kpff Consulting Engineers

October 22, 2014

Mr. Randy Dixon
City of Coos Bay
500 Central Avenue
Coos Bay, Oregon 97420

RE: Egyptian Theatre Restoration – Marquee Sign and Canopy

Dear Randy:

Attached please find calculation sheets 1 through 31, dated October 22, 2014, which verify the structural adequacy of the Egyptian Theatre Marquee Sign and Canopy, as shown on drawings S0.1 through S6.1, dated November 3, 2014. Design is based on the requirements of the 2014 Oregon Structural Specialty Code (OSSC), based on the 2012 International Building Code.

If you have any questions or need further information, please call me.

Sincerely,

Travis C. Smith

TS:kw
212024/calcs 10-22-14.docx

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
79476PE
OREGON
MARCH 13, 2007
JOSHUA P. RICHARDS
EXPIRES: 12·31·14

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Seattle Everett Tacoma Lacey Portland Eugene Sacramento Grass Valley San Francisco Walnut Creek Los Angeles Long Beach Pasadena Irvine San Diego Boise Phoenix St. Louis Chicago New York

kpff Consulting Engineers Portland, Oregon	Project EGYPTIAN THEATRE	By TCS	Sheet No. 1
	Location	Date	Job No.
	Client	Revised	
	MARQUEE	Date	

MARQUEE SIGN

LOADS

- DEAD LOAD:

  - STEEL = 7 PSF
  - SHEET METAL / FINISHES = 5
  - LIGHTS = 1 PSF
  - MISC = 4 PSF

  DL = 17 PSF

  - MARQUEE SIGN = 2,500 LB OVER 28'-0"

- LIVE LOAD:

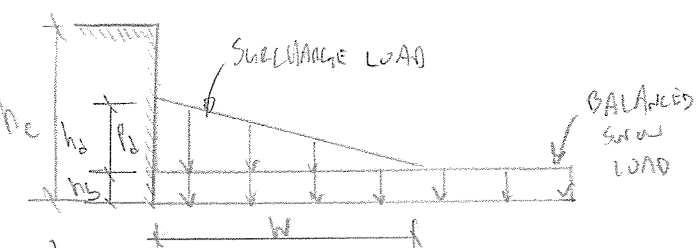
  NO LIVE LOAD = 0.

- SNOW LOAD:

  $P_{f\,MIN} = 25$ PSF

  $P_g = 5$ PSF (2007 SNOW LOAD ANALYSIS FOR OREGON)

  $P_s = 3.5$ PSF



DRIFT:

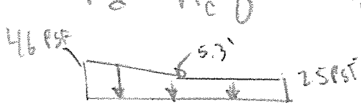
$l_u = 140'-0"$

$h_d = 2.9$ FT (FIGURE 7-9)

$W = 4h_d = 11.6$ FT $\longrightarrow$ 8'-0" MAX

$P_d = h_c \gamma = h_d(0.13 P_g + 14) = 42.5$ PSF + 3.5 = 46 PSF

DRIFT   BALANCED



kpff Consulting Engineers Portland, Oregon	Project EGYPTIAN THEATER	By TCS	Sheet No. 2
	Location	Date	Job No.
	Client	Revised	
	MARQUEE	Date	

WIND LOAD:

$V = 100$ MPH

$p = q_h G C_N$

$q_h = 0.00256\, k_z k_{zt} k_d V^2 I$

$= 0.00256(0.85)(1.0)(0.85)(100^2)(1.15) = \underline{21.3 \text{ PSF}}$

$G = 0.85$

$C_N = 1.8$ OR -1.7 (FIGURE 6-19A)

$p = (21.3 \text{ PSF})(0.85)(1.8 \text{ OR } -1.7) = \underline{\underline{32.5 \text{ PSF OR } -30.8 \text{ PSF}}}$

SEISMIC LOADS:

$$F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)}\left(1 + 2\frac{z}{H}\right) = \underline{5.4 \text{ PSF LATERAL}}$$

$a_p = 1.0$

$S_{DS} = 0.9\,g$

$W_p = 15$ PSF

$R_p = 2.5$

$I_p = 1.25$

$z/H = 0.5$

kpff Consulting Engineers, Portland, Oregon	Project: EGYPTIAN THEATRE	By: TCS	Sheet No. 3
	Location	Date	Job No.
	Client	Revised	
	MARQUEE	Date	

INFILL STUD FRAMING (TOP)

* SPANS BETWEEN HSS TUBES

- LENGTH = 7'-9"

- DEAD LOAD:

STEEL = 0 PSF
SHEET METAL / FINISHES = 5 PSF
LIGHTS = 1 PSF
MISC. = 2 PSF

DL = 8 PSF

- LIVE LOAD:

NO LIVE LOAD = 0 PSF

- SNOW LOAD:

$P_{S_{MIN}}$ = 25 PSF

MAX DRIFT = 46 PSF (REF. STEEL CALCULATIONS)

- WIND LOAD:

P_W = 32.5 PSF OR −30.8 PSF (REF STEEL CALCS)

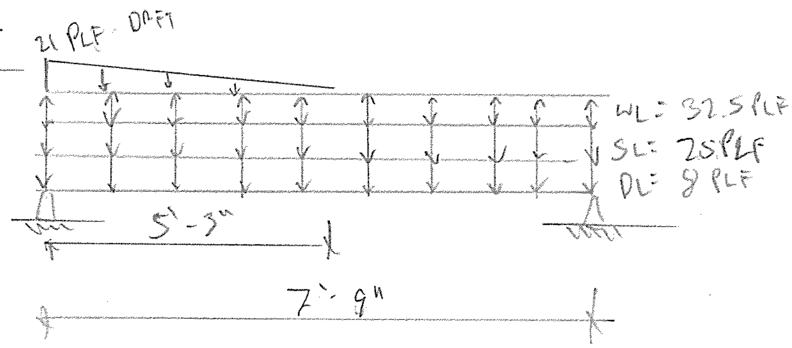
kpff Consulting Engineers Portland, Oregon	Project EGYPTIAN THEATRE	By JLS	Sheet No. 4
	Location	Date	
	Client	Revised	Job No.
	MARQUEE	Date	

INFILL STUD FRAMING (TOP)

L = 7'-9"

SPACING = 12" o.c

LOADING:



LC: 1.0 D + 0.75 W_D + 0.75 S

ADJUSTED TO ACCOUNT FOR DRIFT

W_T = 8 PLF + 0.75(32.5 PLF) + 0.75(30 PLF) = 55 PLF

$M_a = \frac{wL^2}{8}$ = 413 LB-FT = 4.96 K-IN

$V_a = \frac{wL}{2}$ = 213 LB

USE 362S162-43 @ 12" o.c

M_n/Ω = 7.34 K-IN > M_a = 4.96 K-IN ∴ (OK) DCR = 0.68

V_n/Ω = 676 LB > V_a = 213 LB ∴ (OK) DCR = 0.315

$\Delta_T = \frac{5wL^4}{384EI} = \frac{5\left(\frac{.055}{12}\right)(7.75 \times 12)^4}{384(29000)(.175 \text{ in}^4)} \Rightarrow \Delta = 0.217" \Rightarrow L/429$ (OK)

* NEED A MIN OF (2) #10 SCREWS (V_n/Ω = 263 LB/SCREW) AT END TO RESIST SHEAR

kpff Consulting Engineers, Portland, Oregon	Project EGYPTIAN THEATER	By TCS	Sheet No. 5
	Location	Date	Job No.
	Client	Revised	
		Date	

STUD INFILL ON UNDERSIDE (BOTTOM)

* STUDS ONLY TAKE GRAVITY AND WIND UPLIFT

SPAN = 10'-0"

DL = 10 PSF

WL = -30.8 PSF

SPACING : 12" O.C

LOAD COMBO : 0.6D + 1.0 Wup

↳ $W_a = 0.6(10\,PLF) + 1.0(-30.8\,PLF)$

$= -24.8\ PLF$ ↑

$M_a = \frac{wL^2}{8} = -310\ LB\text{-}FT = -3.72\ K\text{-}IN$

$M_n/\Omega = 7.34\ K\text{-}IN > M_a = -3.72\ K\text{-}IN$ DCR = 0.507 (OK) ✓

$\Delta = \frac{5wL^4}{384EI} = 0.273"$ ⇒ $L/439$ (OK) ✓

kpff Consulting Engineers Portland, Oregon	Project EGYPTIAN THEATRE	By JCS	Sheet No. 6
	Location	Date	Job No.
	Client	Revised	
		Date	

BOX HEADER STUD FRAMING (AT BACK SIDE)

SPAN = 7'-3" (BETWEEN HSS BEAMS)

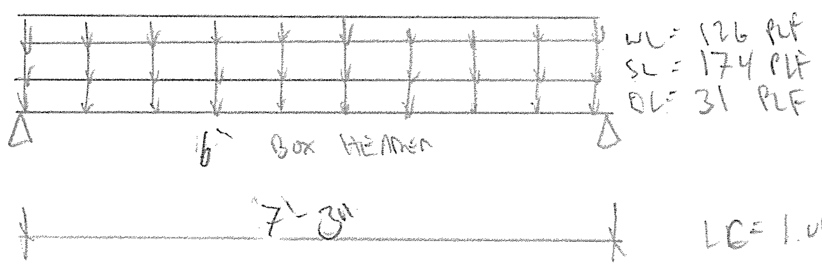
DL = 8 PSF

SL = 45 PSF

WL = 32.5 PSF

TRIB WIDTH = 7'-9"/2 = 3'-10 1/2"

LOADING



LC = 1.0D + 0.75SL + 0.75 WL

w_a = 256 PLF

$M_a = \frac{w_a L^2}{8}$ = 1.68 k-FT = 20.2 k-IN

M_n/Ω FOR 600S162-43 = 14.46 k-IN

↳ 2x = 28.9 k-IN > 20.2 k-IN ∴ (ok) ✓

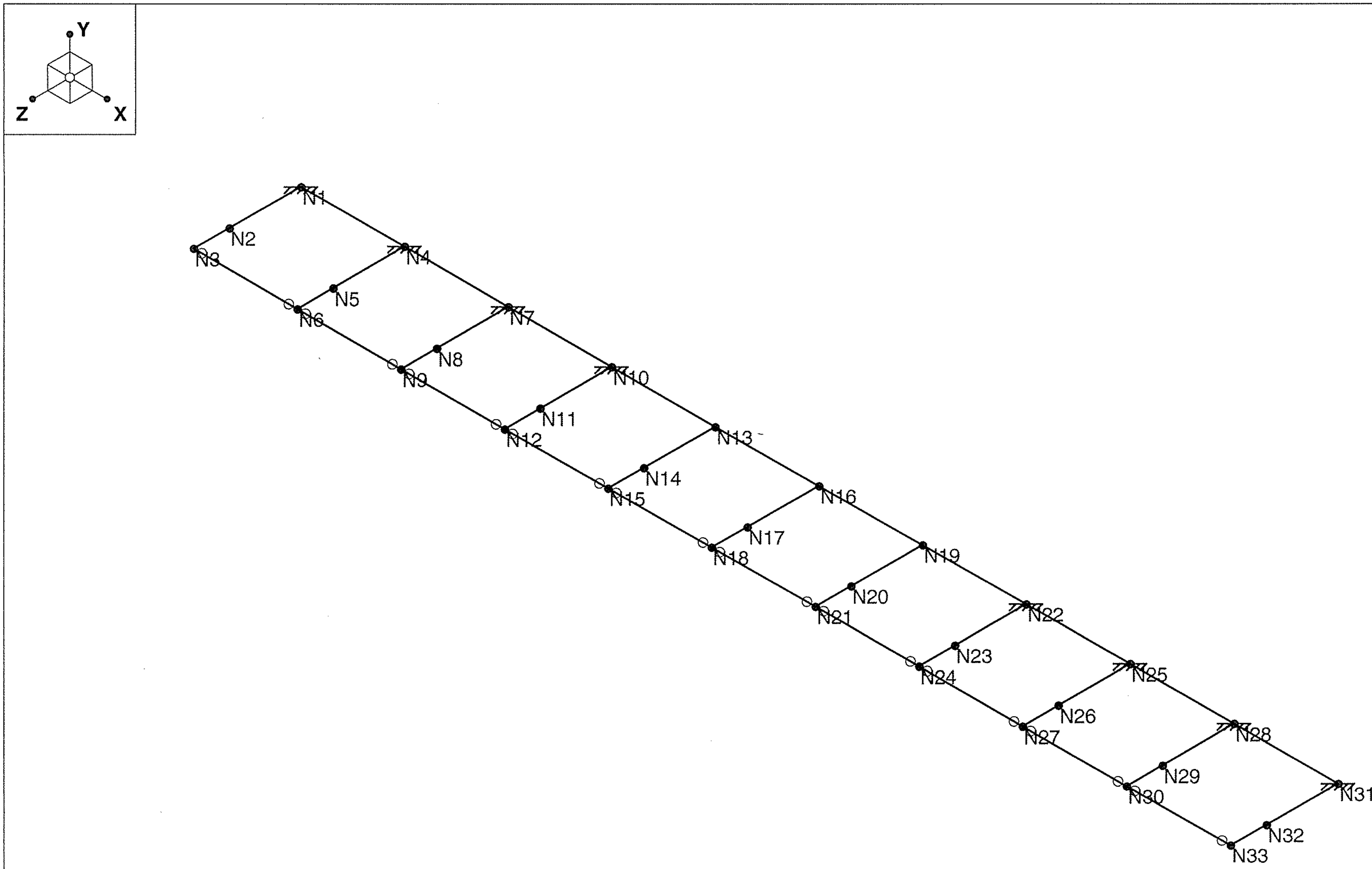
DCR = 0.70

DEFLECTION

$\Delta = \frac{5wL^4}{384EI}$ I = 2x 2.316 in^4 = 4.63 in^4

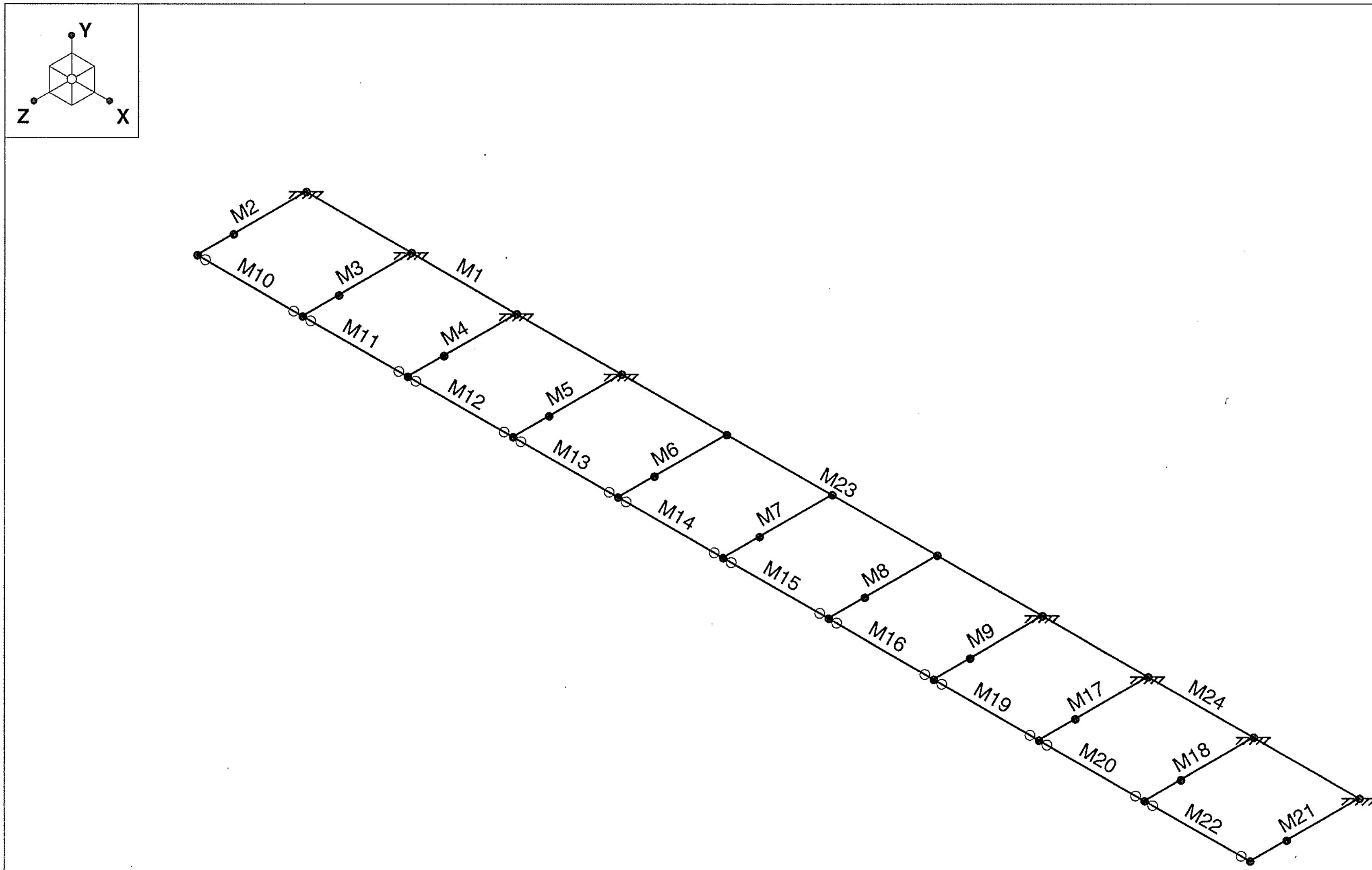
Δ_D = 0.014" ⇒ L/6062 (ok) ✓

Δ_T = 0.119" ⇒ L/731 (ok) ✓



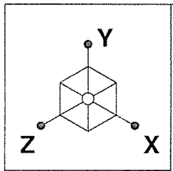
KPFF	Egyptian Theatre Marquee	SK - 1
TCS		Aug 19, 2014 at 11:29 AM
		Marquee Frame Cantilver with center tube.r3d

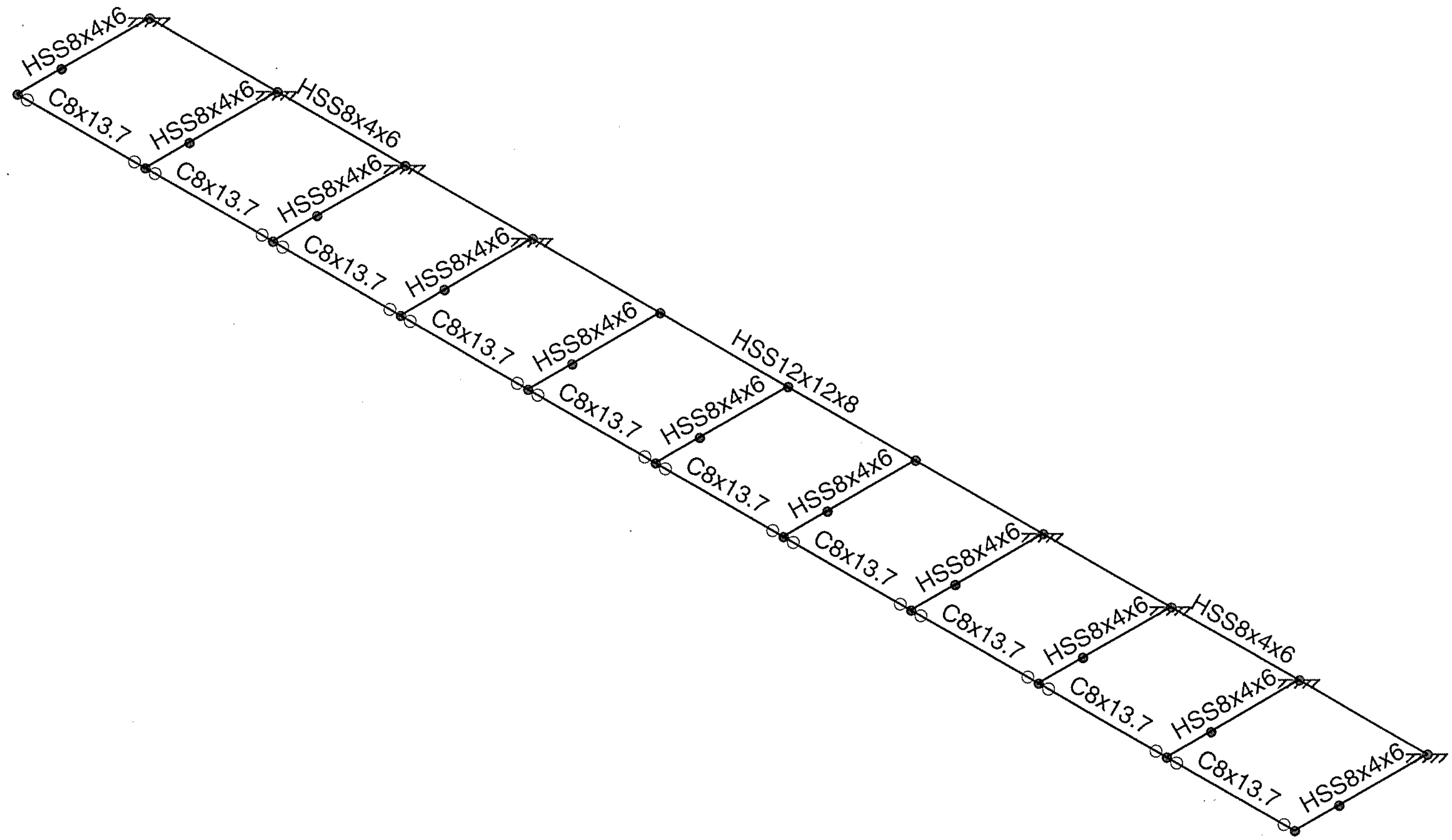
7



KPFF	Egyptian Theatre Marquee	SK - 2
TCS		Aug 19, 2014 at 11:29 AM
		Marquee Frame Cantilver with center tube.r3d

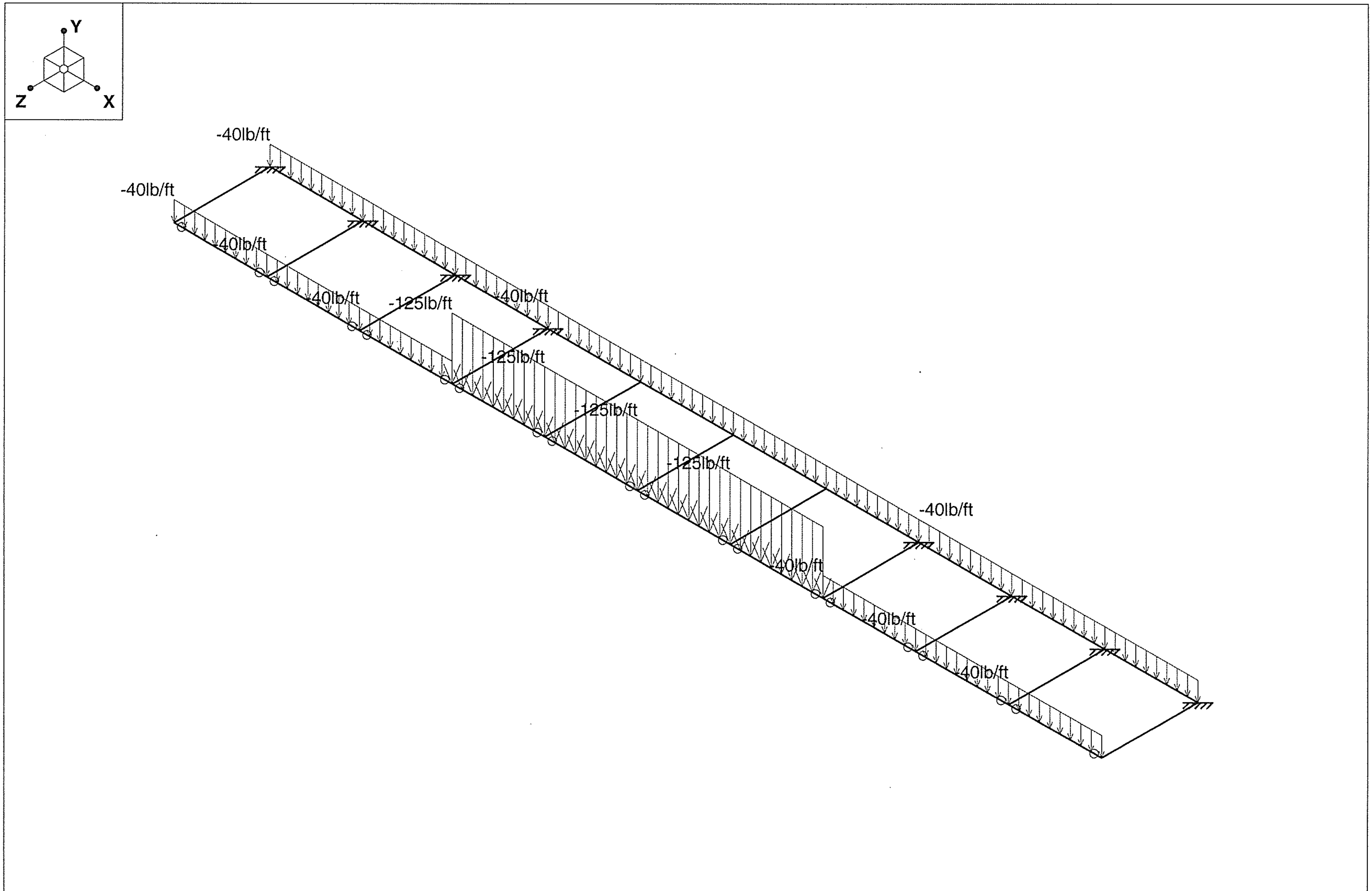
8





KPFF	Egyptian Theatre Marquee	SK - 3
TCS		Oct 21, 2014 at 1:58 PM
		untitled.r3d

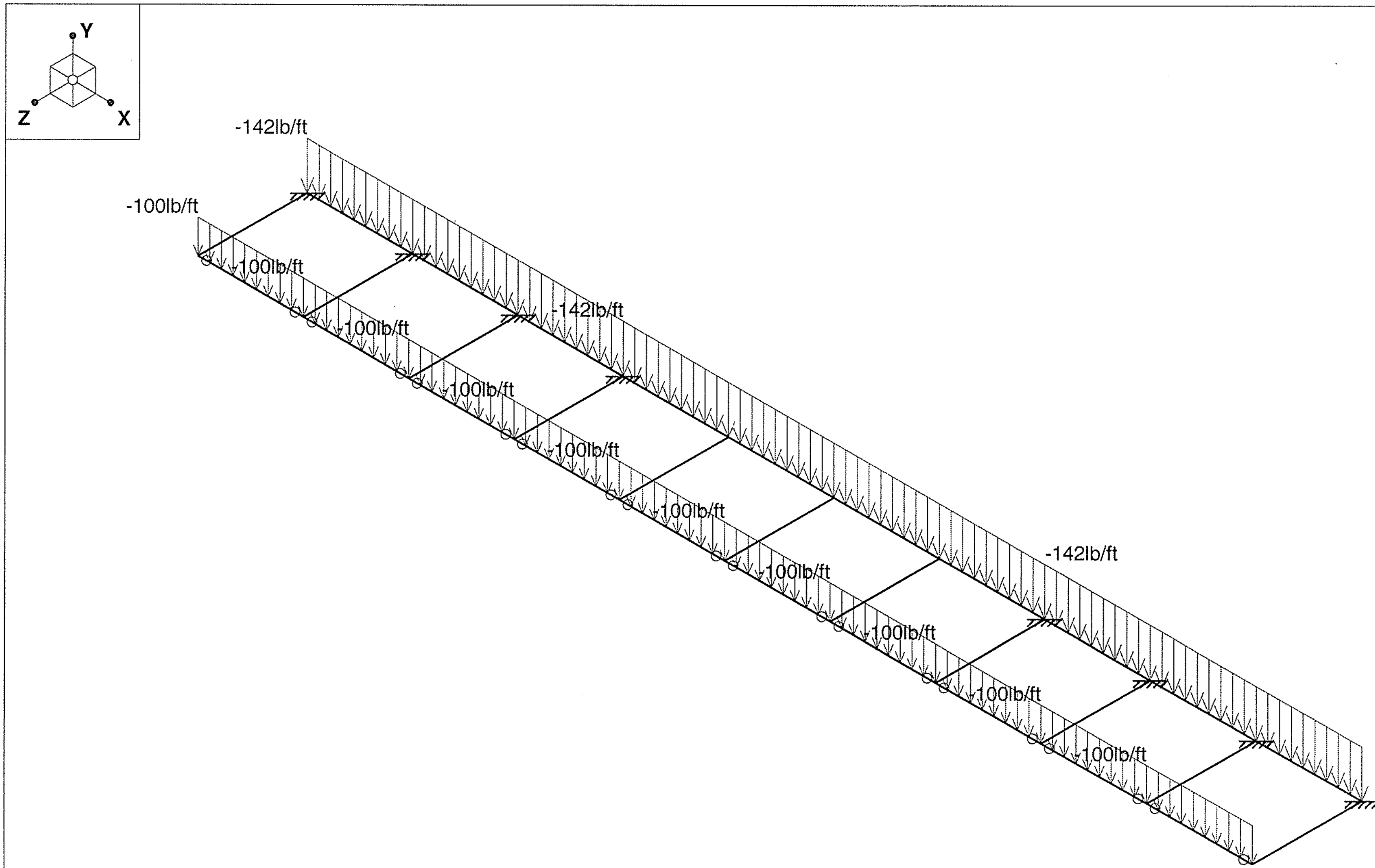
9



Loads: BLC 1, Dead

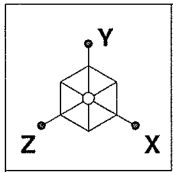
KPFF	Egyptian Theatre Marquee	SK - 4
TCS		Aug 19, 2014 at 11:31 AM
		Marquee Frame Cantilver with center tube.r3d

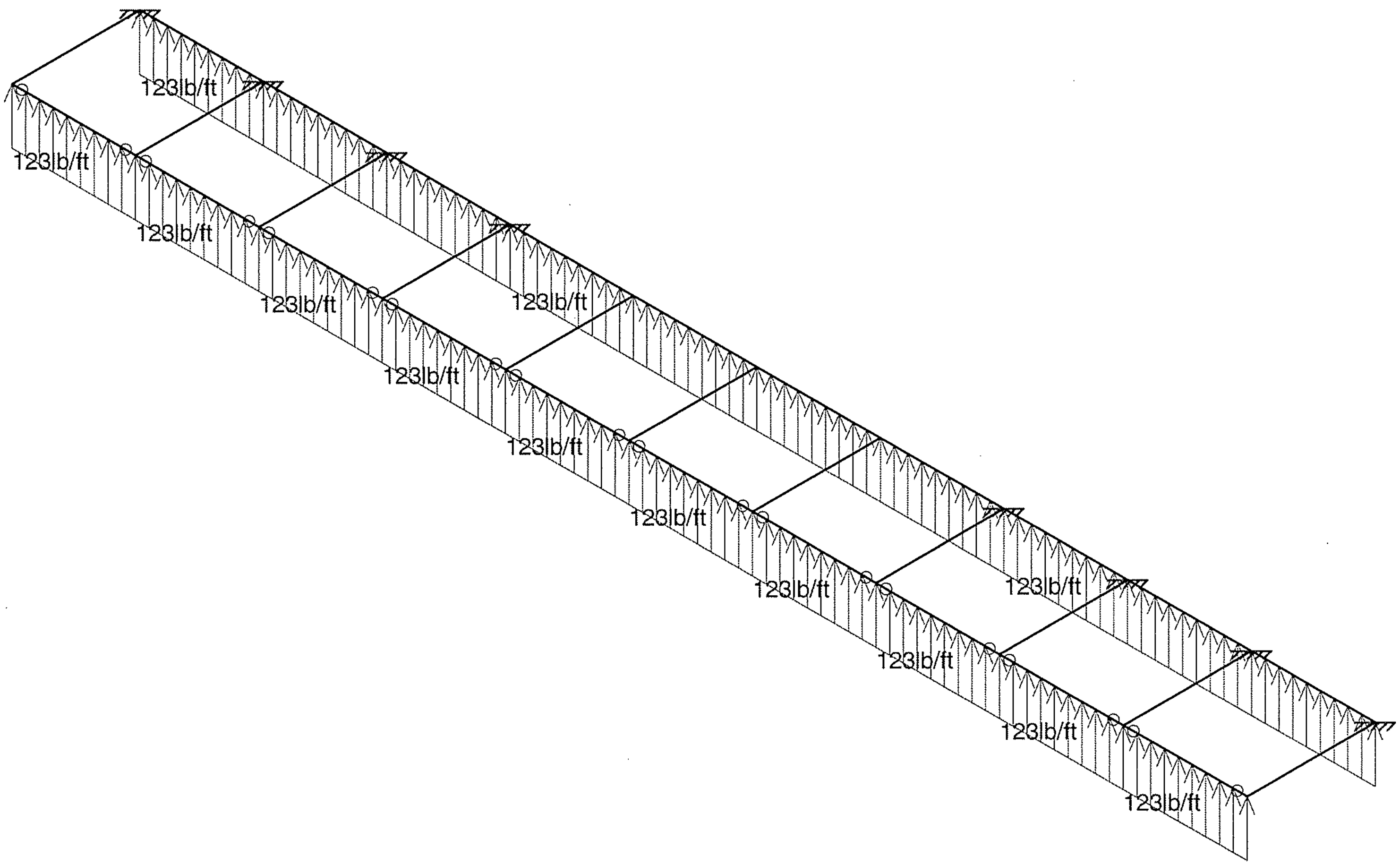
10



Loads: BLC 2, Snow

KPFF	Egyptian Theatre Marquee	SK - 5
TCS		Aug 19, 2014 at 11:31 AM
		Marquee Frame Cantilver with center tube.r3d

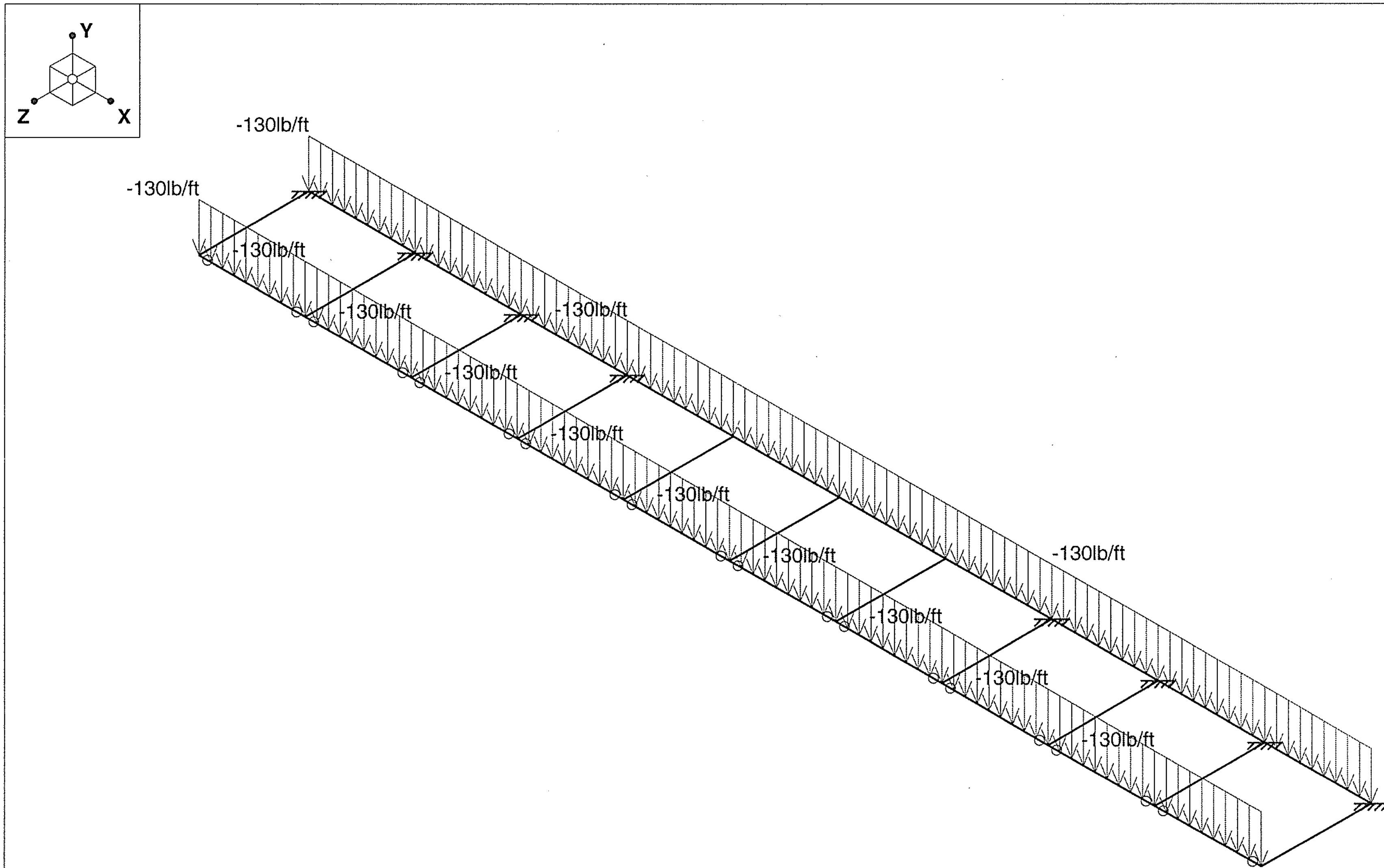




Loads: BLC 3, Wind Up

KPFF	Egyptian Theatre Marquee	SK - 6
TCS		Aug 19, 2014 at 11:31 AM
		Marquee Frame Cantilver with center tube.r3d

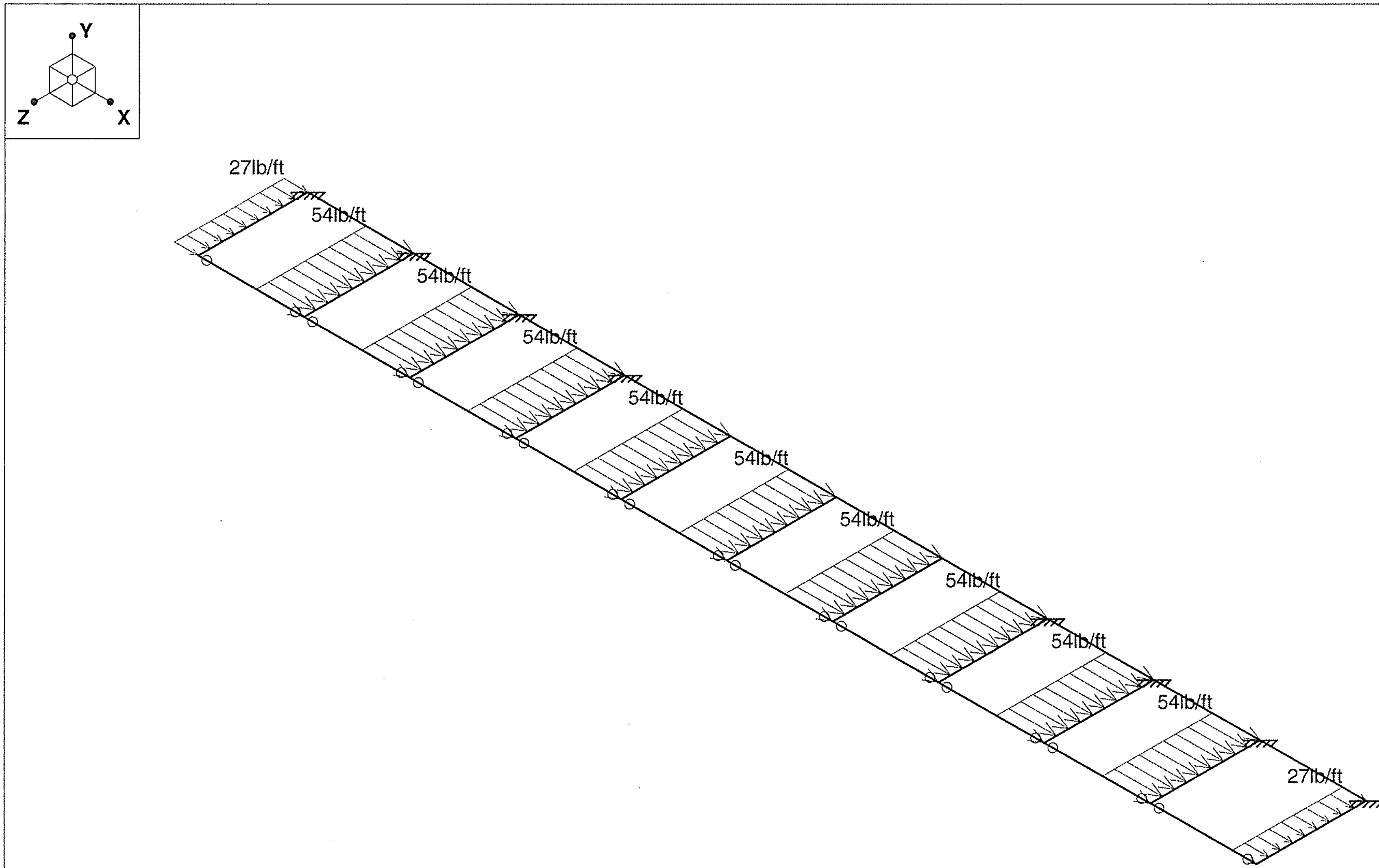
12



Loads: BLC 4, Wind Down

KPFF	Egyptian Theatre Marquee	SK - 7
TCS		Aug 19, 2014 at 11:31 AM
		Marquee Frame Cantilver with center tube.r3d

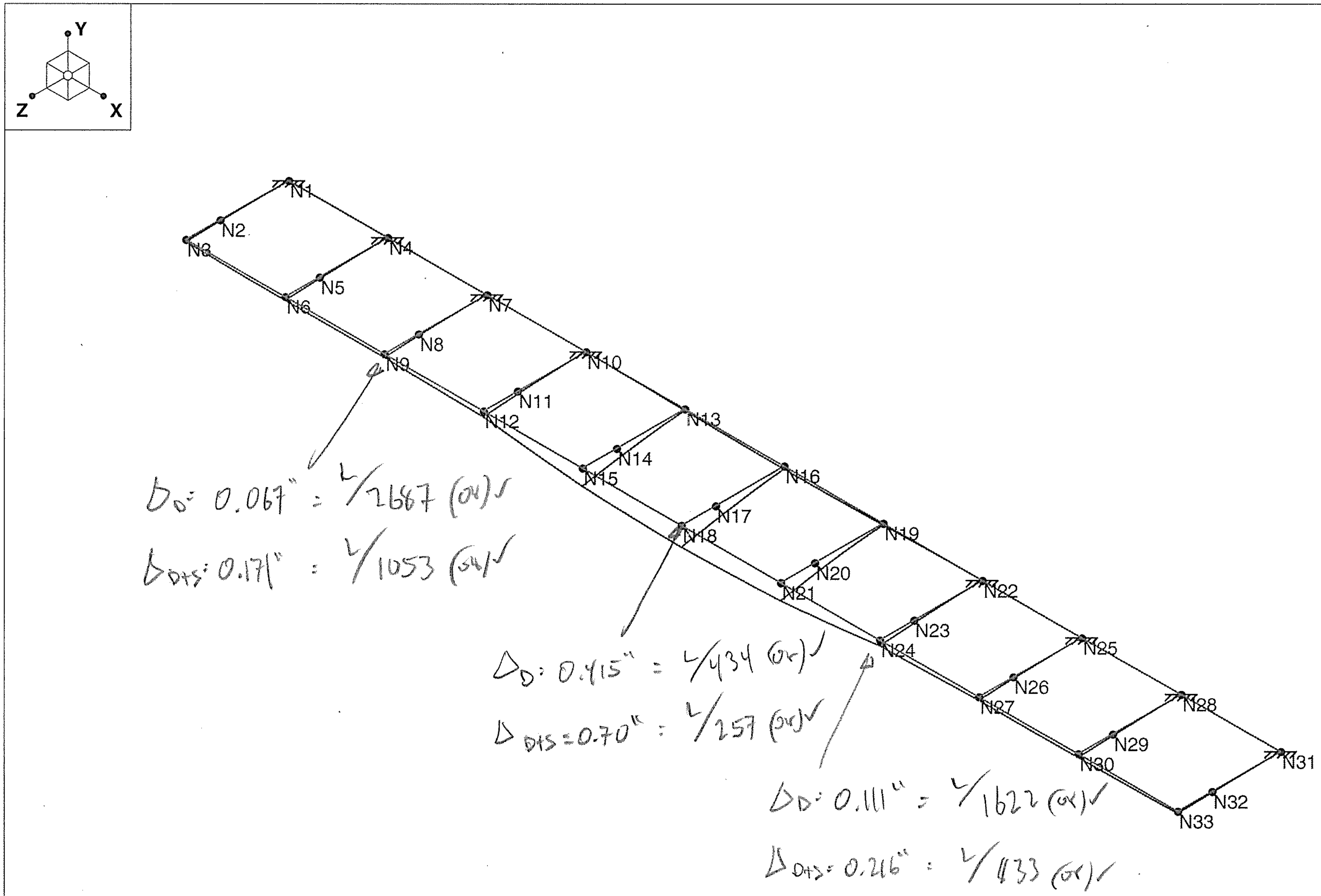
B



Loads: BLC 5, EQ

KPFF	Egyptian Theatre Marquee	SK - 8
TCS		Aug 19, 2014 at 11:31 AM
		Marquee Frame Cantilver with center tube.r3d

14



Results for LC 1, 1.0D

KPFF	Egyptian Theatre Marquee	SK - 9
TCS		Aug 19, 2014 at 11:37 AM
		Marquee Frame Cantilver with center tube.r3d

T1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Ledger Beam	HSS8x4x6	Beam	Tube	A500 Gr.46	Typical	7.58	19.6	58.7	49.3
2	Outriggers	HSS8x4x6	Beam	Tube	A500 Gr.46	Typical	7.58	19.6	58.7	49.3
3	Chain	PIPE_1.0	Beam	Tube	A500 Gr.46	Typical	.469	.083	.083	.166
4	End Frame	C8x13.7	Beam	Channel	A36 Gr.36	Typical	4.03	1.52	36.1	.186
5	Center Ledg...	HSS12x12x8	Beam	Tube	A500 Gr.46	Typical	20.9	457	457	728

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Ledger Bea...	21.75									Gravity
2	M2	Outriggers	7.5									Gravity
3	M3	Outriggers	7.5									Gravity
4	M4	Outriggers	7.5									Gravity
5	M5	Outriggers	7.5									Gravity
6	M6	Outriggers	7.5									Gravity
7	M7	Outriggers	7.5									Gravity
8	M8	Outriggers	7.5									Gravity
9	M9	Outriggers	7.5									Gravity
10	M10	End Frame	7.25									Gravity
11	M11	End Frame	7.25									Gravity
12	M12	End Frame	7.25									Gravity
13	M13	End Frame	7.25									Gravity
14	M14	End Frame	7.25									Gravity
15	M15	End Frame	7.25									Gravity
16	M16	End Frame	7.25									Gravity
17	M17	Outriggers	7.5									Gravity
18	M18	Outriggers	7.5									Gravity
19	M19	End Frame	7.25									Gravity
20	M20	End Frame	7.25									Gravity
21	M21	Outriggers	7.5									Gravity
22	M22	End Frame	7.25									Gravity
23	M23	Center Led...	29									Gravity
24	M24	Ledger Bea...	21.75									Gravity

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N10			Ledger Beam	Beam	Tube	A500 Gr.46	Typical
2	M2	N1	N3			Outriggers	Beam	Tube	A500 Gr.46	Typical
3	M3	N4	N6			Outriggers	Beam	Tube	A500 Gr.46	Typical
4	M4	N7	N9			Outriggers	Beam	Tube	A500 Gr.46	Typical
5	M5	N10	N12			Outriggers	Beam	Tube	A500 Gr.46	Typical
6	M6	N13	N15			Outriggers	Beam	Tube	A500 Gr.46	Typical
7	M7	N16	N18			Outriggers	Beam	Tube	A500 Gr.46	Typical
8	M8	N19	N21			Outriggers	Beam	Tube	A500 Gr.46	Typical
9	M9	N22	N24			Outriggers	Beam	Tube	A500 Gr.46	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
10	M10	N3	N6			End Frame	Beam	Channel	A36 Gr.36	Typical
11	M11	N6	N9			End Frame	Beam	Channel	A36 Gr.36	Typical
12	M12	N9	N12			End Frame	Beam	Channel	A36 Gr.36	Typical
13	M13	N12	N15			End Frame	Beam	Channel	A36 Gr.36	Typical
14	M14	N15	N18			End Frame	Beam	Channel	A36 Gr.36	Typical
15	M15	N18	N21			End Frame	Beam	Channel	A36 Gr.36	Typical
16	M16	N21	N24			End Frame	Beam	Channel	A36 Gr.36	Typical
17	M17	N25	N27			Outriggers	Beam	Tube	A500 Gr.46	Typical
18	M18	N28	N30			Outriggers	Beam	Tube	A500 Gr.46	Typical
19	M19	N24	N27			End Frame	Beam	Channel	A36 Gr.36	Typical
20	M20	N27	N30			End Frame	Beam	Channel	A36 Gr.36	Typical
21	M21	N31	N33			Outriggers	Beam	Tube	A500 Gr.46	Typical
22	M22	N30	N33			End Frame	Beam	Channel	A36 Gr.36	Typical
23	M23	N10	N22			Center Ledger Beam	Beam	Tube	A500 Gr.46	Typical
24	M24	N22	N31			Ledger Beam	Beam	Tube	A500 Gr.46	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	0	0	0	0	
2	N2	0	0	5	0	
3	N3	0	0	7.5	0	
4	N4	7.25	0	0	0	
5	N5	7.25	0	5	0	
6	N6	7.25	0	7.5	0	
7	N7	14.5	0	0	0	
8	N8	14.5	0	5	0	
9	N9	14.5	0	7.5	0	
10	N10	21.75	0	0	0	
11	N11	21.75	0	5	0	
12	N12	21.75	0	7.5	0	
13	N13	29	0	0	0	
14	N14	29	0	5	0	
15	N15	29	0	7.5	0	
16	N16	36.25	0	0	0	
17	N17	36.25	0	5	0	
18	N18	36.25	0	7.5	0	
19	N19	43.5	0	0	0	
20	N20	43.5	0	5	0	
21	N21	43.5	0	7.5	0	
22	N22	50.75	0	0	0	
23	N23	50.75	0	5	0	
24	N24	50.75	0	7.5	0	
25	N25	58	0	0	0	
26	N26	58	0	5	0	
27	N27	58	0	7.5	0	
28	N28	65.25	0	0	0	
29	N29	65.25	0	5	0	
30	N30	65.25	0	7.5	0	
31	N31	72.5	0	0	0	
32	N32	72.5	0	5	0	
33	N33	72.5	0	7.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
3	N7	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
4	N10	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
5	N13							
6	N16							
7	N19							
8	N22	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
9	N25	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
10	N28	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
11	N31	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
12	N2							
13	N5							
14	N8							
15	N11							
16	N14							
17	N17							
18	N20							
19	N23							
20	N26							
21	N29							
22	N32							

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Dead	None		-1				17		
2	Snow	None						13		
3	Wind Up	None						13		
4	Wind Down	None						13		
5	EQ	None						11		

Load Combinations

	Description	Sol...	PDelta	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.0D		Y		1	1														
2	1.0D+1.0S		Y		1	1	2	1												
3	1.0D+0.7E		Y		1	1	5	.7												
4	1.0D+1.0Wu		Y		1	1	3	1												
5	1.0D+1.0Wd		Y		1	1	4	1												
6	1.0D+.75Wd+.75S		Y		1	1	4	.75	2	.75										
7	0.6D+1.0Wu		Y		1	.6	3	1												
8	1.4D	Yes	Y		1	1.4														
9	1.2D+1.6S+0.8Wd	Yes	Y		1	1.2	2	1.6	4	.8										
10	1.2D+1.6Wd+0.5S	Yes	Y		1	1.2	4	1.6	2	.5										
11	1.2D+1.6Wu+0.5S	Yes	Y		1	1.2	3	1.6	2	.5										
12	1.2D+1.0E+0.2S	Yes	Y		1	1.2	5	1	2	.2										
13	0.9D+1.6Wu	Yes	Y		1	.9	3	1.6												
14	0.9D+1.0E	Yes	Y		1	.9	5	1												
15	1.6S+0.8Wd	Yes	Y		2	1.6	4	.8												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	0	8	2909.59	9	0	8	3.386	13	0	8	1.797	9

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
2		min	-265.469	12	-862.808	13	0	12	-9.806	9	-1.232	12	-.603	13
3	N4	max	0	8	5587.042	9	0	8	7.417	13	0	8	0	8
4		min	-391.904	12	-1899.719	13	0	12	-18.725	9	-1.421	12	0	9
5	N7	max	0	8	5587.042	9	0	12	7.418	13	0	8	0	14
6		min	-391.99	12	-1899.719	13	0	8	-18.732	9	-1.421	12	0	9
7	N10	max	0	8	16235.26	9	0	8	10.231	13	0	8	61.146	9
8		min	-975.637	12	-3048.555	13	-178.68	12	-57.916	9	-.93	12	-9.331	13
9	N22	max	0	8	16235.26	9	178.68	12	10.231	13	0	8	9.331	13
10		min	-975.637	12	-3048.555	13	0	8	-57.916	9	-.93	12	-61.146	9
11	N25	max	0	8	5587.042	9	0	8	7.418	13	0	8	0	10
12		min	-391.99	12	-1899.719	13	0	12	-18.732	9	-1.421	12	0	13
13	N28	max	0	8	5587.042	9	0	12	7.417	13	0	8	0	8
14		min	-391.904	12	-1899.719	13	0	8	-18.725	9	-1.421	12	0	9
15	N31	max	0	8	2909.59	9	0	12	3.386	13	0	8	.603	13
16		min	-265.469	12	-862.808	13	0	8	-9.806	9	-1.232	12	-1.797	9
17	Totals:	max	0	8	60637.866	9	0	8						
18		min	-4050	12	-15421.6	13	0	12						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code ...	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M1	HSS8x4x6	.028	21.75	9	.012	21.75	y	9	65000....	313812	39.675	64.86	2.3...	H1-1b
2	M2	HSS8x4x6	.151	0	9	.012	0	y	9	254187..	313812	39.675	64.86	1.7...	H1-1b
3	M3	HSS8x4x6	.289	0	9	.022	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
4	M4	HSS8x4x6	.289	0	9	.022	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
5	M5	HSS8x4x6	.332	0	9	.025	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
6	M6	HSS8x4x6	.374	0	9	.028	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
7	M7	HSS8x4x6	.374	0	9	.028	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
8	M8	HSS8x4x6	.374	0	9	.028	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
9	M9	HSS8x4x6	.332	0	9	.025	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
10	M10	C8x13.7	.082	3.625	9	.033	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
11	M11	C8x13.7	.082	3.625	9	.025	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
12	M12	C8x13.7	.082	3.625	9	.028	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
13	M13	C8x13.7	.107	3.625	9	.047	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
14	M14	C8x13.7	.107	3.625	9	.037	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
15	M15	C8x13.7	.107	3.625	9	.037	7.25	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
16	M16	C8x13.7	.107	3.625	9	.047	7.25	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
17	M17	HSS8x4x6	.289	0	9	.022	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
18	M18	HSS8x4x6	.289	0	9	.022	0	y	9	254187..	313812	39.675	64.86	1.6...	H1-1b
19	M19	C8x13.7	.082	3.625	9	.028	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
20	M20	C8x13.7	.082	3.625	9	.025	0	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
21	M21	HSS8x4x6	.151	0	9	.012	0	y	9	254187..	313812	39.675	64.86	1.7...	H1-1b
22	M22	C8x13.7	.082	3.625	9	.033	7.25	y	9	45367....	130572	3.677	26.401	1.1...	H1-1b
23	M23	HSS12x12x8	.204	29	9	.209	29	y	9	596136..	865260	309.12	309.12	2.2...	H1-1b
24	M24	HSS8x4x6	.028	0	9	.012	0	y	9	65000....	313812	39.675	64.86	2.3...	H1-1b

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
1	N1	max	0	3	0	7	0	3	0	6	0	3	0	7
2		min	0	1	0	6	0	1	0	7	0	1	0	6
3	N2	max	.023	3	.021	7	0	3	1.884e-3	6	6.045e-4	3	0	7
4		min	0	1	-.068	6	0	1	-6.079e-4	7	0	1	0	6
5	N3	max	.042	3	.041	7	0	3	2.107e-3	6	6.52e-4	3	0	7
6		min	0	1	-.129	6	0	1	-6.918e-4	7	0	1	0	6
7	N4	max	0	3	0	7	0	3	0	6	0	3	0	7
8		min	0	1	0	6	0	1	0	7	0	1	0	2
9	N5	max	.024	3	.046	7	0	3	3.614e-3	6	5.915e-4	3	0	7
10		min	0	1	-.129	6	0	1	-1.302e-3	7	0	1	0	2
11	N6	max	.042	3	.089	7	0	3	4.053e-3	6	6.093e-4	3	0	7
12		min	0	1	-.247	6	0	1	-1.473e-3	7	0	1	0	2
13	N7	max	0	3	0	7	0	1	0	6	0	3	0	5
14		min	0	1	0	6	0	3	0	7	0	1	0	7
15	N8	max	.024	3	.046	7	0	3	3.617e-3	6	5.918e-4	3	0	5
16		min	0	1	-.129	6	0	1	-1.303e-3	7	0	1	0	7
17	N9	max	.042	3	.089	7	0	3	4.056e-3	6	6.097e-4	3	0	5
18		min	0	1	-.247	6	0	1	-1.473e-3	7	0	1	0	7
19	N10	max	0	3	0	7	0	3	0	6	0	3	0	7
20		min	0	1	0	6	0	1	0	7	0	1	0	6
21	N11	max	.024	3	.032	7	0	3	4.271e-3	6	5.921e-4	3	0	7
22		min	0	1	-.152	6	0	1	-9.124e-4	7	0	1	0	6
23	N12	max	.042	3	.062	7	0	3	4.793e-3	6	6.1e-4	3	0	7
24		min	0	1	-.292	6	0	1	-1.034e-3	7	0	1	0	6
25	N13	max	0	3	.009	7	0	3	3.616e-3	6	1.141e-5	3	1.322e-4	7
26		min	0	1	-.075	6	0	1	-3.541e-4	7	0	1	-1.078e-3	6
27	N14	max	.024	3	.049	7	0	3	8.533e-3	6	5.878e-4	3	1.322e-4	7
28		min	0	1	-.467	6	0	1	-8.754e-4	7	0	1	-1.078e-3	6
29	N15	max	.042	3	.076	7	0	3	9.133e-3	6	6.037e-4	3	1.322e-4	7
30		min	0	1	-.737	6	0	1	-9.483e-4	7	0	1	-1.078e-3	6
31	N16	max	0	3	.016	7	0	1	4.821e-3	6	1.5e-5	3	0	6
32		min	0	1	-.131	6	0	3	-4.72e-4	7	0	1	0	3
33	N17	max	.024	3	.063	7	0	1	9.739e-3	6	5.864e-4	3	0	6
34		min	0	1	-.596	6	0	3	-9.93e-4	7	0	1	0	3
35	N18	max	.042	3	.094	7	0	1	1.034e-2	6	6.017e-4	3	0	6
36		min	0	1	-.901	6	0	3	-1.066e-3	7	0	1	0	3
37	N19	max	0	3	.009	7	0	1	3.616e-3	6	1.14e-5	3	1.078e-3	6
38		min	0	1	-.075	6	0	3	-3.541e-4	7	0	1	-1.322e-4	7
39	N20	max	.024	3	.049	7	0	1	8.533e-3	6	5.878e-4	3	1.078e-3	6
40		min	0	1	-.467	6	0	3	-8.754e-4	7	0	1	-1.322e-4	7
41	N21	max	.042	3	.076	7	0	1	9.133e-3	6	6.037e-4	3	1.078e-3	6
42		min	0	1	-.737	6	0	3	-9.483e-4	7	0	1	-1.322e-4	7
43	N22	max	0	3	0	7	0	1	0	6	0	3	0	6
44		min	0	1	0	6	0	3	0	7	0	1	0	7
45	N23	max	.024	3	.032	7	0	3	4.271e-3	6	5.921e-4	3	0	6
46		min	0	1	-.152	6	0	1	-9.124e-4	7	0	1	0	7
47	N24	max	.042	3	.062	7	0	3	4.793e-3	6	6.1e-4	3	0	6
48		min	0	1	-.292	6	0	1	-1.034e-3	7	0	1	0	7
49	N25	max	0	3	0	7	0	3	0	6	0	3	0	7
50		min	0	1	0	6	0	1	0	7	0	1	0	6
51	N26	max	.024	3	.046	7	0	3	3.617e-3	6	5.918e-4	3	0	7
52		min	0	1	-.129	6	0	1	-1.303e-3	7	0	1	0	6
53	N27	max	.042	3	.089	7	0	3	4.056e-3	6	6.097e-4	3	0	7
54		min	0	1	-.247	6	0	1	-1.473e-3	7	0	1	0	6
55	N28	max	0	3	0	7	0	1	0	6	0	3	0	7
56		min	0	1	0	6	0	3	0	7	0	1	0	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
57	N29	max	.024	3	.046	7	0	1	3.614e-3	6	5.915e-4	3	0	7
58		min	0	1	-.129	6	0	3	-1.302e-3	7	0	1	0	6
59	N30	max	.042	3	.089	7	0	1	4.053e-3	6	6.093e-4	3	0	7
60		min	0	1	-.247	6	0	3	-1.473e-3	7	0	1	0	6
61	N31	max	0	3	0	7	0	1	0	6	0	3	0	6
62		min	0	1	0	6	0	3	0	7	0	1	0	7
63	N32	max	.023	3	.021	7	0	1	1.884e-3	6	6.045e-4	3	0	6
64		min	0	1	-.068	6	0	3	-6.079e-4	7	0	1	0	7
65	N33	max	.042	3	.041	7	0	1	2.107e-3	6	6.52e-4	3	0	6
66		min	0	1	-.129	6	0	3	-6.918e-4	7	0	1	0	7

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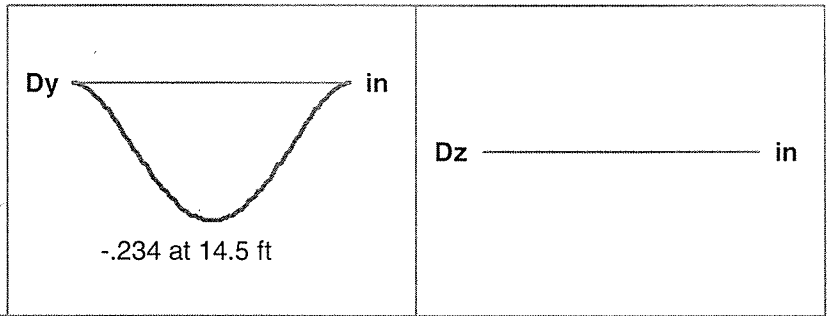
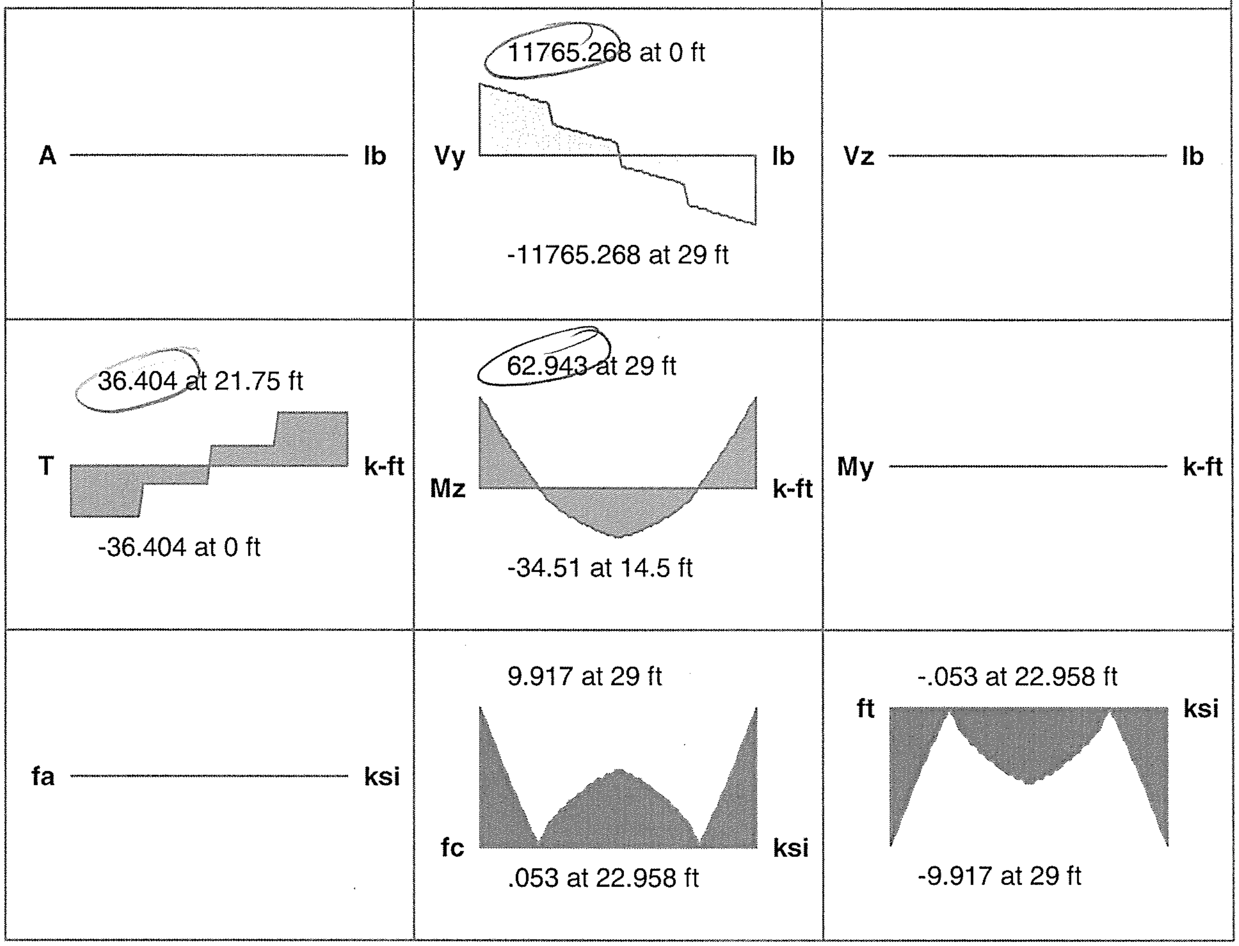
Beam: *M23*

Shape: **HSS12x12x8**
Material: **A500 Gr.46**
Length: **29 ft**
I Joint: **N10**
J Joint: **N22**
LC 9: 1.2D+1.6S+0.8Wd
Code Check: **0.209 (shear)**
Report Based On 97 Sections





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

Max Bending Check	**0.204**	Max Shear Check	**0.209 (y)**
Location	**29 ft**	Location	**29 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1490**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

Fy	**46 ksi**
phi*Pnc	**596136.648 lb**
phi*Pnt	**865260 lb**
phi*Mny	**309.12 k-ft**
phi*Mnz	**309.12 k-ft**
phi*Vny	**244988.226 lb**
phi*Vnz	**244988.226 lb**
phi*Tn	**255.343 k-ft**
Cb	**2.208**

	y-y	z-z
Lb	**29 ft**	**29 ft**
KL/r	**74.421**	**74.421**

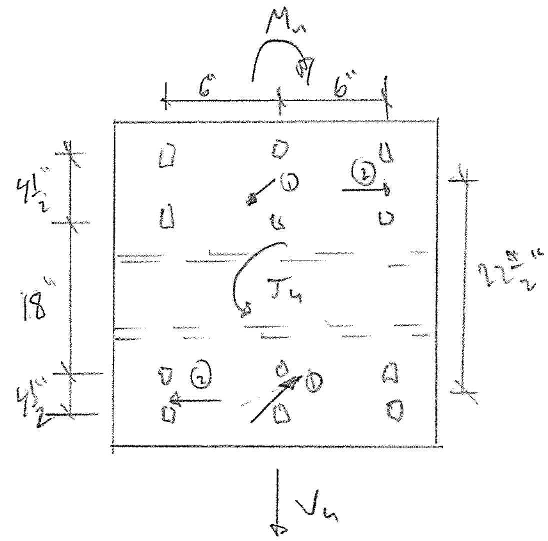
L Comp Flange	**29 ft**
Warp Length	**NC**

kpff Consulting Engineers, Portland, Oregon	Project: EGYPTIAN THEATER	By: TCS	Sheet No. 23
	Location: COOS BAY, OR	Date	Job No.
	Client	Revised	
		Date	

ANCHOR CONN TO CONCRETE WALL

MOMENT = 62.9 k-FT
TORQUE = 36.4 k-FT
SHEAR = 11.8 k-FT

} ULTIMATE STRENGTH



- TENSION (1) (FROM TORQUE)

  ↳ $\frac{36.4 \text{ k-FT}}{(22\frac{1}{2}"/12")} = \underline{19.4 \text{ k}}$

- SHEAR (2) (FROM MOMENT)

  ↳ $\frac{62.9 \text{ k-FT}}{(22\frac{1}{2}"/12")} = \underline{33.5 \text{ k}}$

- SHEAR (FROM SHEAR)

  ↳ $\underline{11.8 \text{ KIPS}}$

- SHEAR PER BOLT

  ↳ $11.8\text{k}/12 \text{ BOLTS} + 33.5\text{k}/6 \text{ BOLTS} = \underline{6.6 \text{ KIPS/BOLT}}$

- TENSION PER BOLT

  ↳ $19.4\text{k}/6 \text{ BOLTS} = \underline{3.2 \text{ KIPS/BOLT}}$

- BEARING CAPACITY PER BOLT

  ↳ $\phi\, 0.85\, f'_c\, A = (0.65)(0.85)(2{,}500 \text{ PSI})(1")(12") = \underline{16.6 \text{ K}}$

  $\underline{16.6 \text{ KIPS} > 6.6 \text{ KIPS} \therefore \text{(OK)}}$ ✓

kpff Consulting Engineers Portland, Oregon	Project EGYPTIAN THEATER	By TCS	Sheet No. 24
	Location	Date	Job No.
	Client	Revised	
		Date	

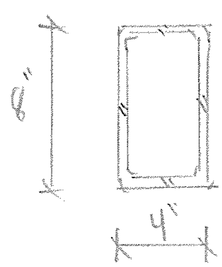
WELDED CONNECTIONS

HSS OUTRIGGERS TO HSS LEDGER BEAM

$M_{u\,MAX}\ (1.2D + 1.6S + 0.8W) = \underline{24.4\ \text{K-FT}} = 293\ \text{K-IN}$

$V_{u\,MAX}\ (1.2D + 1.6S + 0.8W) = \underline{6.38\ \text{KIPS}}$

*REF. RISA OUTPUT FOR VALUES



$\Rightarrow S_x = bd + \dfrac{d^2}{3} = (8")(4") + \dfrac{(8")^2}{3} = \underline{53.3\ \text{IN}^2}$

COMBINE FORCES

$$\sqrt{\left(\frac{M_u}{S_x}\right)^2 + \left(\frac{V_u}{2d}\right)^2} = \sqrt{\left(\frac{293\ \text{K-IN}}{53.3\ \text{IN}^2}\right)^2 + \left(\frac{6.38\ \text{K}}{(2)(8")}\right)^2} = \underline{5.51\ \text{K/IN}}$$

$\frac{1}{16}\ D_{FILLET} = 1.392\ \text{K/IN} \Rightarrow \frac{3.98}{16}$ REQ'D $\Rightarrow$ $\underline{\text{NEED } \tfrac{1}{4}" \text{ FILLET}}$

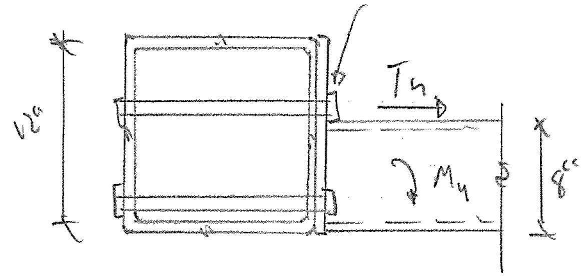
$\hookrightarrow 5.57\ \text{K/IN}$ CAPACITY

$\frac{1}{4}"$ FLARE BEVEL $= \left[\begin{array}{c} 1.97\ \text{K/IN} \\ \text{PER } \frac{1}{16} \end{array}\right] \Rightarrow$ CAPACITY $= \underline{7.88\ \text{K/IN} > 5.51\ \text{K/IN}\ \therefore \text{(OK)}} \checkmark$

kpff Consulting Engineers
Portland, Oregon

Project	EGYPTIAN THEATRE	By	TCS	Sheet No. 25
Location		Date		Job No.
Client		Revised		
		Date		

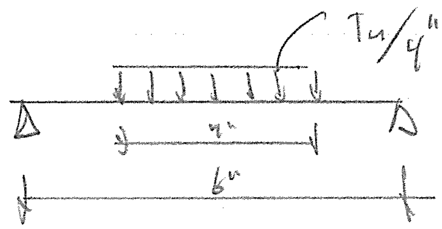
CHECK WALLS OF HSS



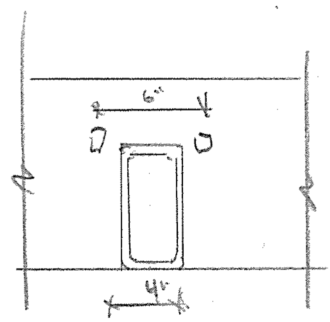
$M_u = 24.5$ K-FT $= 294$ K-IN

$T_u = 294$ K-IN / 8" $= 36.75$ KIPS

LOADING



$T_u / 4" = 9.2$ K/IN
$= 110$ K/FT



$R_1 = 36.75$ K / 2 $= 18.4$ KIPS

$$M_u = R_1\left(a + \frac{R_1}{2w}\right) = 18.4k\left(\frac{1"}{12} + \frac{18.4k}{(2)(110^{k}/_{FT})}\right) = 3.07 \text{ K-FT} = 36.9 \text{ K-IN}$$

$$M_u \le \phi M_n \Rightarrow M_u = \phi F_y Z_x \Rightarrow M_u = \phi F_y \frac{bh^2}{4} \Rightarrow h = \sqrt{\frac{M_u\, 4}{\phi F_y\, b}}$$

$$\Rightarrow h = \sqrt{\frac{(36.9 \text{ K-IN})(4)}{(0.9)(36 \text{ KSI})(12")}} \Rightarrow 0.616" \Rightarrow \text{USE } \tfrac{5}{8}" \text{ PL}$$

$= 0.625"$ ✓

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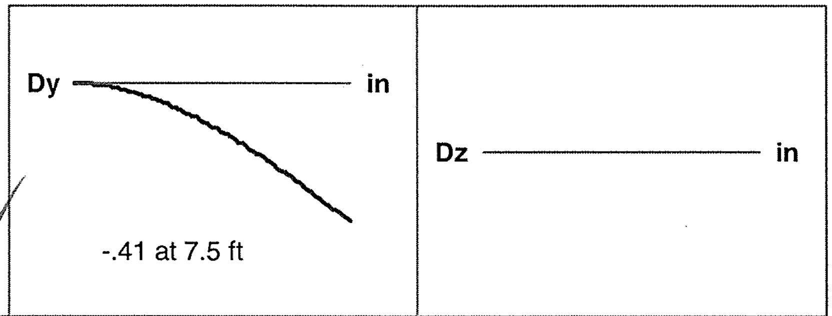
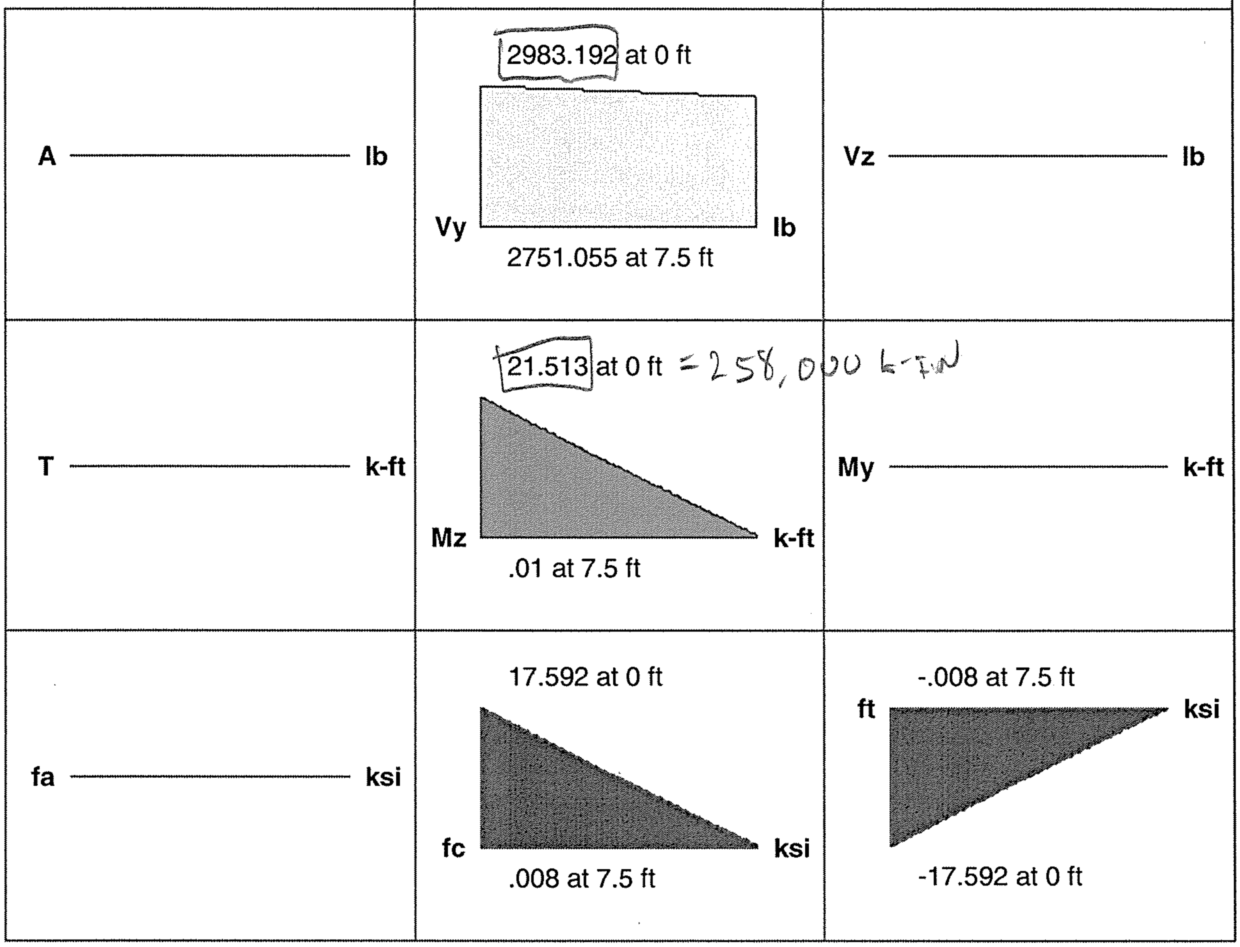
Beam: M5

Shape: **HSS8x4x6**
Material: **A500 Gr.46**
Length: **7.5 ft**
I Joint: **N10**
J Joint: **N12**
LC 9: 1.2D+1.6S+0.8Wd
Code Check: **0.332 (bending)**
Report Based On 97 Sections





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

Max Bending Check	**0.332**	Max Shear Check	**0.025 (y)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/220**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

Fy	**46 ksi**		y-y	z-z
phi*Pnc	**254187.959 lb**	Lb	**7.5 ft**	**7.5 ft**
phi*Pnt	**313812 lb**	KL/r	**55.969**	**32.341**
phi*Mny	**39.675 k-ft**			
phi*Mnz	**64.86 k-ft**			
phi*Vny	**120553.339 lb**	L Comp Flange	**7.5 ft**	
phi*Vnz	**51200.059 lb**	Warp Length	**NC**	
phi*Tn	**40.021 k-ft**			
Cb	**1.685**			

BEAM ANCHORAGE TO WALL

Company:	KPFF	Page:	1
Specifier:	Travis Smith	Project:	Egyptian Theatre
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	8/19/2014
E-Mail:			

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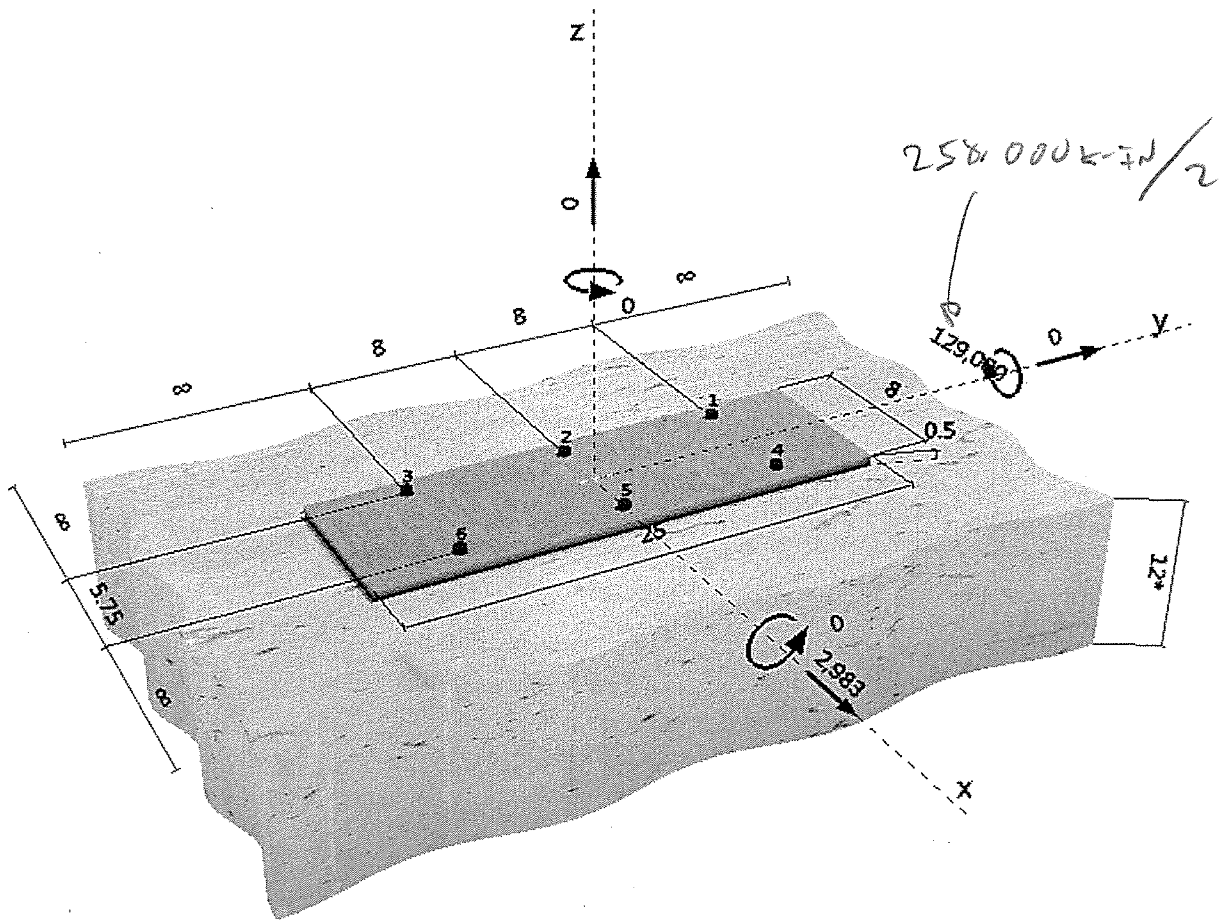
Specifier's comments: REF. DETAIL 2/S6.1 FOR CONNECTION

1 Input data

Anchor type and diameter:	**HIT-RE 500-SD + HAS 5/8**
Effective embedment depth:	$h_{ef,act}$ = 8.000 in. ($h_{ef,limit}$ = - in.)
Material:	5.8
Evaluation Service Report:	ESR-2322
Issued I Valid:	2/1/2014 | 4/1/2016
Proof:	design method ACI 318 / AC308
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 8.000 in. x 25.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, 3000, f_c' = 3000 psi; h = 12.000 in., Temp. short/long: 32/32 °F
Installation:	hammer drilled hole, installation condition: dry
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	no

Geometry [in.] & Loading [lb, in.lb]



Company:	KPFF	Page:	2
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Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	8/19/2014
E-Mail:			

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2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb] Load	Capacity	Utilization β_N / β_V [%]	Status
Tension	Concrete Breakout Strength	20137	22825	89 / -	OK
Shear	Steel Strength	497	5898	- / 9	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.882	0.084	1.0	81	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

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CHECK (E) CONCRETE WALL

Concrete Beam

			beff	0	ft
Width	36	in	Slab Thickness	0	in
Depth	12	in	Trib Width L	0	ft
			Trib Width R	0	ft
f'c	3000	psi	β1	0.85	ACI 318-05
fy	40	ksi	Steel E	29000	ksi

Rebar Information

	Number	Size	Area, in2	Diam, in		From Bottom Rebar		
Top Bars	2	#4	0.4	0.5		Top Cover	1	in
Bottom Bars	2	#4	0.4	0.5		Bottom Cov	1	in
Above Bottom		#3	0	0.375		Above Cov		in
Skin Bars		#3	0	0.375	Spacing	Skin Cover		in
Stirrup Size	0	#4	0.2	0.5	18			

c	0.78	in	Concrete f	60.6	kips
a	0.66	in	d	10.250	in
c/dt	0.076	<0.375?	d'	1.75	in

Bar Location	dx, in	Strain	As, in2	fs, kips	M about Cc, k-ft
Top Bar	1.75	-0.00375826	0.4	-44.6	-5.28
Bottom Bar	10.25	-0.002	0.4	-16	-13.23
Above Bottom	10.25	-0.002	0	0	0.00
Skin 2	10.25	-0.002	0	0	0.00
Skin 3	10.25	-0.002	0	0	0.00
Skin 4	10.25	-0.002	0	0	0.00

Cc+Cs	16	
T	-16	
Sum	0.00	Make = 0
Strain T steel	0.037	Yes
Mu	12	kip-ft
Mn	18.51	kip-ft
ϕ	0.9	
ϕMn	✓ 16.655	kip-ft
DCR	0.72	

SUM TO ZERO

Shear

Vu	3.1	kips
Vs	10.7	kips
Vc	47.3	kips
Vn	58.0	kips
ϕ	0.75	
ϕVn	43.5	kips
DCR	0.07	

* CONSIDERING 3'-0" WIDTH OF WALL TO RESIST ONE SIDE OF ANCHORAGE.

* ASSUMING 40 ksi REBAR @ 18" o.c

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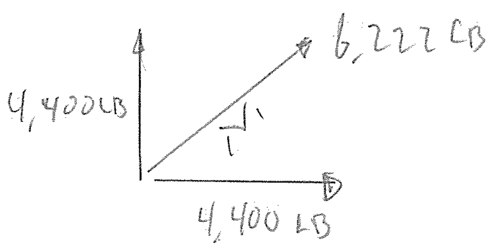
	Location	Date	Job No.
	Client	Revised	
		Date	

DESIGN CHAIN TUBE

* DESIGN TUBE TO TAKE BENDING FORCE FROM CHAIN TENSION EVEN THOUGH CHAIN IS NOT BEING RELIED ON FOR STRENGTH OR DEFLECTION. IN REALITY THE CHAIN AND ITS EXISTING CONNECTION WILL HELP WITH DEFLECTIONS OF CANOPY.

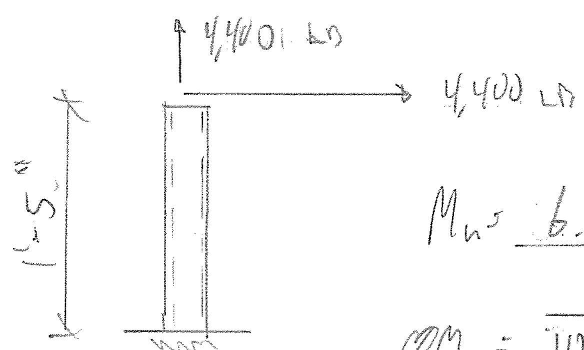
CHAIN FORCE (IF CHAIN WAS USED)



* FACTORED LOADS
  $1.6S + 0.8W$

  ↳ TAKE OUT DEAD. LOAD WILL NOT ACT ON CHAIN UNTIL LIVE LOADS ARE APPLIED.

TUBE BENDING



$M_u = \underline{6.23\ k\text{-}FT} = \underline{75\ k\text{-}IN}$

$\phi M_n = \underline{10.6\ k\text{-}FT > 6.23\ k\text{-}FT \therefore (OK)}$ ✓

↳ 4" STANDARD

WELD

$S_x = \pi r^2 = \pi (2")^2 = 12.57\ IN^2$

$\frac{M_u}{S} = 5.97\ k/IN$

↳ NEED $\frac{5}{16}$" FILLET ALL AROUND

↳ 6.96 k/IN CAPACITY > 5.97 k/IN ✓

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Project EGYPTIAN THEATRE	By TLS	Sheet No. 31
Location	Date	
Client	Revised	Job No.
MARQUEE	Date	

CHAIN TUBE SPANNING BETWEEN TUBES

* CHECK TORSION ON TUBE

$M_u = T_u = 6.23$ k-FT $= 75$ k-IN (VALUE FROM CHAIN TUBE CALC)

H3. MEMBERS SUBJECT TO TORSION (HSS 6x2x1/4)

$\phi T_n = \phi F_{cr} C$

(b) FOR RECTANGULAR HSS

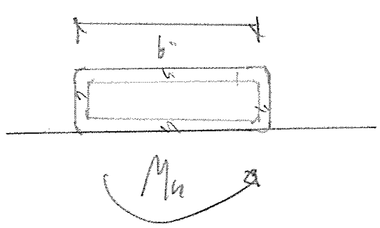
(i) $h/t \leq 2.45\sqrt{E/F_y} \Rightarrow 24 \leq 61.5 \therefore$ (i) APPLIES

$F_{cr} = 0.6 F_y = 0.6(46 \text{ ksi}) = \underline{27.6 \text{ ksi}}$

$C = 4.7 \text{ in}^3$

$\phi T_n = (0.9)(27.6 \text{ ksi})(4.7 \text{ in}^3) = \underline{\underline{116.75 \text{ k-in} > 75 \text{ k-in}}} \therefore$ (OK) ✓

CHECK END WELD TO RESOLVE TORSION



$M_u = \underline{6.23 \text{ k-FT}} = \underline{75 \text{ k-in}}$

$T_u = 75 \text{ k-in}/6" = \underline{12.5 \text{ kips}}$

1/4" FLARE BEVEL FOR 2" $= \phi R_n = \phi F_{nw} A_{we} = (0.8)(0.6 F_{EXX})(2")(1/4") =$

$\hookrightarrow \phi R_n = \underline{\underline{16.8 \text{ kips} > 12.5 \text{ kips}}} \therefore$ WELD (OK) ✓