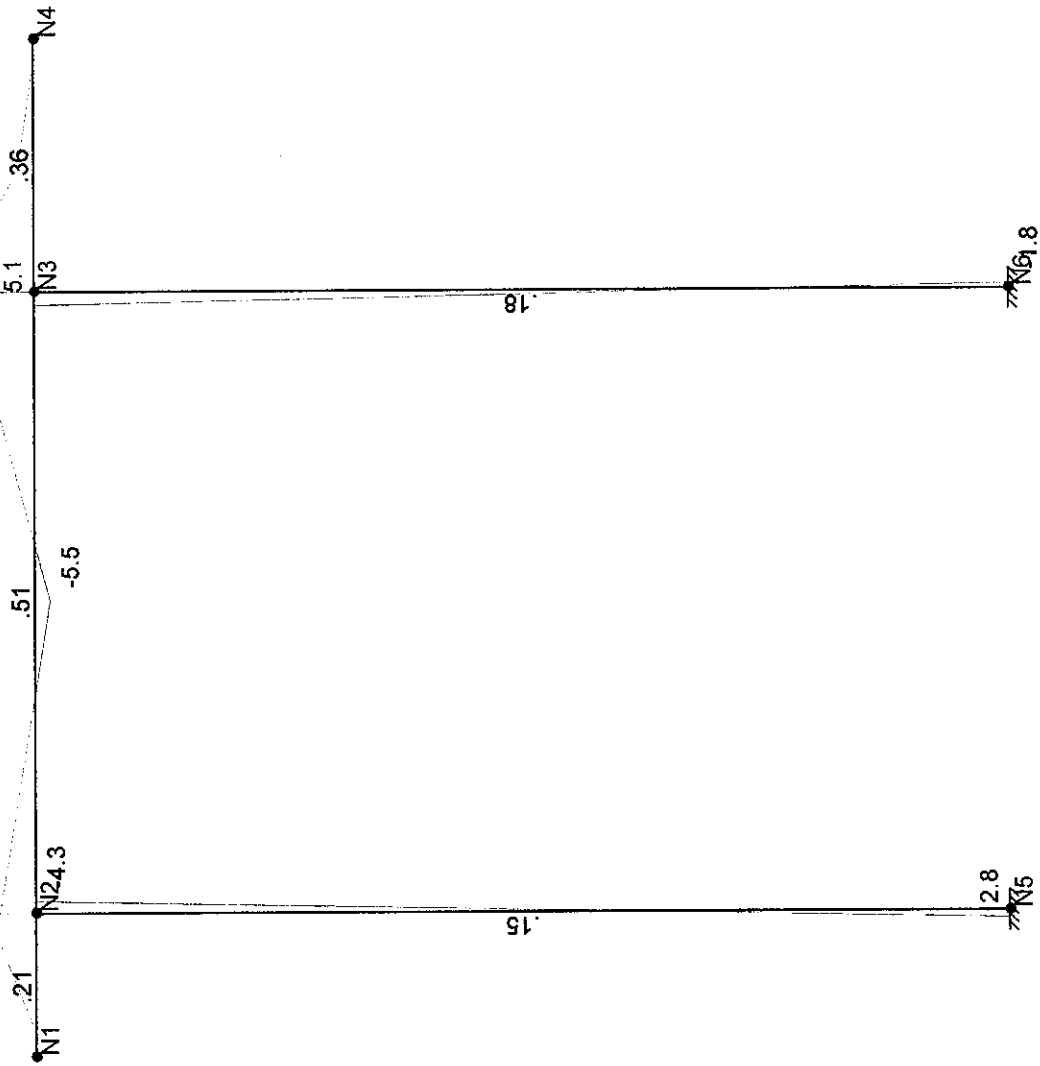
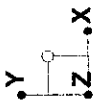
D+WLAT (OK)
 $u_{min} = 0.48 < 1.0$
 $\Delta_{LAT} = 0.8''$
 (L/300)

	D	L	WLAT
V1	0.2	0.3	±1.8
R1	3.4	7	±2.6
M1	1	2	±20
V2	0.2	0.3	
R2	4.8	10.2	
M2	1	2	

22-141 50 SHEETS
 22-142 100 SHEETS
 22-144 200 SHEETS



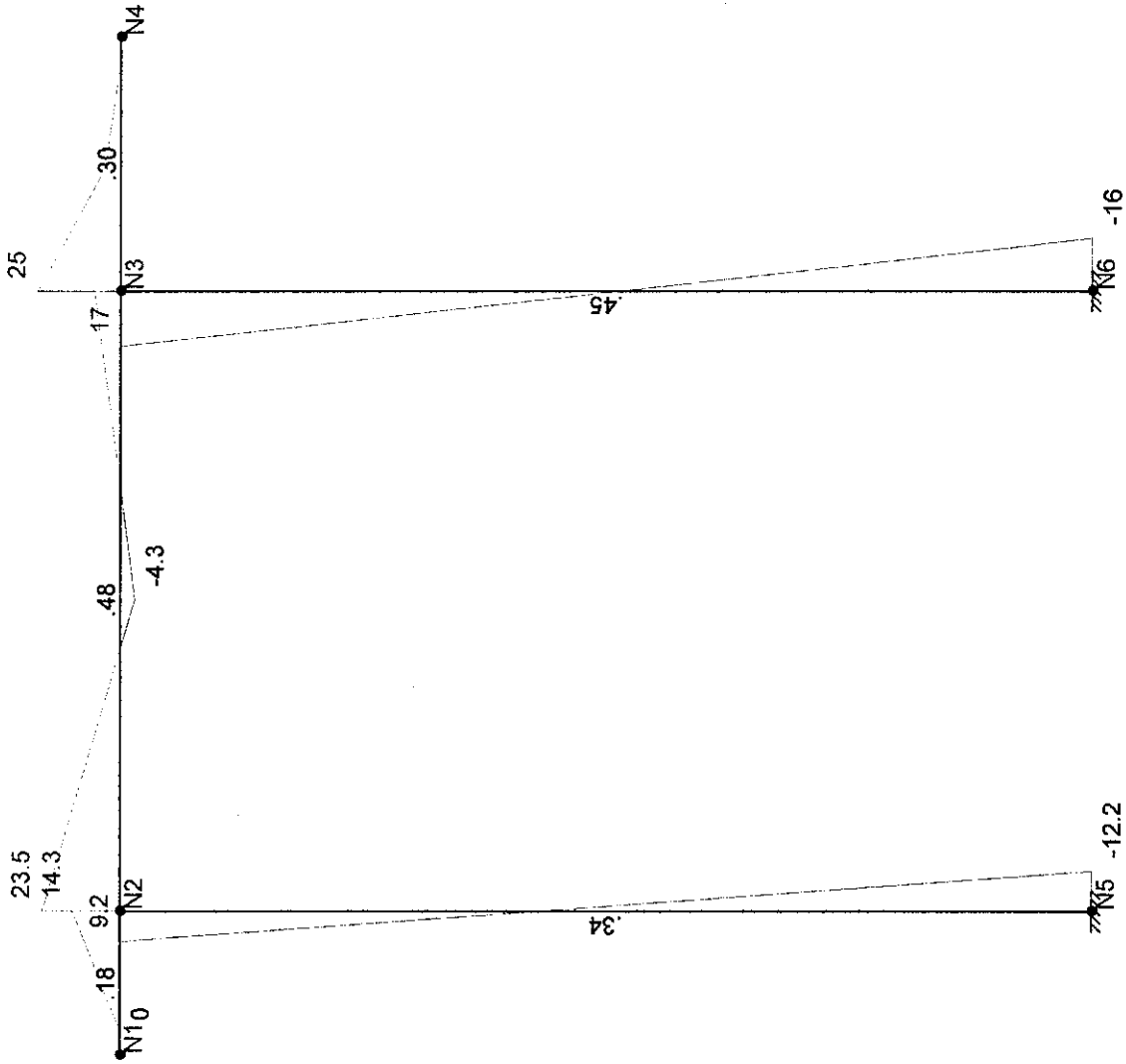
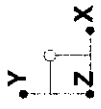
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Member Code Checks Displayed
Results for LC 6, D+L
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME	SK - 3
	Outer Frame - Unity Check & Moments	Oct 24, 2016 at 6:39 PM
		Sheet: 24x34.radiusframe.Outer.25psf.r2d

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DIST = 0.57" (2/420)

← (WIND TO LEFT)

Member Code Checks Displayed
Results for LC 7, D +.75(L+Wlat)
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE

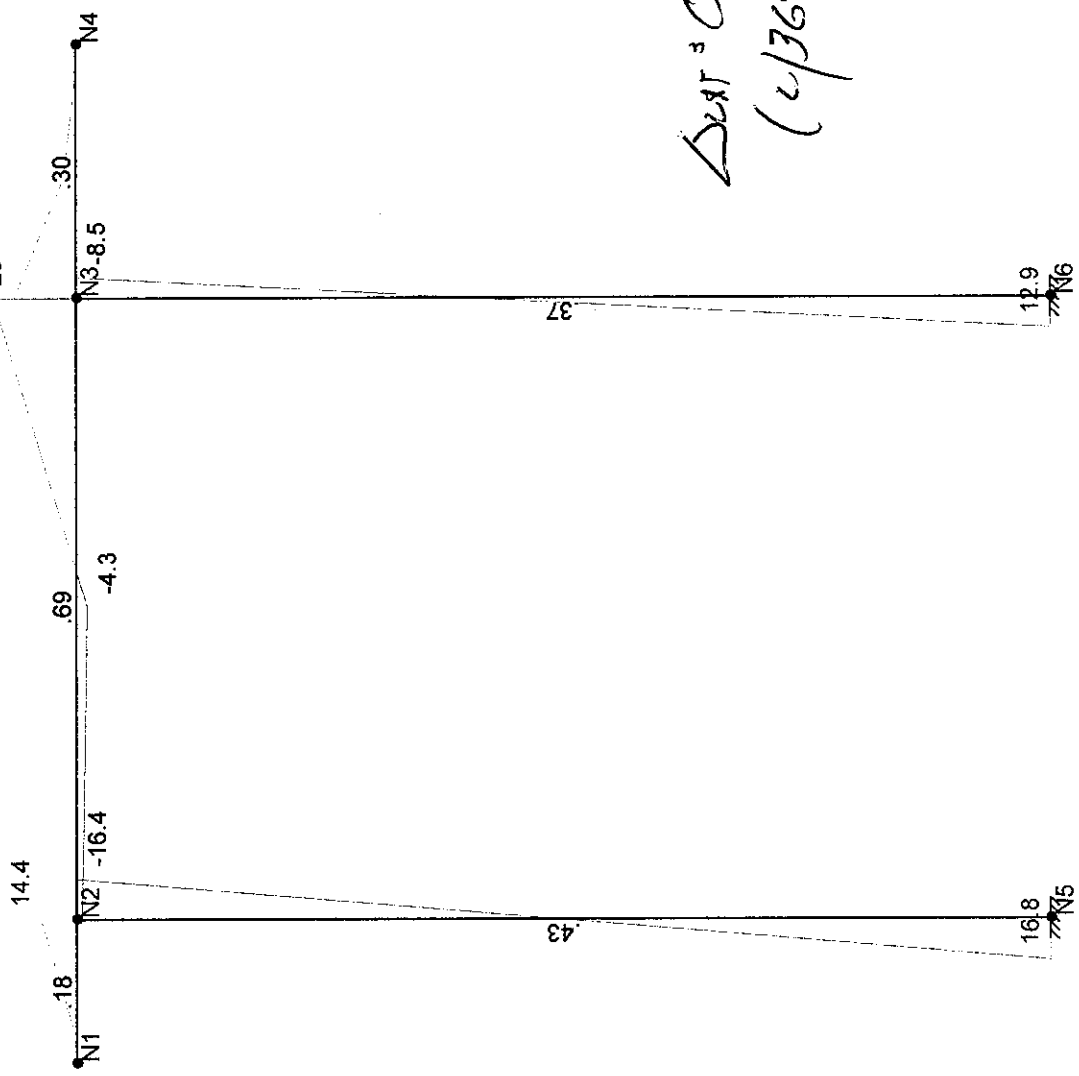
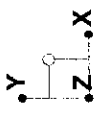
CROSSBEAM / COLUMN FRAME
Outer Frame - Unity Check & Moments

SK - 2
Oct 24, 2016 at 6:38 PM

Sheetz.24x34.radiusframe.Outer.25psf.r2d

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$\Delta_{EXT} = 0.65''$
(4/369)



(WIND TORQUE)

Member Code Checks Displayed
Results for LC 7, D + 75(L+W)
Member Bending Moments (k-ft)

SK - 4

Oct 24, 2016 at 6:40 PM

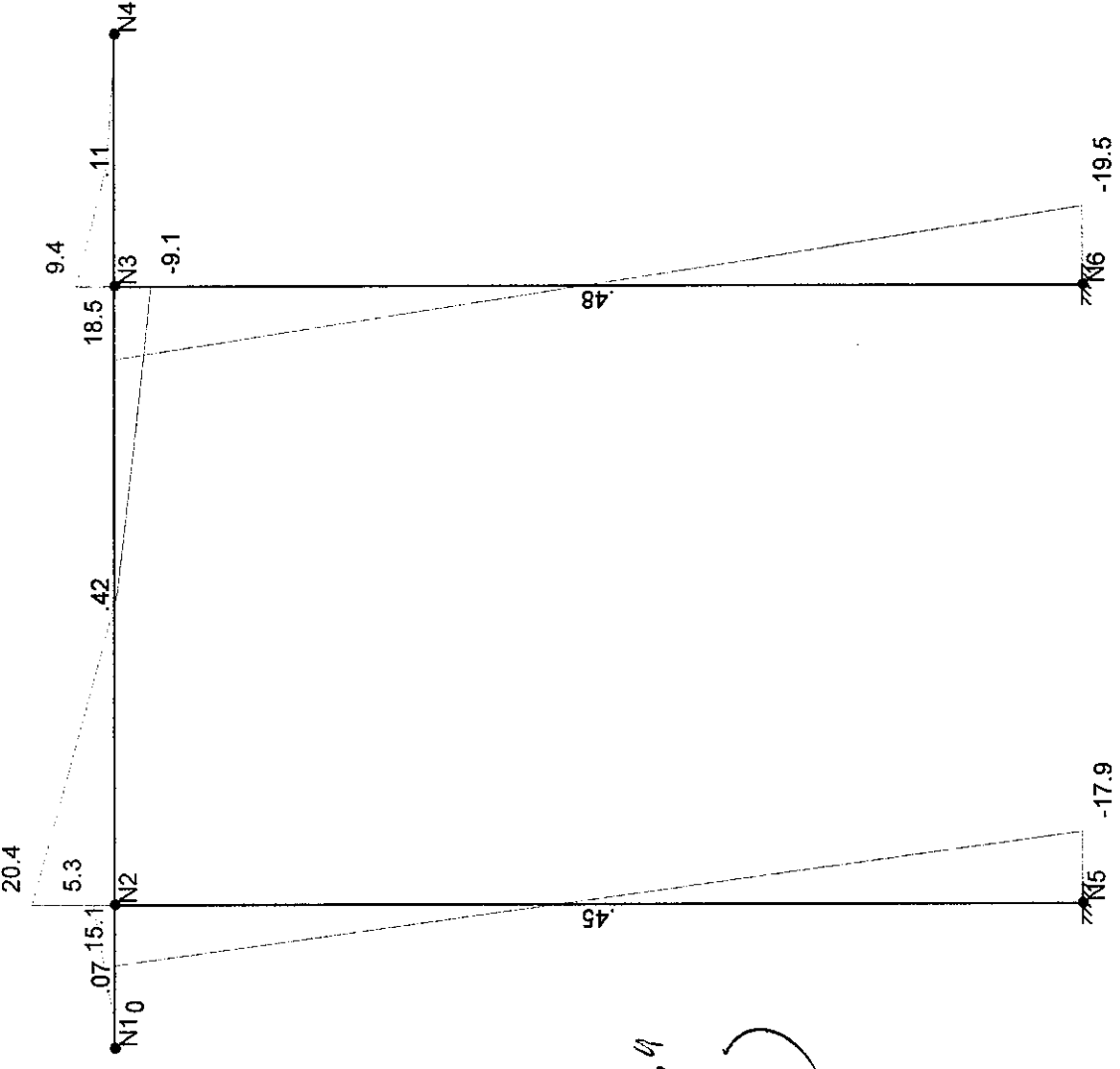
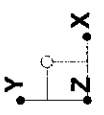
Sheetz.24x34.radiusframe.Outer.25psf.r2d

CROSSBEAM / COLUMN FRAME

Outer Frame - Unity Check & Moments

Lawrence R. Pilon, PE

15/3/16



$\sum UAT = 0.78^A$
(4/305)

(WIND TO LEFT) ←

Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

SK - 1

Oct 24, 2016 at 6:38 PM

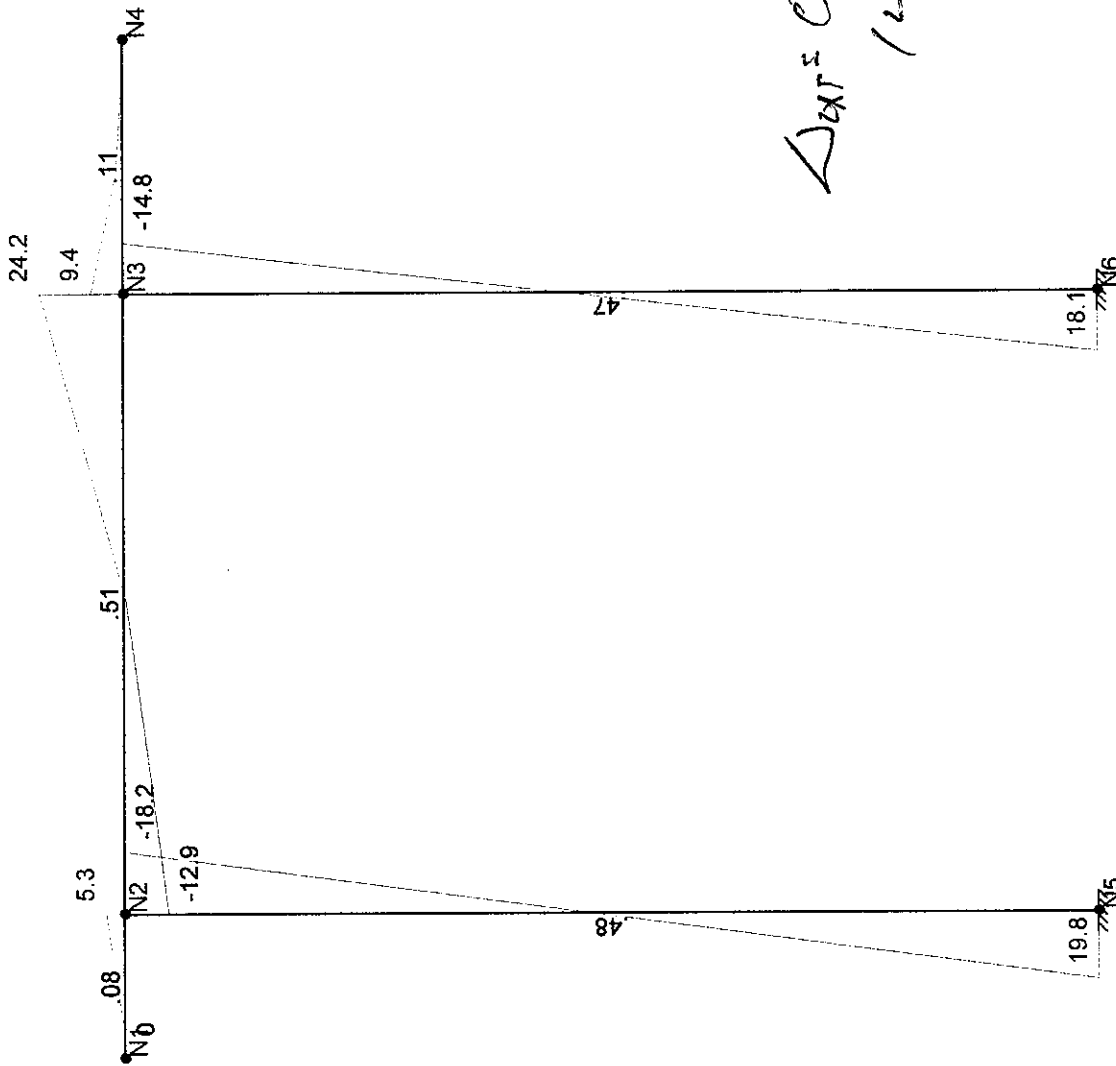
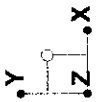
Sheetz.24x34.radiusframe.Outer.25psf.r2d

CROSSBEAM / COLUMN FRAME

Outer Frame - Unity Check & Moments

Lawrence R. Pilon, PE

16/36



Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE

CROSSBEAM / COLUMN FRAME
Outer Frame - Unity Check & Moments

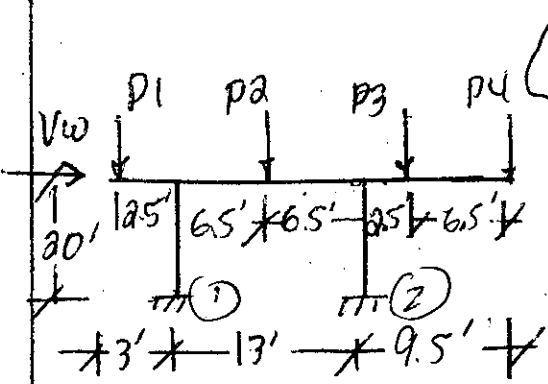
SK - 5

Oct 24, 2016 at 6:41 PM

Sheetz.24x34.radiusframe.Outer.25psf.r2d

MAIN BEAM / COLUMN FRAME ANALYSIS

1ST INTERIOR FRAME



	D	L (25 PSF)
P1	1.8	4.8
P2	1.4	5.8
P3	1.0	5.5
P4	1.9	4.6

$V_w = 25 \text{ PSF} (26' \times 4') (15)$

$V_w = 3.9 \text{ K/FRAME}$

ANALYSIS PER AISC DIRECT ANAL. METHOD

Crossbeam W18x35 $C_b = 1.4$ (BOTTOM FLOOR LOAD)
 $L_b = 13'$ (SPAN) / $9.5'$ (OVERHANG)

D+L $M_{max} = 78 \text{ K}'$

$u = 0.54 < 1.0$ (OK)

$\Delta_{end} = 0.56''$ (L/203)

D+.75(L+WLAT) $u_{max} = 0.56 < 1.0$ (OK)

Columns HSS10x10x3/16"

SEE RESULTS ON FOLLOWING SHEETS

D+L $u_{min} = 0.3 < 1.0$ (OK)

D+.75(L+WLAT) $u_{max} = 0.59 < 1.0$ (OK)
 $\Delta_{LAT} = 0.71''$ (L/778)

W/1/2 L ON GH

REACTIONS

TOP PLATE LOADS:

	D	L	WLAT
P1	1.5	4.5	4/3
M1	2	5	1/9
P2	6.1	15.9	↓
M2	3	6	↓

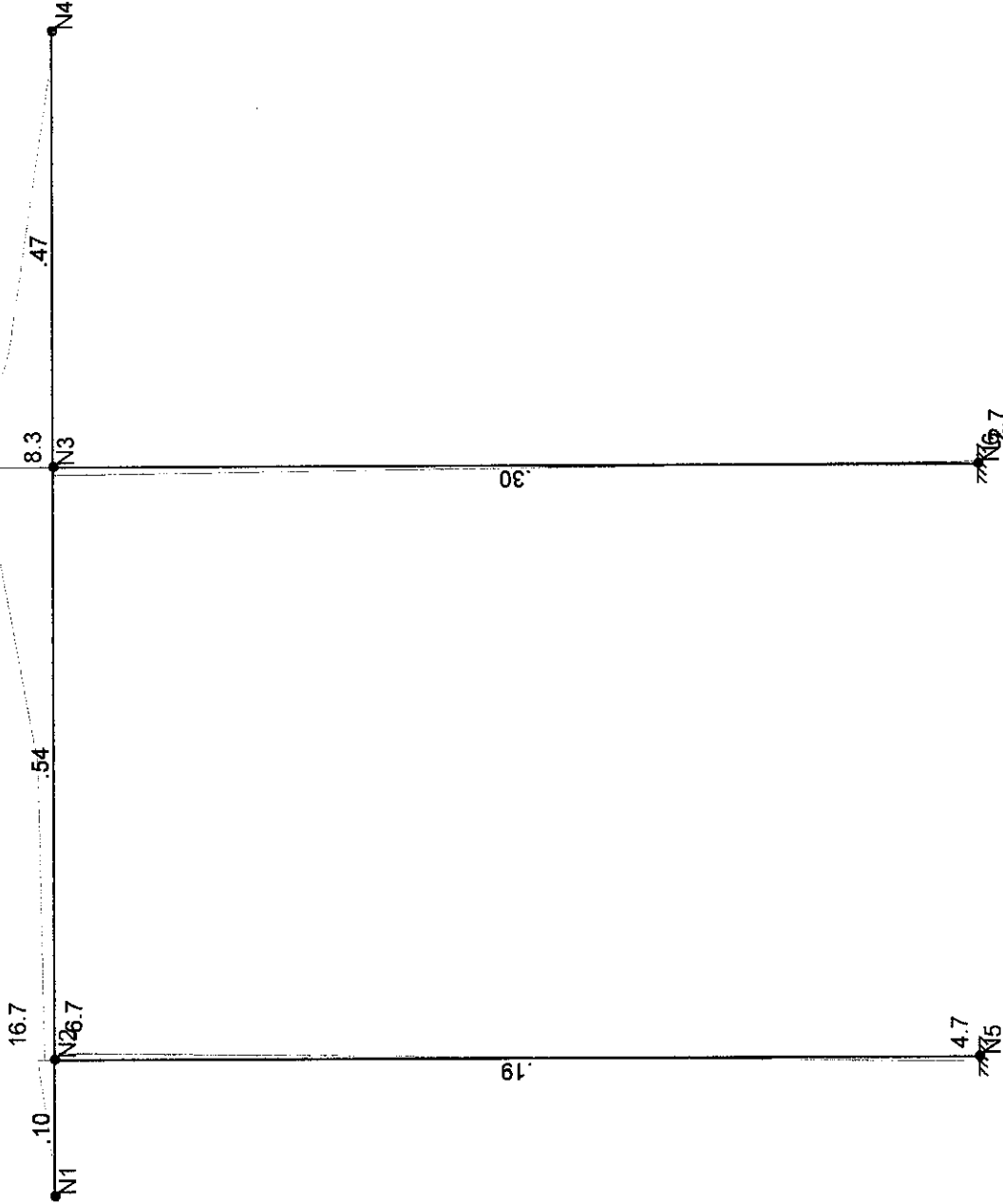
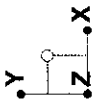
D+WLAT (OK)
 $u_{max} = 0.54 < 1.0$
 $\Delta_{LAT} = 0.81''$ (L/295)

	D	L	WLAT
V1	0.2	0.4	4/2
R1	2	4.5 / 6.6	4/3
M1	2	4	2/1
V2	0.2	0.4	↓
R2	6.6	10.2	↓
M2	1	2	↓


22-141 50 SHEETS
 22-142 100 SHEETS
 22-144 200 SHEETS



18/36

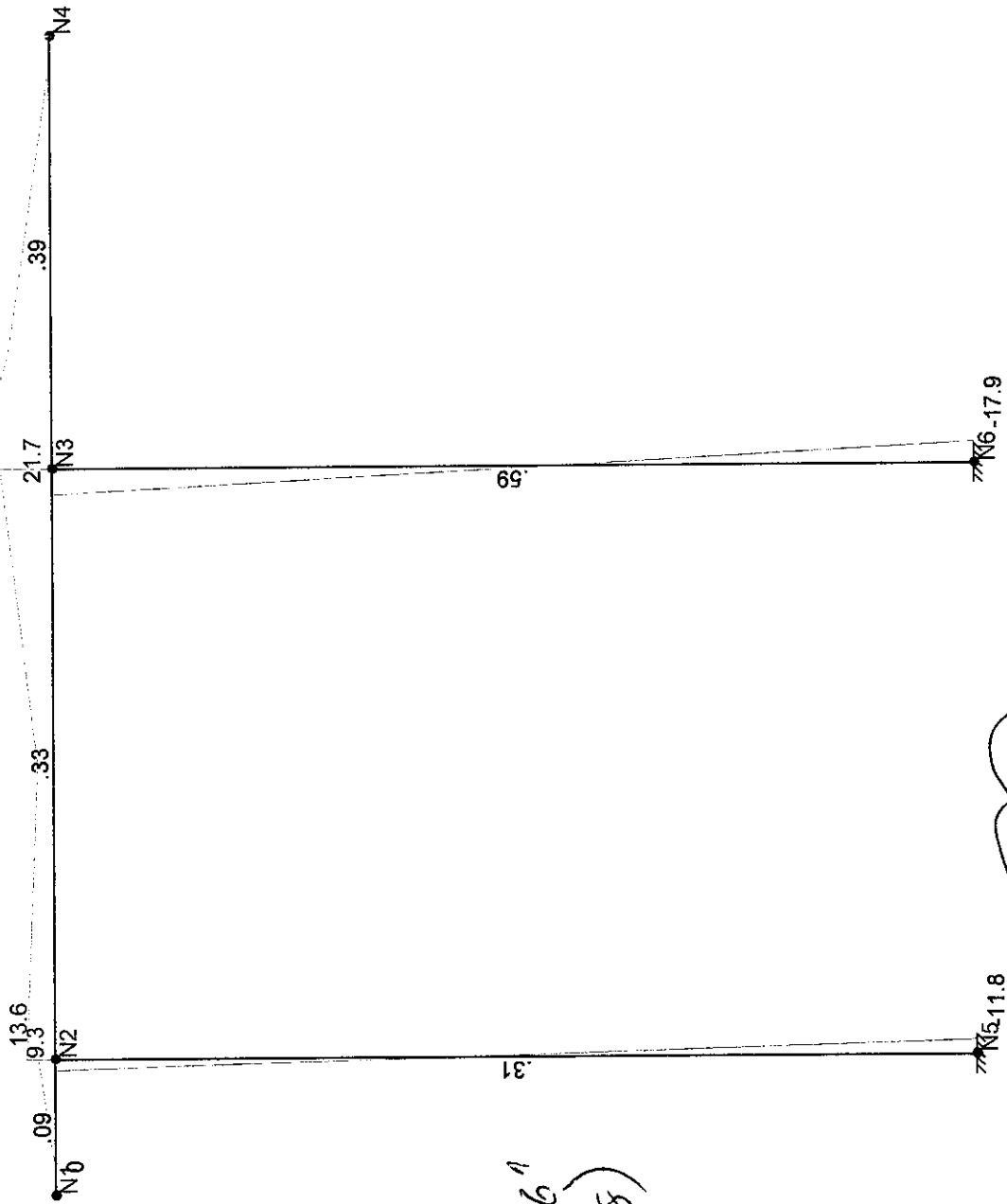
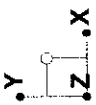


Member Code Checks Displayed
 Results for LC 6, D+L
 Member Bending Moments (k-ft)



Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME	SK - 1
	1st Interior Frame - Unity Check & Moments	Oct 25, 2016 at 6:48 AM
		Sheet: 24x34.radiusframe.1stInterior.25psf.r2d

79/36



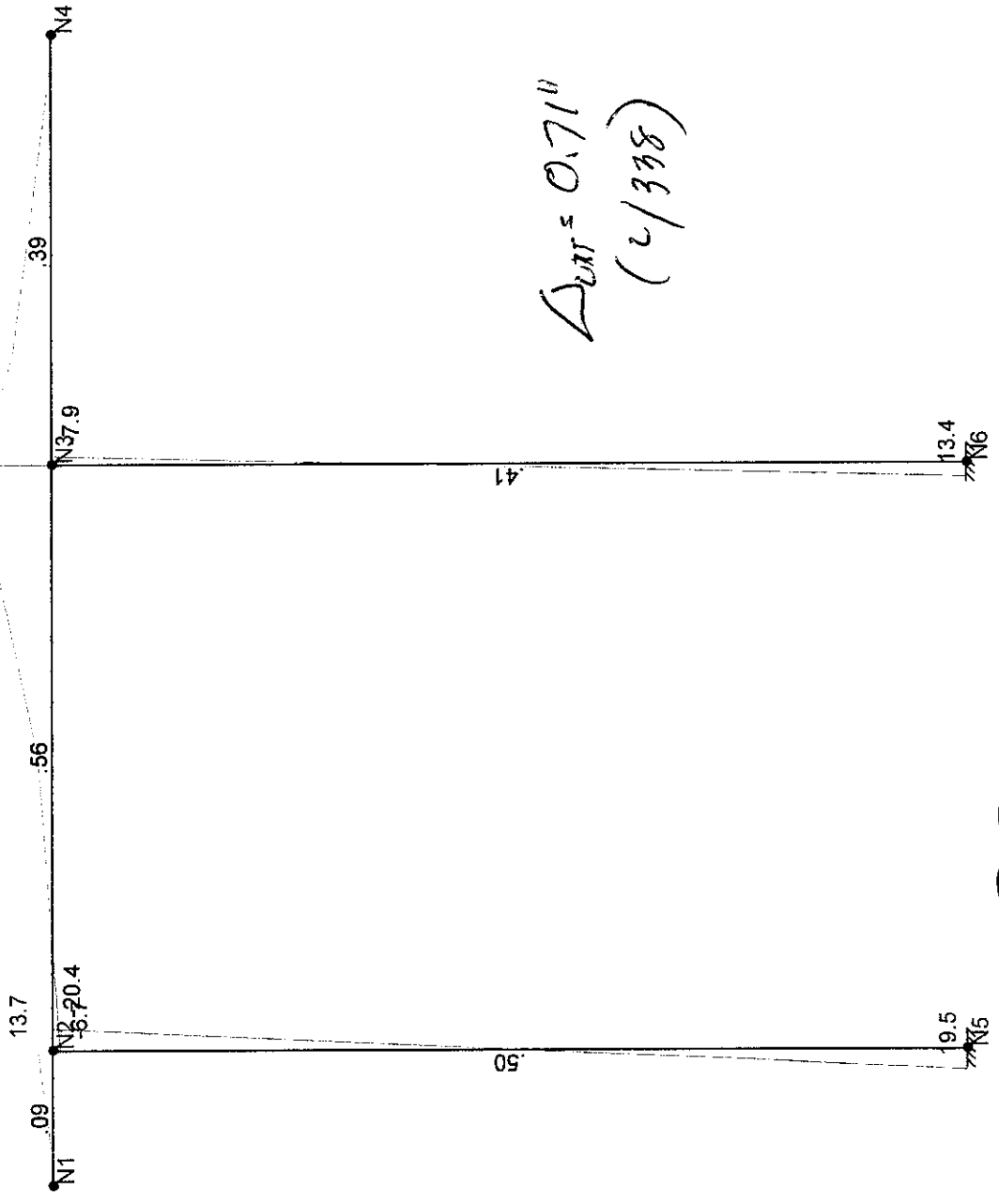
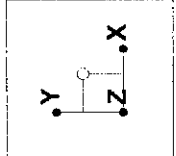
$\Delta W1 = 0.56^1$
(2/478)

(WARD TO LEFT)

Member Code Checks Displayed
Results for LC 7, D + 75(L+Wlat) ←
Member Bending Moments (k-ft)

SK - 3	CROSSBEAM / COLUMN FRAME
Oct 25, 2016 at 6:52 AM	1st Interior Frame - Unity Check & Moments
Sheet: 24x34.radiusframe.1stInterior.25psf.r2d	

Lawrence R. Pilon, PE



$\Delta_{UNIT} = 0.71''$
(2/338)

← wants TO RIGHT →

Member Code Checks Displayed
Results for LC 7, D + .75(L+Wlat)
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE

CROSSBEAM / COLUMN FRAME

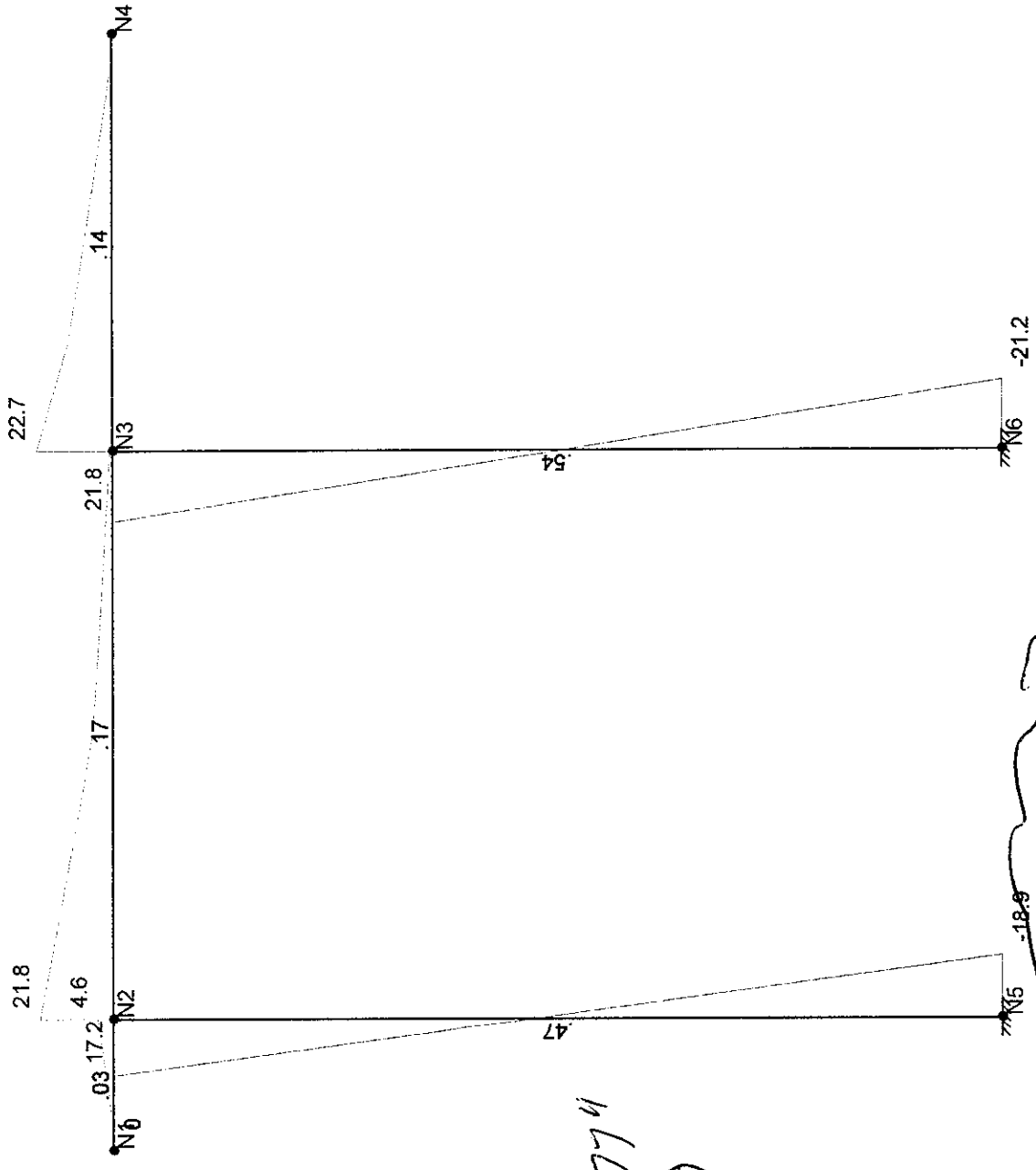
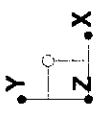
1st Interior Frame - Unity Check & Moments

SK - 2

Oct 25, 2016 at 6:50 AM

Sheetz.24x34.radiusframe.1stInterior.25psf.r2d

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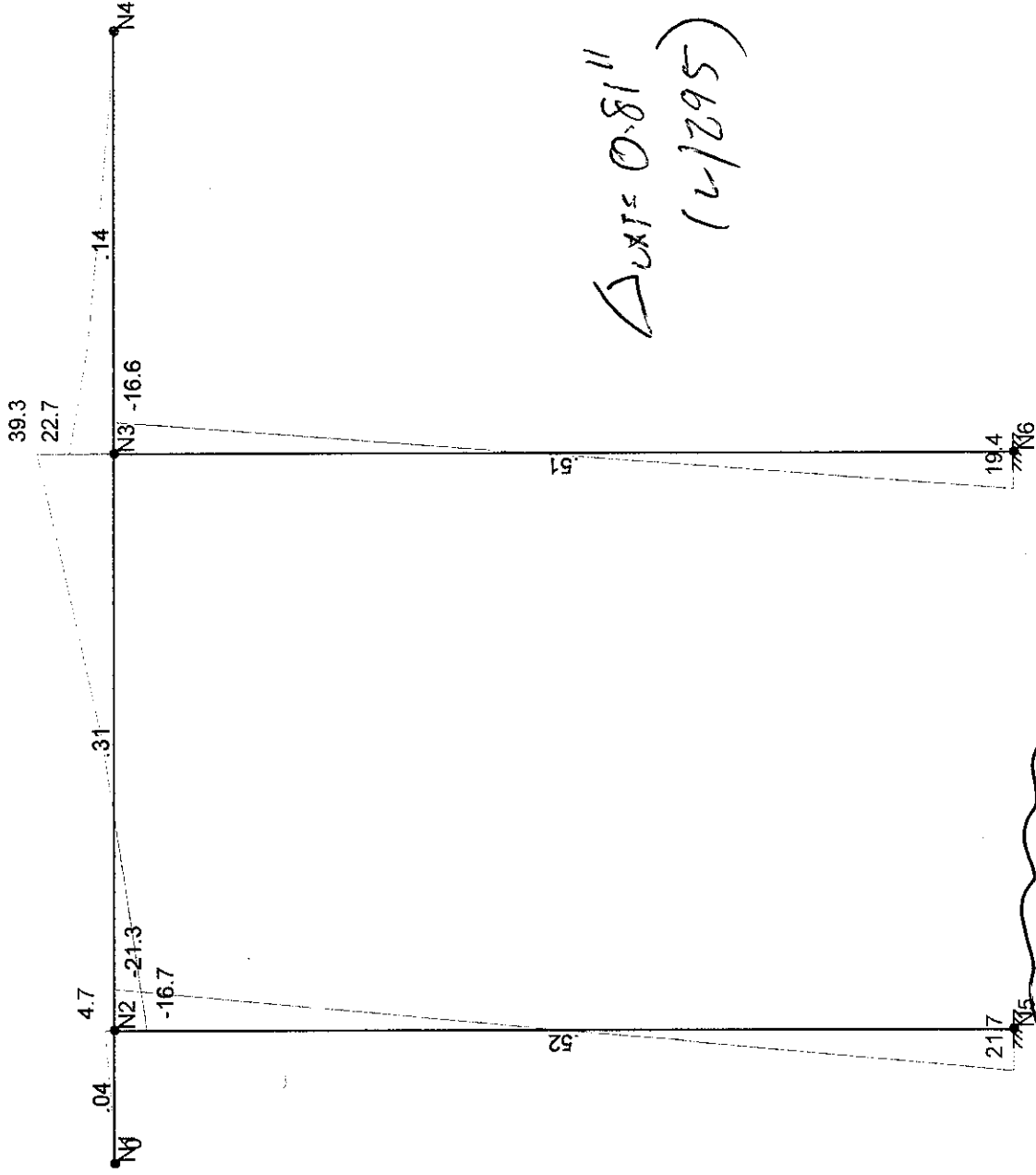
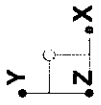
$\Delta UAT = 0.774$
(4/311)

WIND TO LEFT

Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME	SK - 5
	1st Interior Frame - Unity Check & Moments	Oct 25, 2016 at 7:05 AM
		Sheet: 24x34.radiussframe.1stInterior.25psf.r2d

22/30



$\Delta_{LX1} = 0.81''$
(2/295)

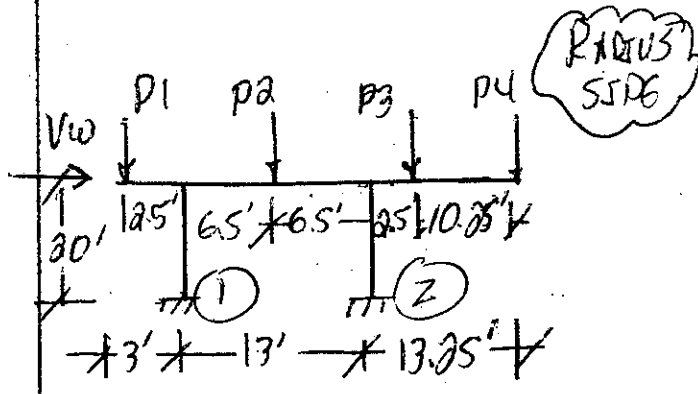
WIND TO RIGHT

Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME	SK - 4
	1st Interior Frame - Unity Check & Moments	Oct 25, 2016 at 7:05 AM
		Sheetz.24x34.radiusframe.1stinterior.25psf.r2d

MAIN BEAM / COLUMN FRAME ANALYSIS

CENTER / EXTERIOR FRAME



	D	L (25 DTF)
P1	2	5
P2	1.6	6
P3	1.6	6.2
P4	2	5.6

$VW = 25 \text{ PSF } (26 \times 4) (15)$
 $VW = 3.9 \text{ K/FRAME}$

ANALYSIS PER AISC DIRECT ANAL. METHOD

CROSS BEAM W24x44 ($C_b = 1.4$ (BOTTOM FLG LOAD))
 $L_B = 13'$ (SPAN) / $13.25'$ (OVERHUNG)

D+L $M_{OH} = 120.3 \text{ K}$ $u = 0.63 < 1.0$ (OK) $\Delta_{evid} = 0.92''$ (L/172)
 (OK FOR CRT) (Le = 2Lc)

D+.75(L+WLAT) $u_{max} = 1.0$ (OK)

COLUMNS HSS 10x10x3/16"

SEE RESULTS ON FOLLOWING SHEETS

D+L $u_{max} = 0.43 < 1.0$ (OK)
D+.75(L+WLAT) $u_{max} = 0.63 < 1.0$ (OK)
 $\Delta_{LAT} = 0.72''$ (L/373)

REACTIONS

TOP PLATE LOADS:

	D	L	WLAT
P1	1	2.4	4.3
M1	2	5	1.9
P2	7.4	20.5	↓
M2	3	6.5	

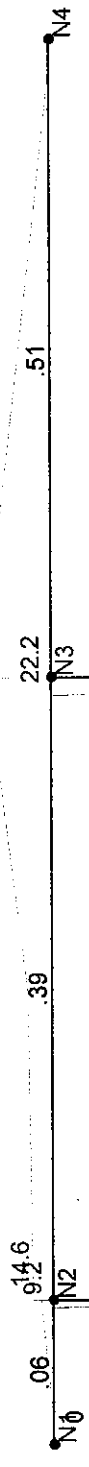
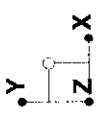
D+WLAT (OK)
 $u_{max} = 0.55 < 1.0$
 $\Delta_{LAT} =$
 (L)

	D	L	WLAT
V1	0.2	0.4	4.2
R1	1.6	2.4/5.7	4.3
M1	2	4	2.0
V2	0.2	0.4	↓
R2	7.9	20.5	
M2	1	2	1/2 L ON OH

22-141 50 SHEETS
 22-142 100 SHEETS
 22-144 200 SHEETS



25/30



$\Delta_{inf} = 0.54''$
(2/4114)

62

6.17.8

5.11.4

WIND TO LEFT
←

Member Code Checks Displayed
Results for LC 7, D + 75(L+Wiat)
Member Bending Moments (k-ft)

SK - 2

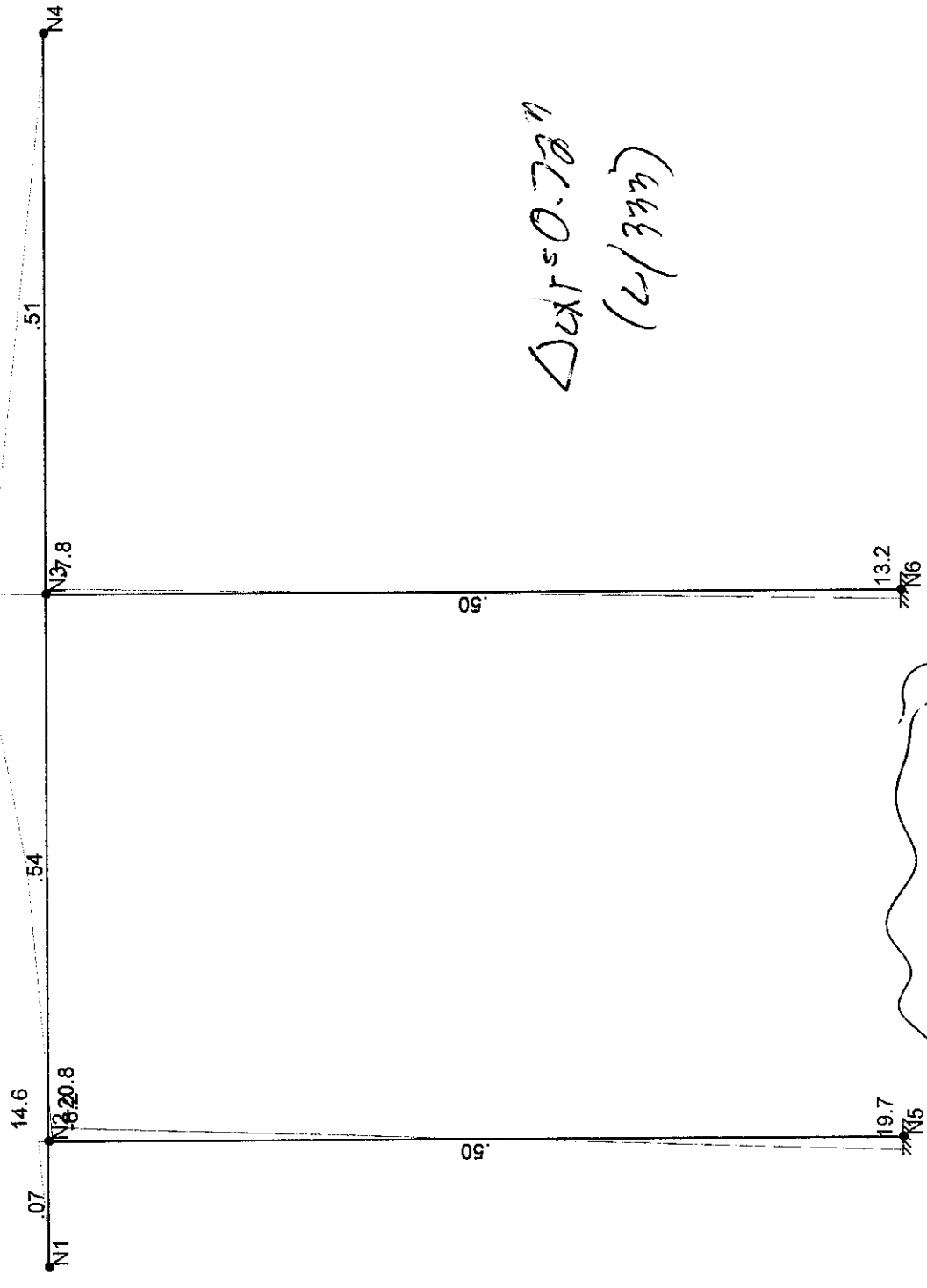
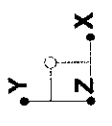
Oct 25, 2016 at 9:30 AM

Sheetz.24x34.radiusframe.Center.25psf.r2d

CROSSBEAM / COLUMN FRAME

Center Frame - Unity Check & Moments

Lawrence R. Pilon, PE



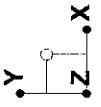
$\Delta Y = 0.78''$
(2/333)

(WIND TO RIGHT) →

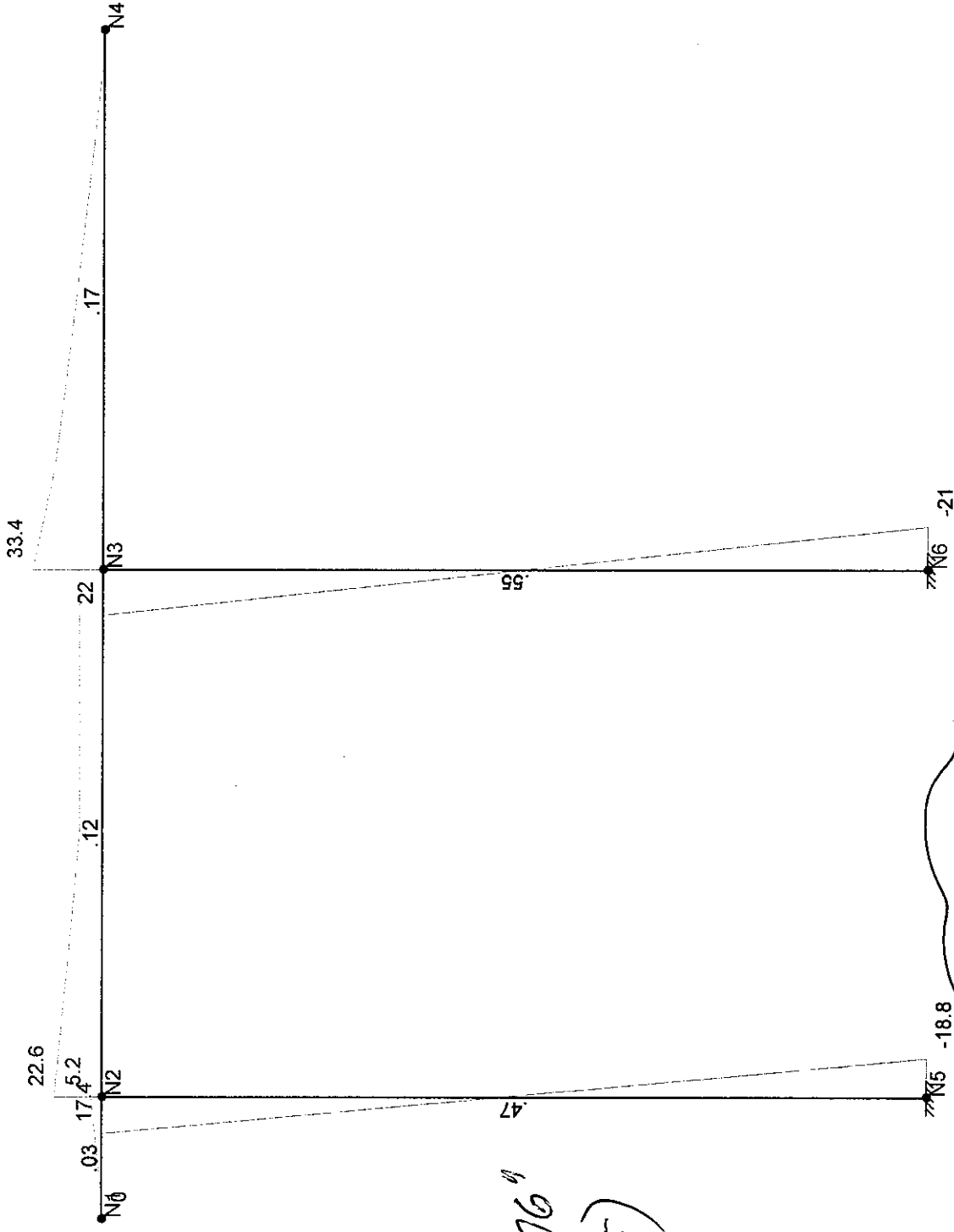
Member Code Checks Displayed
Results for LC 7, D + 75(L+Wlat)
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME		SK - 3
	Center Frame - Unity Check & Moments		Oct 25, 2016 at 9:32 AM
		Sheetz.24x34.radiusframe.Center.25psf.r2d	

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$\Delta_{LRF} = 0.76''$
(4/315)

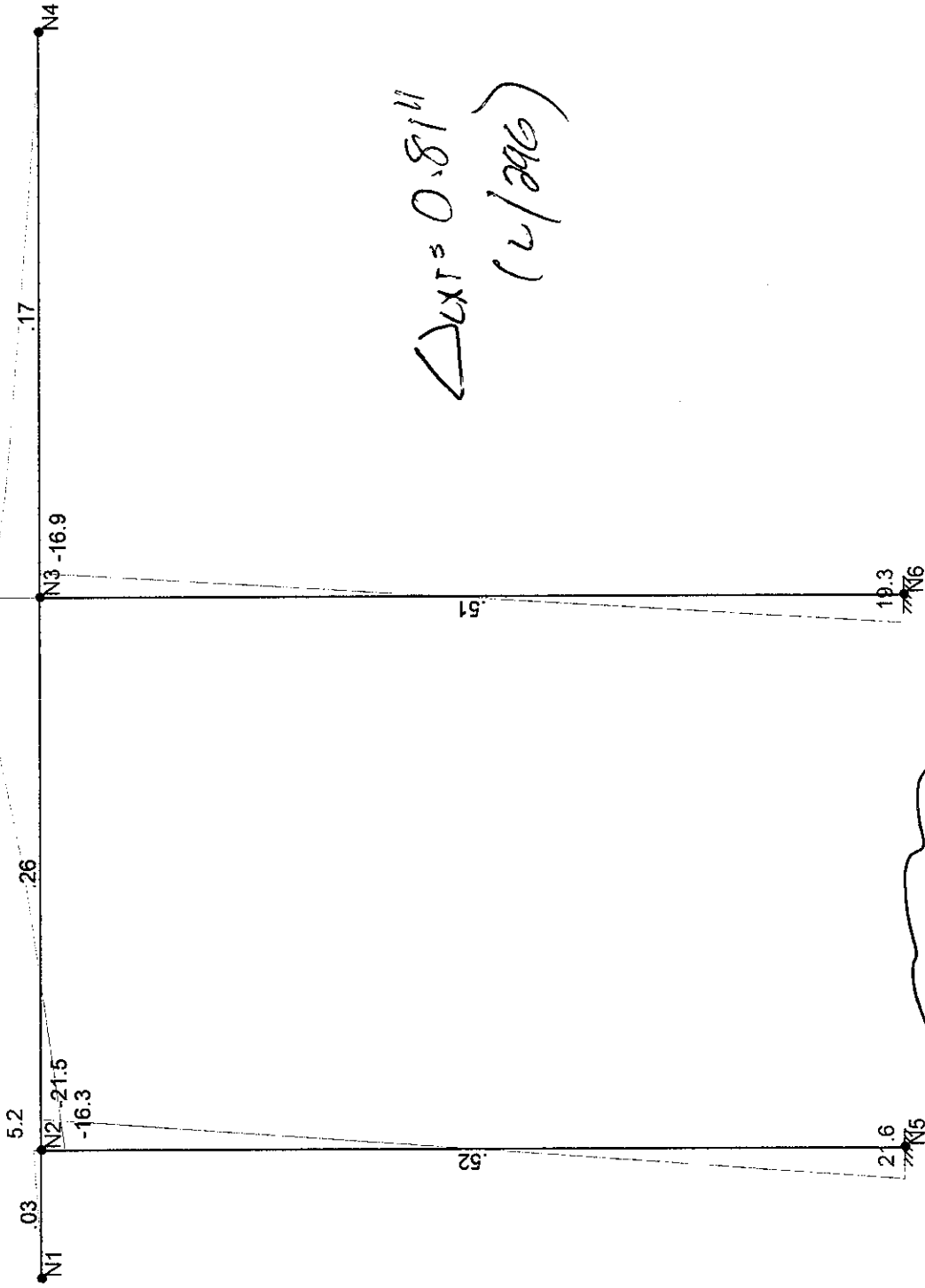
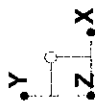


W-SHIFT TO LEFT
←

Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE	CROSSBEAM / COLUMN FRAME	SK - 4
	Center Frame - Unity Check & Moments	Oct 25, 2016 at 9:34 AM
		Sheet: 24x34.radiusframe.Center.25psf.r2d

28/36



Member Code Checks Displayed
Results for LC 8, D + Wlat
Member Bending Moments (k-ft)

Lawrence R. Pilon, PE

CROSSBEAM / COLUMN FRAME
Center Frame - Unity Check & Moments

SK - 5

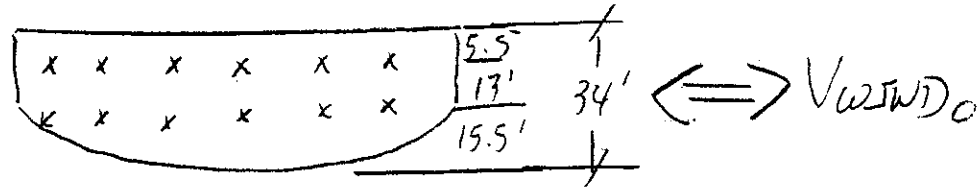
Oct 25, 2016 at 9:35 AM

Sheet: 24x34.radiuframe.Center.25psf.r2d

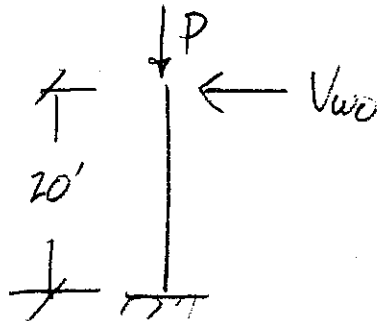
SHEET 24' / 34' RADIUS CANOPY

29/30

WIND LOADS PERP. TO FRAMES



COLUMNS ACT AS CANTILEVERS



COLUMNS ALONG STRAIGHT EDGE

$$V_{WIND} = 25 \text{ PSF} \left(5.5' + \frac{17'}{2} \right) (4') (1.5) / 4 \text{ COLS} = \underline{0.5 \text{ K/COL}}$$

COLUMNS ALONG RADIUS SIDE

$$V_{WIND} = 25 \text{ PSF} \left(15.5' + \frac{17'}{2} \right) (4') (1.5) / 4 \text{ COLS} = \underline{0.85 \text{ K/COL}}$$

(CONTROLS)

SEE ANALYSIS FOR OUT-OF-PLANE WIND ON FOLLOWING SHEETS

30/36

COLUMNS AS CONTINUOUS FOR OUT OF FRAME PLANE (WIND) LOADS

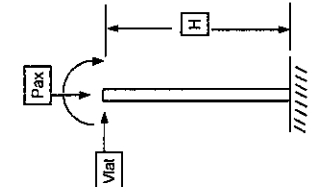
⇒ MSS 10x10 x 7/16" (OK)
 C-SHOTS 1/2" : 6 SHORTEST WELDED COLUMN (AVERAGE STRONG AXIS EDGE)
 C-SHOTS 3/4" : 16 SHORTEST WELD COLUMN (AVERAGE RADIUS)

CUSTOMER: Sheetz
 LOCATION: 25 psf live load
 DATE: 10/25/16
 CALC BY: LRP
 DWG#: 0

COLUMN LOCATION	LOADS AT TOP OF COLUMN				SLENDERNESS RATIOS		ALLOW STR		LOADS AT COLUMN BASE											
	Pdead (KIPS)	Mlive (KIPS)	Plive (KIPS)	W or .7E _v or .7E _w (KIPS)	K _L /R _x	K _L /R _y	F _a (KSI)	F _b (KSI)	D + L (KIPS)	M _{bend} (K-FT)	V _{shear} (KIPS)	P _{axial} (KIPS)	M _{bend} (K-FT)	V _{shear} (KIPS)	D + W (or .7E) (KIPS)	P _{axial} (KIPS)	M _{bend} (K-FT)	V _{shear} (KIPS)	.6D + W (or .7E) (KIPS)	
1	1.00	0.50	2.50	0.50	120.1	120.1	10.4	30.4	3.99	0.00	0.00	3.37	7.50	0.19	1.49	10.00	0.50	0.90	10.00	0.50
2	1.00	0.50	2.50	-6.00	120.1	120.1	10.4	30.4	3.99	0.00	0.00	-1.13	7.50	0.19	-4.51	10.00	0.50	-5.10	10.00	0.50
3	7.40	0.90	20.50	0.90	120.1	120.1	10.4	30.4	28.39	0.00	0.00	23.27	13.50	0.34	7.89	18.00	0.90	4.74	18.00	0.90
4	7.40	0.90	20.50	-16.00	120.1	120.1	10.4	30.4	28.39	0.00	0.00	11.27	13.50	0.34	18.14	18.00	0.90	-11.26	18.00	0.90

INPUT VALUES FOR 8 COLUMNS (B-H AND J) ABOVE (IF ZERO VALUE, ENTER '0' OR CLEAR CELL)
 AISC E2-1 or E2-2 Coils AE/AF
 K=2 STRONG AXIS
 K=2 WEAK AXIS
 AISC F3-1
 4' x 10" & 4' x 10" Δ'S OK FOR CHOT. ANALYSIS
 4' x 10" & 4' x 10" Δ'S OK FOR CHOT. ANALYSIS

COLUMN LOC	STRESSES AT COLUMN BASE						DEFLECTION CRITERIA						REACTIONS AT COLUMN BASE					
	f _a (KSI)	f _b (KSI)	f _a (KSI)	UNITY	f _a (KSI)	f _b (KSI)	MAX LAT DEF (IN)	<L/200?	P _{dead} (KIPS)	M _{dead} (K-FT)	P _{live} (KIPS)	M _{live} (K-FT)	V _{wind} (KIPS)	W or .7E (LAT) (KIPS)	P _{up/down} (KIPS)	W or .7E (UP) (KIPS)		
1	0.59	0.00	0.06	0.06	0.22	5.56	0.13	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19		
2	0.59	0.00	0.06	0.12	-0.67	5.56	-0.75	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13		
3	4.20	0.00	0.41	0.69	1.17	10.00	0.70	0.44	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
4	4.20	0.00	0.41	0.44	2.68	10.00	-1.67	0.70	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21		



NOTES:

- 1) THE FOUR LOAD CASES ARE LC1) DEAD + LIVE; LC2) DEAD + .75(WIND or .75SEISMIC) + 0.75LIVE; LC3) DEAD + WIND(or .75SEISMIC); AND LC4) .6DEAD + WIND(or .75SEISMIC)
- 2) COLUMN ANALYSIS ASSUMES THAT COLUMN BENDING OCCURS ONLY ABOUT ONE AXIS (STRONG AXIS) V_{wind} IS ASSUMED TO ACT PARALLEL TO LONG COLUMN DIMENSION (ie. NO BIAXIAL BENDING OCCURS) IF BIAXIAL OR WEAK AXIS BENDING CONTROLS, PERFORM SEPARATE ANALYSIS
- 3) VALID ONLY FOR ASTM A500 GR B TUBE COLUMNS AND ASTM A53 GR B PIPE COLUMNS
- 4) NO ALLOWABLE STRESS INCREASE OF 1.33 IS USED FOR CASES WITH WIND OR SEISMIC LOADS

V_{wind}=(Wind load X Load area length X fascia ht)/(# coils loaded)
 OR

3/4" x 20" x 20" BASE PLATE w/ GUSSETS
 (4) 1/4" Ø ANCHORS

FRAME BASE
 RANS
 CONTROL

LINE 1/2: LIGHTEST LOAD COLUMN
 LINE 3/4: HEAVIEST LOAD COLUMN

CUSTOMER: Sheetz / McGee
 DATE: 10/25/16
 LOCATION: 25 psf live load
 SIZE: 24'3/4" Radius Front
 CALC BY: LRP
 DWG#: 0

PLATE	LOADS AT COLUMN BASE				Col depth "d" (IN)	Col width "w" (IN)	Col Flange "t" (IN)	Plate Len "L" (IN)	Plate Width "B" (IN)	Bolt Pattern "Ln" (IN)	Bolt Pattern "Lb" (IN)	Anchor Bolt Diam (IN)	# Bolts on width "B"
	Pdead (KIPS)	Mdead (KIPS)	Mlive (KIPS)	(W or 7E) (W or 7E) (KIPS)									
1	1.80	2.00	2.40	5.00	10.00	10.00	0.25	20.00	20.00	16.00	16.00	1.25	2
2	1.80	2.00	2.40	5.00	10.00	10.00	0.25	20.00	20.00	16.00	16.00	1.25	2
3	7.90	2.00	20.50	5.00	10.00	10.00	0.25	20.00	20.00	16.00	16.00	1.25	2
4	7.90	2.00	20.50	5.00	10.00	10.00	0.25	20.00	20.00	16.00	16.00	1.25	2

INPUT VALUES FOR SIXTEEN COLUMNS (B-Q) ABOVE
 (IF ZERO VALUE, ENTER '0' OR CLEAR CELL)

USE t = 3/4" w/ gussets

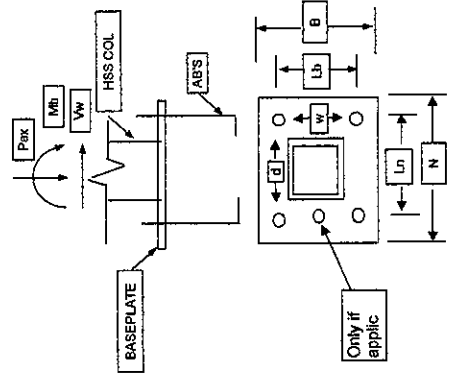


PLATE	PLATE BENDING RESULTS				REQUIRED WELD SIZE				MAX ANCHOR BOLT LOAD				
	LOAD CASE 1	LOAD CASE 2	LOAD CASE 3	LOAD CASE 4	LC1	LC2	LC3	LC4	REQ'D WELD (IN)	LD CASE 1	LD CASE 2	LD CASE 3	LD CASE 4
1	0.059	0.399	0.140	0.654	0.051	0.113	0.160	0.140	5/16	2.50	9.03	9.95	2.80
2	0.059	0.399	0.115	0.559	0.051	0.113	0.160	0.140	5/16	2.50	10.16	11.46	2.31
3	0.212	0.759	0.220	0.772	0.093	0.156	0.202	0.151	5/16	2.11	5.26	8.76	4.45
4	0.212	0.759	0.162	0.664	0.093	0.156	0.202	0.151	5/16	2.11	7.96	12.35	2.94

MAX BEARING STRESS ON CONCRETE IS ASSUMED TO BE .35*3 KSI = 1.05 KSI FOR 3000 PSI CONCRETE

- NOTES:
- THE FOUR LOAD CASES ARE LC1) DEAD + LIVE; LC2) DEAD + .75(WIND or .7SEISMIC) + 0.75LIVE; LC3) DEAD + WIND(or .7SEISMIC); AND LC4) .6DEAD + WIND(or .7SEISMIC)
 - VALID ONLY FOR RECTANGULAR OR SQUARE HSS COLUMNS (ASTM A500) WITH ASTM A36 BASE PLATE AND ASTM A36 (OR A307) ANCHOR BOLTS (FOR ROUND COLUMNS CAN ASSUME d = .75*DIAMETER)
 - WELD ELECTRODES ASSUMED TO BE E70XX WELDING ROD
 - MINIMUM SAFETY FACTOR (SF) FOR ANCHOR BOLTS IS 1.0
 - NO ALLOWABLE STRESS INCREASE OF 1.33 IS USED FOR CASES WITH WIND OR SEISMIC LOAD
 - CHECK BASEPLATE FOR BENDING @ COLUMN CORNER DUE TO ROLL TENSION LOADS PER HSS CONNECTIONS MANUAL PG 7-9 AND 7-10 (GUIDE FOR 10x10 OR 12x12 COLS ON 3/4" PLATE - USE GUSSETS IF Tbolt > 6 KIPS) (GUIDE FOR 10x10 OR 12x12 COLS ON 1" PLATE - USE GUSSETS IF Tbolt > 10 KIPS)

CHECK IF STIFFENERS REQ'D DUE TO ANCHOR BOLT TENSILE LOADS (SEE NOTE 6)

REQ'D t = $\frac{(6 \cdot T_{bolt} \cdot L)}{(.75 \cdot F_y \cdot b_e)} \geq 0.5$ (MIN "t" FOR NO GUSSETS)

PLATE

1	REQ'D t = 1.37	IF REQ t > ACTUAL USE GUSSET
2	REQ'D t = 1.47	IF REQ t > ACTUAL USE GUSSET
3	REQ'D t = 1.30	IF REQ t > ACTUAL USE GUSSET
4	REQ'D t = 1.54	IF REQ t > ACTUAL USE GUSSET

L = dist from bolt cl to corner of column
 b_e = effective weld strain width = 2*L (max = 5" allowed)
 F_y = 36 ksi

USE 3 GUSSETS

CHECK IF STIFFENERS REQ'D DUE TO ANCHOR BOLT TENSILE LOADS (SEE NOTE 6)

32/36

OUTER COL'S @ ENDS & @ RADIUS CONTROL
 COL'S AROUND STRAIGHT EDGE

CONSTRAINED FOOTERS - SQUARE

CSRS 1/2: 3000 PSF & ROAD: 4'x4'x4' DEEP

LINGS 3/4: 2500 PSF & ROAD: 4'x4'x4'-6" DEEP

CUSTOMER: Sheetz / McGee
 LOCATION: 25 psf live load
 DATE: 10/25/16
 CALC BY: LRP
 DWG#: 0
 SIZE: 24/34 w/ Radius Front

FOOTER	LOADS AT COLUMN BASE				COLUMN HEIGHT (FT)	SOIL BEARING STR (KSF)	SOIL PROPERTIES LATERAL BRNG STR (KSF/FT)	PRELIM FTR SIZE / WEIGHT		ISLAND WEIGHT		MISC WT (KIPS)	TOTAL DEAD WT (KIPS)	
	Pdead (KIPS)	Mlive (K-FT)	Mlat (K-FT)	W or .7E (W or .7E) (KIPS)				DEPTH (FT)	WT (KIPS)	DEPTH (FT)	WT (KIPS)			
1	4.80	2.00	3.00	1.80	20.00	3.00	0.30	4	4	9.28	3	1	1.74	15.82
2	4.80	2.00	3.00	1.80	20.00	3.00	0.30	4	4	9.28	3	1	1.74	15.82
3	4.80	2.00	3.00	1.80	20.00	2.50	0.25	4	4.5	10.44	3	1	1.74	16.98
4	4.80	2.00	3.00	1.80	20.00	2.50	0.25	4	4.5	10.44	3	1	1.74	16.98

Square footings only
 Conc wt = 145 pcf

INPUT VALUES FOR SEVENTEEN COLUMNS (B-R) ABOVE
 (IF ZERO VALUE, ENTER '0' OR CLEAR CELL)

Canopy footer island misc

FOOTER	FOOTER BEARING RESULTS AND REQUIRED DEPTH FOR LATERAL LOADS											
	LOAD CASE 1		LOAD CASE 2		LOAD CASE 3		LOAD CASE 4		BEARING LOADS LESS THAN SOIL ALLOWABLE?		DEPTH CHECK	
	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	F.S.	OK?	REQ'D DEPTH (FT)	CHOSEN DEPTH OK?
1	0.94	1.8	0.78	3.5	0.30	3.7	3.6	0.18	3.6	YES	3.71	YES
2	0.94	1.8	0.31	3.5	-0.33	3.7	3.6	-0.45	3.6	YES	3.71	YES
3	0.94	1.8	0.78	3.6	0.30	3.8	3.8	0.18	3.8	YES	3.83	YES
4	0.94	1.8	0.31	3.6	-0.33	3.8	3.8	-0.45	3.8	YES	3.83	YES

Check less than specified allowable
 Check less than specified allowable
 Check less than specified allowable
 Check less than specified allowable
 Greater than 1.5
 Max value of 4 load cases

NOTES:
 1) THE FOUR LOAD CASES ARE LC1) DEAD + LIVE; LC2) DEAD + .75(WIND or .75EISMIC) + 0.75LIVE LC3) DEAD + WIND(or .75EISMIC); AND LC4) .6DEAD + WIND(or .75EISMIC)

2) USE ONLY FOR SQUARE FOOTINGS, CONSTRAINED BY A DRIVE SLAB OR PUMP ISLAND

3) REQUIRED DEPTH TO RESIST LATERAL LOADS BASED ON CONSTRAINED PIER DESIGN (IIRC 1807.3.2.2 & 1806.3.4)

4) BEARING LOADS FOR ALLOWABLE CHECK DO NOT INCLUDE WEIGHT OF FOOTER, ISLAND OR MISC THESE WEIGHTS USED TO CHECK UPLIFT ONLY

34/76

OUTER COL'S @ BOUNDS & CONTROL
COLUMNS ALONG STRAIGHT SIDE

CONSTRAINED FOOTERS - ROUND

LSWES 1/2: 2000 PSF & ABOVE: 4' φ x 5' D66P

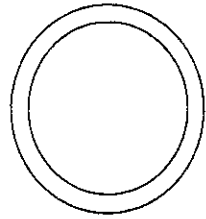
LSWES 3/4: 1500 → 1999 PSF: 5' φ x 5' D66P

CUSTOMER: Sheetz / McGee
 DATE: 10/25/16
 LOCATION: 25 psf live load
 SIZE: 24/34 w/ Radius Front
 CALC BY: LRP
 DWG#: 0

FOOTER	LOADS AT COLUMN BASE				COLUMN HEIGHT (FT)	SOIL BEARING STR (KSF)	SOIL PROPERTIES LATERAL BRNG STR (KSF/FT)	PRELIM FTR SIZE / WEIGHT		ISLAND WEIGHT		MISC WT (KIPS)	TOTAL DEAD WT (KIPS)
	Pdead (KIPS)	Mlive (K-FT)	Vwind (KIPS)	Mwind (K-FT)				Puplift (KIPS)	FOOTER DIAMETER (FT)	DEPTH (FT)	WT (KIPS)		
1	4.80	2.00	10.20	1.80	20.00	2.00	0.20	4	5	3	1	1.74	15.65
2	4.80	2.00	10.20	1.80	20.00	2.00	0.20	4	5	3	1	1.74	15.65
3	4.80	2.00	10.20	1.80	20.00	1.50	0.15	5	5	3	1	2.18	21.20
4	4.80	2.00	10.20	1.80	20.00	1.50	0.15	5	5	3	1	2.18	21.20

INPUT VALUES FOR SEVENTEEN COLUMNS (B-R) ABOVE
 (IF ZERO VALUE, ENTER '0' OR CLEAR CELL)

Round footings only
 Conc wt = 145 pcf



FOOTER	FOOTER BEARING RESULTS AND REQUIRED DEPTH FOR LATERAL LOADS								DEPTH CHECK			
	LOAD CASE 1 BEARING LOAD (KSF)	REQ'D DEPTH (FT)	LOAD CASE 2 BEARING LOAD (KSF)	REQ'D DEPTH (FT)	LOAD CASE 3 BEARING LOAD (KSF)	REQ'D DEPTH (FT)	LOAD CASE 4 BEARING LOAD (KSF)	REQ'D DEPTH (FT)	UPLIFT CHECK (LC 4) FACTOR OF SAFETY	DEPTH OK?	REQ'D CHOSEN DEPTH OK?	
1	1.19	2.3	0.99	4.5	4.8	4.7	0.23	4.7	N/A	YES	4.83	YES
2	1.19	2.3	0.39	4.5	4.8	4.7	-0.57	4.7	1.56	YES	4.83	YES
3	0.76	2.4	0.63	4.7	5.0	4.9	0.15	4.9	N/A	YES	4.99	YES
4	0.76	2.4	0.25	4.7	5.0	4.9	-0.36	4.9	2.12	YES	4.99	YES

Check less than specified allowable

Check less than specified allowable

Check less than specified allowable

Check less than specified allowable

Check if max bearing value is less than specified allowable

Greater than 1.5

Max value of 4 load cases

- NOTES:
- 1) THE FOUR LOAD CASES ARE LC1) DEAD + LIVE; LC2) DEAD + .75(WIND or .75SEISMIC) + 0.75LIVE LC3) DEAD + WIND(or .75SEISMIC); AND LC4) .6DEAD + WIND(or .75SEISMIC)
 - 2) USE ONLY FOR SQUARE FOOTINGS, CONSTRAINED BY A DRIVE SLAB OR PUMP ISLAND
 - 3) REQUIRED DEPTH TO RESIST LATERAL LOADS BASED ON CONSTRAINED PIER DESIGN (IAC 1807, 7.2.2 & 1806.3.4)
 - 4) BEARING LOADS FOR ALLOWABLE CHECK DO NOT INCLUDE WEIGHT OF FOOTER, ISLAND OR MISC THESE WEIGHTS USED TO CHECK UPLIFT ONLY

INTENSEN CO'S ACQUA PUMPERS
(CIVIL CONTRACTORS)

CONSTRAINED FOOTERS - SQUARE

Lines 112: 2000 PSF & 1000 PSF: 5' x 5' x 5' DOGP

CUSTOMER: Sheetz / McGee
LOCATION: 25 psf live load
SIZE: 24/34 w/ Radius Front

Lines 3/4: 1500 PSF → 1994 PSF: 6' x 6' x 9' DOGP

DATE: 10/25/16
CALC BY: LRP
DWG#: 0

FOOTER	LOADS AT COLUMN BASE				COLUMN HEIGHT (FT)	SOIL BEARING STR (KSF)	SOIL PROPERTIES LATERAL BRNG STR (KSF/FT)	PRELIM FTR SIZE / WEIGHT		ISLAND WEIGHT		MISC WT (KIPS)	TOTAL DEAD WT (KIPS)
	Pdead (KIPS)	Mlive (KIPS)	Mlat (K-FT)	(W or .7E) (W or .7E) (W or .7E) Pup/down (KIPS)				DEPTH (FT)	WT (KIPS)	DEPTH (FT)	WT (KIPS)		
1	7.90	2.00	5.00	1.80	20.00	2.00	0.20	5	18.13	3	1	2.18	28.20
2	7.90	2.00	5.00	1.80	20.00	2.00	0.20	5	18.13	3	1	2.18	28.20
3	7.90	2.00	5.00	1.80	20.00	1.50	0.15	6	26.10	3	1	2.61	36.61
4	7.90	2.00	5.00	1.80	20.00	1.50	0.15	6	26.10	3	1	2.61	36.61

INPUT VALUES FOR SEVENTEEN COLUMNS (B-R) ABOVE
(IF ZERO VALUE, ENTER '0' OR CLEAR CELL)

Square footings only
Conc
wt = 145 pcf

Canopy footer island misc

FOOTER	FOOTER BEARING RESULTS AND REQUIRED DEPTH FOR LATERAL LOADS												
	LOAD CASE 1 BEARING (KSF)	LOAD CASE 2 REQ'D DEPTH (FT)	LOAD CASE 3 BEARING (KSF)	LOAD CASE 4 REQ'D DEPTH (FT)	BEARING LOADS LESS THAN SOIL ALLOWABLE?	UPLIFT CHECK (LC 4) FACTOR OF SAFETY	DEPTH CHOSEN OK?						
1	1.14	2.1	0.93	3.5	0.32	3.6	0.19	3.6	YES	N/A	YES	3.64	YES
2	1.14	2.1	0.42	3.5	-0.36	3.6	-0.49	3.6	YES	1.66	YES	3.64	YES
3	0.79	2.2	0.65	4.0	0.22	4.2	0.13	4.2	YES	N/A	YES	4.25	YES
4	0.79	2.2	0.29	4.0	-0.25	4.2	-0.34	4.2	YES	2.15	YES	4.25	YES

Check less than specified allowable

Check less than specified allowable

Check less than specified allowable

Check if max bearing value is less than specified allowable

Greater than 1.5

Max value of 4 load cases

NOTES:

- 1) THE FOUR LOAD CASES ARE LC1) DEAD + LIVE; LC2) DEAD + .75(WIND or .75SEISMIC) + 0.75LIVE LC3) DEAD + WIND(or .75SEISMIC); AND LC4) .6DEAD + WIND(or .75SEISMIC)
- 2) USE ONLY FOR SQUARE FOOTINGS, CONSTRAINED BY A DRIVE SLAB OR PUMP ISLAND
- 3) REQUIRED DEPTH TO RESIST LATERAL LOADS BASED ON CONSTRAINED PIER DESIGN (IAC 1807.3.2.2 & 1806.3.4)
- 4) BEARING LOADS FOR ALLOWABLE CHECK DO NOT INCLUDE WEIGHT OF FOOTER, ISLAND OR MISC THESE WEIGHTS USED TO CHECK UPLIFT ONLY

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INTOLSON COU'S AVENUE RADIUS
CENTEL CONTROLS

CONSTRAINED FOOTERS - ROUND

CSNBS 1/2: 2SDOORSE & ADJUT: 5'φ x 5' DEEP

CUSTOMER: Sheeiz / McGee
 LOCATION: 25 psf live load
 SIZE: 24/34 w/ Radius Front

DATE: 10/25/16
 CALC BY: LRP
 DWG#: 10

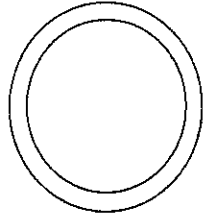
USNBS 3/4: 1500 → 2449 DIA: 6'φ x 5' DEEP

FOOTER	LOADS AT COLUMN BASE				COLUMN HEIGHT (FT)	SOIL BEARING STR (KSF)	SOIL PROPERTIES LATERAL BRNG STR (KSF/FT)	PRELIM FTR SIZE / WEIGHT		ISLAND WEIGHT		MISC WT (KIPS)	TOTAL DEAD WT (KIPS)	
	Pdead (KIPS)	Plive (KIPS)	Mlive (K-FT)	Mwind (KIPS)				Mwind (K-FT)	Puplift (KIPS)	FOOTER DIAMETER (FT)	DEPTH (FT)			WT (KIPS)
1	7.90	2.00	5.00	1.80	20.00	2.50	0.25	5	5	14.23	3	1	2.18	24.30
2	7.90	2.00	5.00	1.80	20.00	2.50	0.25	5	5	14.23	3	1	2.18	24.30
3	7.90	2.00	5.00	1.80	25.00	1.50	0.15	6	5	20.49	3	1	2.61	31.00
4	7.90	2.00	5.00	1.80	25.00	1.50	0.15	6	5	20.49	3	1	2.61	31.00

INPUT VALUES FOR SEVENTEEN COLUMNS (B-R) ABOVE
 (IF ZERO VALUE, ENTER '0' OR CLEAR CELL)

Round footings only
 Conc wt = 145 pcf
 Canopy footer island misc

OR (CONSERVATIVE UPSET & HOLLOWETS) F.A. SECTION & SOIL



FOOTER	FOOTER BEARING RESULTS AND REQUIRED DEPTH FOR LATERAL LOADS												
	LOAD CASE 1		LOAD CASE 2		LOAD CASE 3		LOAD CASE 4		BEARING LOADS LESS THAN SOIL ALLOWABLE?		DEPTH CHECK		
	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	BEARING LOAD (KSF)	REQ'D DEPTH (FT)	OK?	OK?	REQ'D DEPTH (FT)	CHOSEN DEPTH OK?	
1	1.45	2.2	1.19	3.8	0.40	3.9	3.8	0.24	YES	N/A	YES	3.87	YES
2	1.45	2.2	0.54	3.8	-0.46	3.9	3.8	-0.62	YES	1.43	NO	3.87	YES
3	1.00	2.6	0.82	4.8	0.28	5.0	5.0	0.17	YES	N/A	YES	5.05	NO
4	1.00	2.6	0.37	4.8	-0.32	5.0	5.0	-0.43	YES	1.82	YES	5.05	NO

Check less than specified allowable
 Check less than specified allowable
 Check less than specified allowable
 Check less than specified allowable
 Greater than 1.5
 Max value of 4 load cases

NOTES:
 1) THE FOUR LOAD CASES ARE LC(1) DEAD + LIVE; LC(2) DEAD + .75(WIND or .75SEISMIC) + 0.75LIVE LC(3) DEAD + WIND(or .75SEISMIC); AND LC(4) .6DEAD + WIND(or .75SEISMIC)

2) USE ONLY FOR SQUARE FOOTINGS, CONSTRAINED BY A DRIVE SLAB OR PUMP ISLAND

3) REQUIRED DEPTH TO RESIST LATERAL LOADS BASED ON CONSTRAINED PIER DESIGN (IAC 1807.3.2.2 & 1806.3.4)

4) BEARING LOADS FOR ALLOWABLE CHECK DO NOT INCLUDE WEIGHT OF FOOTER, ISLAND OR MISC THESE WEIGHTS USED TO CHECK UPLIFT ONLY

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