Roof Joist
Structutral Calculations

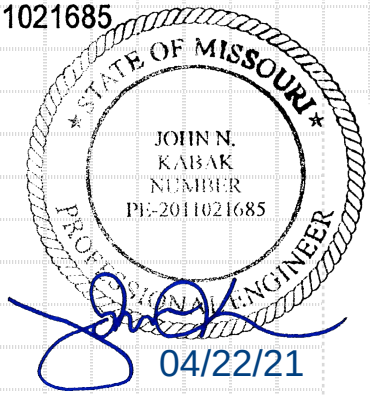
for

Lee's Summit Animal Hospital

Project Address: 250 NW McNary Ct.
Lee's Summit, MO

GPD Project No.: 2020155.27

John N. Kabak – Structural Engineer
PE-2011021685



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Note: Calculations provided are for roof joist supporting roof top equipment that will be servicing the Lee's Summit Animal Hospital. Weights of roof equipment used in the calculations are based on Lee's Summit Animal Hospital North plans by Curban Architecture dated April 1, 2021.

Project Design Criteria

Design Criteria:

Building Code:	2018 International Building Code
Building Loads:	ASCE 7-16
Concrete:	ACI 318-14
Masonry:	TMS 402 & 602 -2016
Steel:	AISC 360-16
Steel Joist Institute:	SJI 100-2020

Building Dimensions

Mean Roof Height =	15	ft
Building Width =	81.33	ft
Building Length =	177.67	ft

Building Loads

Gravity Loads:

Roof Dead Load =	18	psf
Roof Live Load =	20	psf
Roof Snow Load =	20	psf
Floor Dead =	100	psf
Floor Live (Light Storage) =	125	psf
Floor Live (Commerical) =	100	psf

Lateral Loads

Wind Loads:

Wind Speed ULT. (3 Second Gust) =	109
Risk Category =	II
Exposure Factor =	B

Seismic Loads:

Risk Category =	II
Short Period Spectral Acceleration S_s =	0.152
One Second Spectral Acceleration S_1 =	0.064
Soil Classification =	D
S_{ds}=	0.162
S_{d1}=	0.102
Seismic Design Category =	B

Seismic Resisting System:

Ordinary reinforced masonry shear walls (ASCE 7-16)

Analysis Procedure Used = Equivalent Lateral Force Procedure.

Hazards by Location

Search Information

Address: 250 NW McNary Ct, Lee's Summit, MO 64086, USA

Coordinates: 38.926149, -94.387247

Elevation: 999 ft

Timestamp: 2021-01-05T18:56:48.108Z

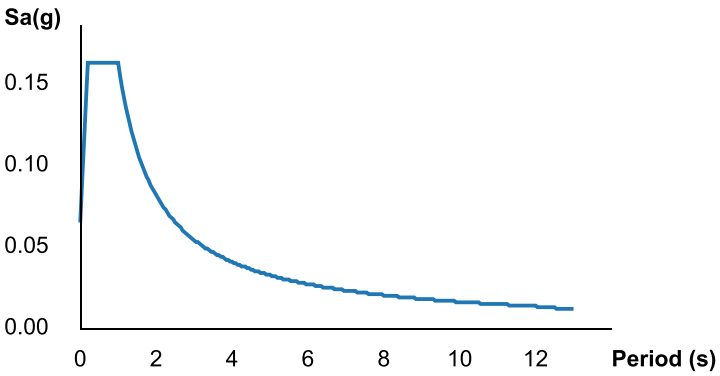
Hazard Type: Seismic

Reference Document: ASCE7-16

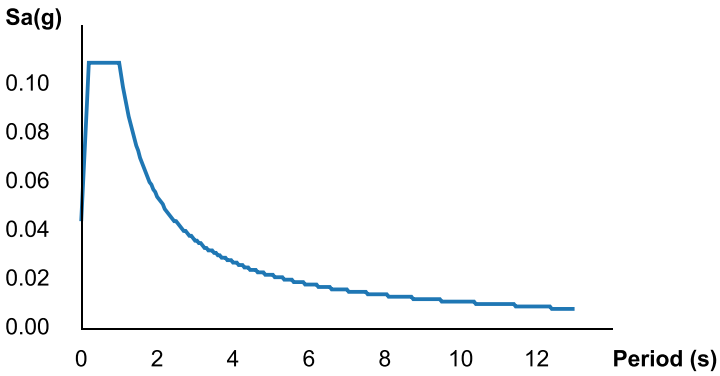
Risk Category: II

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.099	MCE_R ground motion (period=0.2s)
S_1	0.068	MCE_R ground motion (period=1.0s)
S_{MS}	0.159	Site-modified spectral acceleration value
S_{M1}	0.163	Site-modified spectral acceleration value
S_{DS}	0.106	Numeric seismic design value at 0.2s SA
S_{D1}	0.109	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s

CR_S	0.927	Coefficient of risk (0.2s)
CR_1	0.877	Coefficient of risk (1.0s)
PGA	0.047	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.075	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.099	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.107	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.068	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.078	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

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 provided by the U.S. Geological Survey Seismic Design Web Services.

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Hazards by Location

Search Information

Address: 250 NW McNary Ct, Lee's Summit, MO 64086, USA

Coordinates: 38.926149, -94.387247

Elevation: 999 ft

Timestamp: 2021-01-05T18:55:38.640Z

Hazard Type: Snow

ASCE 7-16	ASCE 7-10	ASCE 7-05
Ground Snow Load ..... 20 lb/sqft	Ground Snow Load ..... 20 lb/sqft	Ground Snow Load ..... 20 lb/sqft

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.

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Hazards by Location

Search Information

Address: 250 NW McNary Ct, Lee's Summit, MO 64086, USA

Coordinates: 38.926149, -94.387247

Elevation: 999 ft

Timestamp: 2021-01-05T18:42:36.912Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	76 mph
MRI 25-Year	83 mph
MRI 50-Year	88 mph
MRI 100-Year	94 mph
Risk Category I	103 mph
Risk Category II	109 mph
Risk Category III	117 mph
Risk Category IV	122 mph

ASCE 7-10

MRI 10-Year	76 mph
MRI 25-Year	84 mph
MRI 50-Year	90 mph
MRI 100-Year	96 mph
Risk Category I	105 mph
Risk Category II	115 mph
Risk Category III-IV	120 mph

ASCE 7-05

ASCE 7-05 Wind Speed	90 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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Roof Gravity Loads

Roof Dead Loads:

Roof Joist/Framing =	2.50	psf
Metal Decking =	1.8	psf
Insulation/Roofing Membrane =	4.7	psf
M.E.P.=	5	psf
Drop Ceiling =	4	psf
		psf
	18.00	psf

Roof Live Loads, Lr = 20 psf

Roof Live Load Reduction:

Joist Roof Live Loads, Lr = 20 R_1 R_3

Tributary Area, At =		200	ft2
Roof Slope, F =		2	% in/ft
R_1 = 1.0	For $A_t \leq 200$ ft^5		
R_1 = 1.2-0.001A_t	For 200 ft2 < At < 600 ft2		
R_1 = 0.6	For $A_t \geq 600$ ft^5		
	R1 =	1	
R_2 = 1.0	For F ≤ 4		
R_2 = 1.2-0.05*F	For 4 < F < 15		
R_2 = 0.6	For 12 ≥ F		
	R2 =	1	
	Lr = 20 R1 R2 =	20	psf

ASCE 7-16 Snow Loads

Lic. # : KW-06004426 GPD ASSOCIATES

DESCRIPTION: Building Roof Snow Load

Flat Roof Snow Loads

Description : per ASCE 7-16, Chapter 7

Ground Snow Load, per Fig 7.2-1	20.00 psf	Roof Slope, Sec .7.3.4	1.00
Terrain Category	B (see ASCE 7-16 Section 26.7)	Roof Configuration	Monoslope
Exposure of Roof	Partially Exposed		
Ce : Exposure Factor, Table 7.3-1	1.00		
Ct : Thermal Factor	1.0 : All not otherwise defined	pm, Minimum required	**20.00** psf
Risk Category, per Table 1.5-1	II	pf, Calculated Snow Load per Equation 7-1	**14.00** psf
Importance Factor, Is, Table 1.5-2	1.00	pf, Design Snow Load Max(pm min, pf calc)	**20.00** psf

Snow Drifts on Roof Projections

Description : Building Length (N-S) per ASCE 7-16, Chapt

Balanced Snow Load	20.00 psf	hd : windward	2.70 ft
Ground Snow Load	20.00 psf	hd : Design	2.70 ft
lu-upwind	130.00 ft	pd : Max Drift Only	44.80 psf
Height of Projection	6.00 ft	pd + Balanced	64.80 psf
Snow Density	16.60 pcf	W : Drift Width	10.79 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	4.80 ft		
hc / hb	3.98		
Importance Factor	1.00		

Description : Building Width (E-W) per ASCE 7-16, Chapt

Balanced Snow Load	20.00 psf	hd : windward	2.13 ft
Ground Snow Load	20.00 psf	hd : Design	2.13 ft
lu-upwind	80.00 ft	pd : Max Drift Only	35.31 psf
Height of Projection	6.00 ft	pd + Balanced	55.31 psf
Snow Density	16.60 pcf	W : Drift Width	8.51 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	4.80 ft		
hc / hb	3.98		
Importance Factor	1.00		

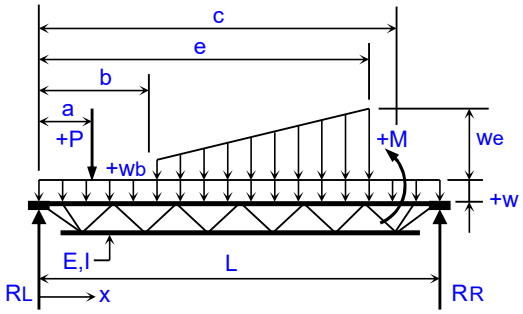
KCS-SERIES JOIST ANALYSIS

For KCS-Series Steel Joists Considered as Simple-Span Beams
Subjected to Non-Standard Loads

Input Data: ROOF JOISTS SUPPORTING RTU-1*

Joist Data: Joist Data & Capacities based on SJI 100-200

Designation =	30KCS4	
Span, L =	46.0000	ft.
Modulus, E =	29000000	psi
Inertia, Ix =	722.00	in.^4 (from KCS Joists Load Table)
Depth, D =	30	in. (from KCS Joists Load Table)
Weight, w =	16.5	lbs./ft. (from KCS Joists Load Table)



Nomenclature

Allowable Capacity Loads:

M(allow) =	116666.7	ft-lbs	M(allow) = (value from KCS Joists Load Table)*1000/12
wm(allow) =	441.08	plf	wm(allow) = 8*M(allow)/L^2
V(allow) =	8500	lbs.	V(allow) = value from KCS Joists Load Table
wv(allow) =	369.57	plf	wv(allow) = 2*V(allow)/L
w(use) =	369.57	plf	w(use) = Minimum of wm(allow) and wv(allow)

Actual Design Loads:

Full Uniform:

w = 228 plf

Distributed:	Start b (ft.)	Start wb (plf)	End e (ft.)	End we (plf)
Snow Drift Loads	0.0000	216	8.5000	0
#2:				
#3:				
#4:				
#5:				
#6:				
#7:				
#8:				

Moments:	c (ft.)	M (ft-lbs)
#1:		
#2:		
#3:		
#4:		

Point Loads:	a (ft.)	P (lbs.)
#1:	29.0000	300
#2:	35.5000	300
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

Results of Joist Analysis:

Allowable Capacity Loads:

End Reactions:

R_L = 8500.0 lbs. R_R = 8500.0 lbs.

Web Member Shear:

V_w = 8500 lbs. Note: all joist web members are designed for a vertical shear equal to this value

Maximum Moments:

$+M_{x(max)}$ = 116666.7 ft-lbs @ x = 23.00 ft. Note: moment is constant for distance = 2*D from each end

$-M_{x(max)}$ = 0.0 ft-lbs @ x = 0.00 ft. Note: moment is constant for distance = 2*D from each end

***Maximum Deflections:**

$-\Delta_{(max)}$ = -2.045 in. @ x = 23.00 ft.

$+\Delta_{(max)}$ = 0.000 in. @ x = 0.00 ft.

$\Delta_{(ratio)}$ = L/270

**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

Actual Design Loads:

End Reactions:

R_L = 6284.8 lbs. R_R = 5721.2 lbs.

Maximum Moments:

$+M_{x(max)}$ = 65764.6 ft-lbs @ x = 23.54 ft.

$-M_{x(max)}$ = 0.0 ft-lbs @ x = 0.00 ft.

***Maximum Deflections:**

$-\Delta_{(max)}$ = -1.383 in. @ x = 23.07 ft.

$+\Delta_{(max)}$ = 0.000 in. @ x = 0.00 ft.

$\Delta_{(ratio)}$ = L/399

**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

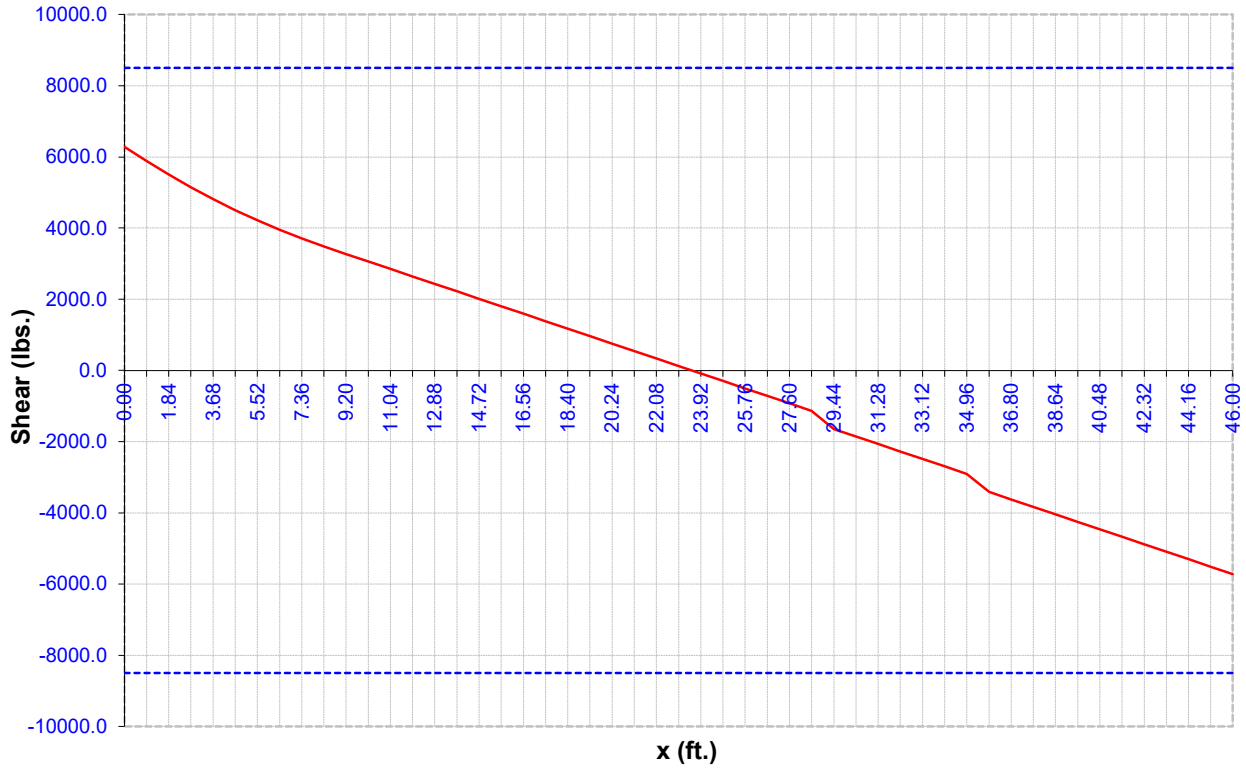
Maximum Stress Ratios:

S.R. = **0.739** for Shear @ x = 0.00 ft.

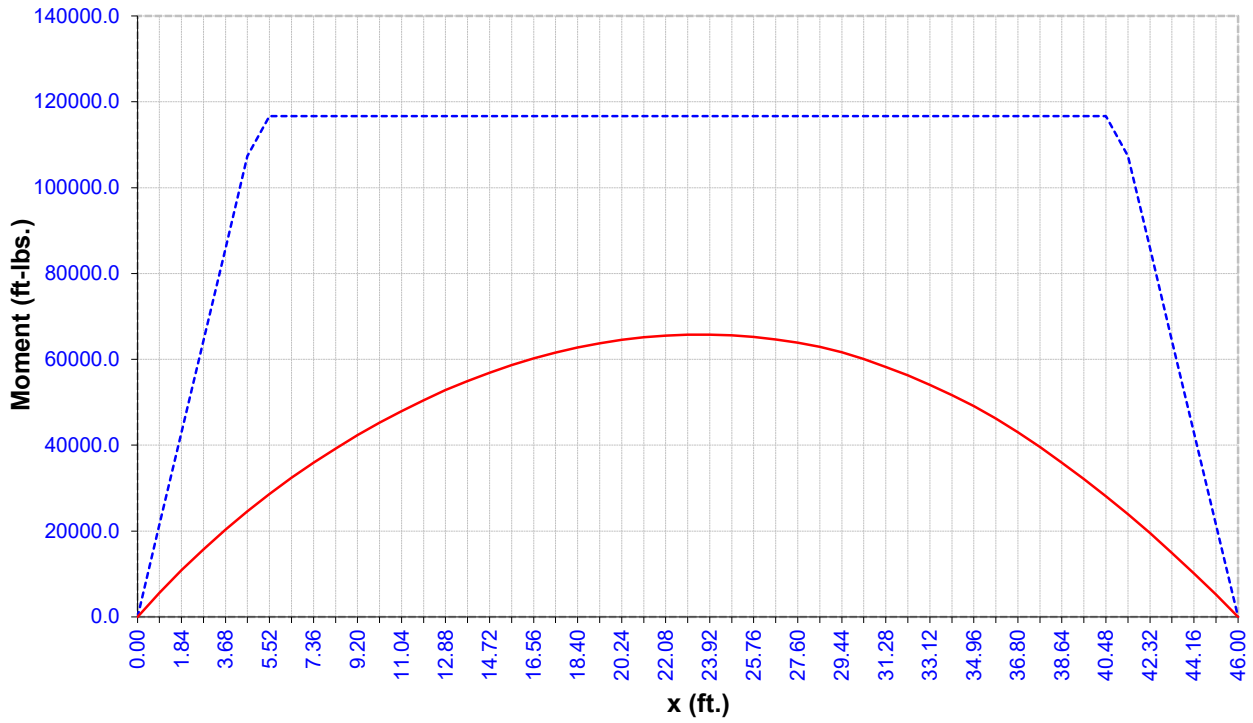
S.R. = **0.564** for Moment @ x = 23.92 ft.

Comments:

Shear Diagram



Moment Diagram



= curves for allowable capacity loads

= curves for actual design loads

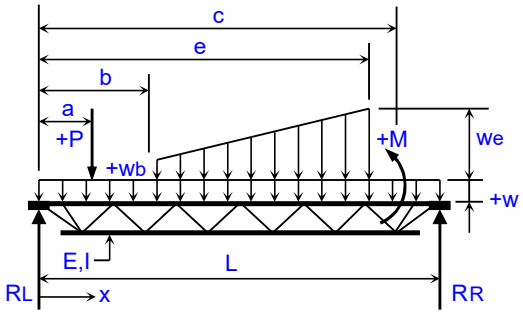
KCS-SERIES JOIST ANALYSIS

For KCS-Series Steel Joists Considered as Simple-Span Beams
Subjected to Non-Standard Loads

Input Data: ROOF JOISTS SUPPORTING RTU-2*

Joist Data: Joist Data & Capacities based on SJI 100-200

Designation =	26KCS3	
Span, L =	36.0000	ft.
Modulus, E =	29000000	psi
Inertia, Ix =	355.00	in.^4 (from KCS Joists Load Table)
Depth, D =	26	in. (from KCS Joists Load Table)
Weight, w =	12.5	lbs./ft. (from KCS Joists Load Table)



Nomenclature

Allowable Capacity Loads:

M(allow) =	65250.0	ft-lbs	M(allow) = (value from KCS Joists Load Table)*1000/12
wm(allow) =	402.78	plf	wm(allow) = 8*M(allow)/L^2
V(allow) =	7800	lbs.	V(allow) = value from KCS Joists Load Table
wv(allow) =	433.33	plf	wv(allow) = 2*V(allow)/L
w(use) =	402.78	plf	w(use) = Minimum of wm(allow) and wv(allow)

Actual Design Loads:

Full Uniform:

w = 228 plf

Distributed:

	Start b (ft.)	Start wb (plf)	End e (ft.)	End we (plf)
Snow Drift Loads	0.0000	216	8.5000	0
#2:				
#3:				
#4:				
#5:				
#6:				
#7:				
#8:				

Point Loads:

	a (ft.)	P (lbs.)
#1:	19.0000	300
#2:	26.5000	300
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

Moments:

	c (ft.)	M (ft-lbs)
#1:		
#2:		
#3:		
#4:		

Results of Joist Analysis:

Allowable Capacity Loads:

End Reactions:

R_L = 7800.0 lbs. R_R = 7800.0 lbs.

Web Member Shear:

V_w = 7800 lbs. Note: all joist web members are designed for a vertical shear equal to this value

Maximum Moments:

$+M_{x(max)}$ = 65250.0 ft-lbs @ x = 18.00 ft. Note: moment is constant for distance = 2*D from each end

$-M_{x(max)}$ = 0.0 ft-lbs @ x = 0.00 ft. Note: moment is constant for distance = 2*D from each end

***Maximum Deflections:**

$-\Delta_{(max)}$ = -1.700 in. @ x = 18.00 ft.

$+\Delta_{(max)}$ = 0.000 in. @ x = 0.00 ft.

$\Delta_{(ratio)}$ = L/254

**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

Actual Design Loads:

End Reactions:

R_L = 5170.6 lbs. R_R = 4555.4 lbs.

Maximum Moments:

$+M_{x(max)}$ = 42259.9 ft-lbs @ x = 18.65 ft.

$-M_{x(max)}$ = 0.0 ft-lbs @ x = 0.00 ft.

***Maximum Deflections:**

$-\Delta_{(max)}$ = -1.099 in. @ x = 18.01 ft.

$+\Delta_{(max)}$ = 0.000 in. @ x = 0.00 ft.

$\Delta_{(ratio)}$ = L/393

**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

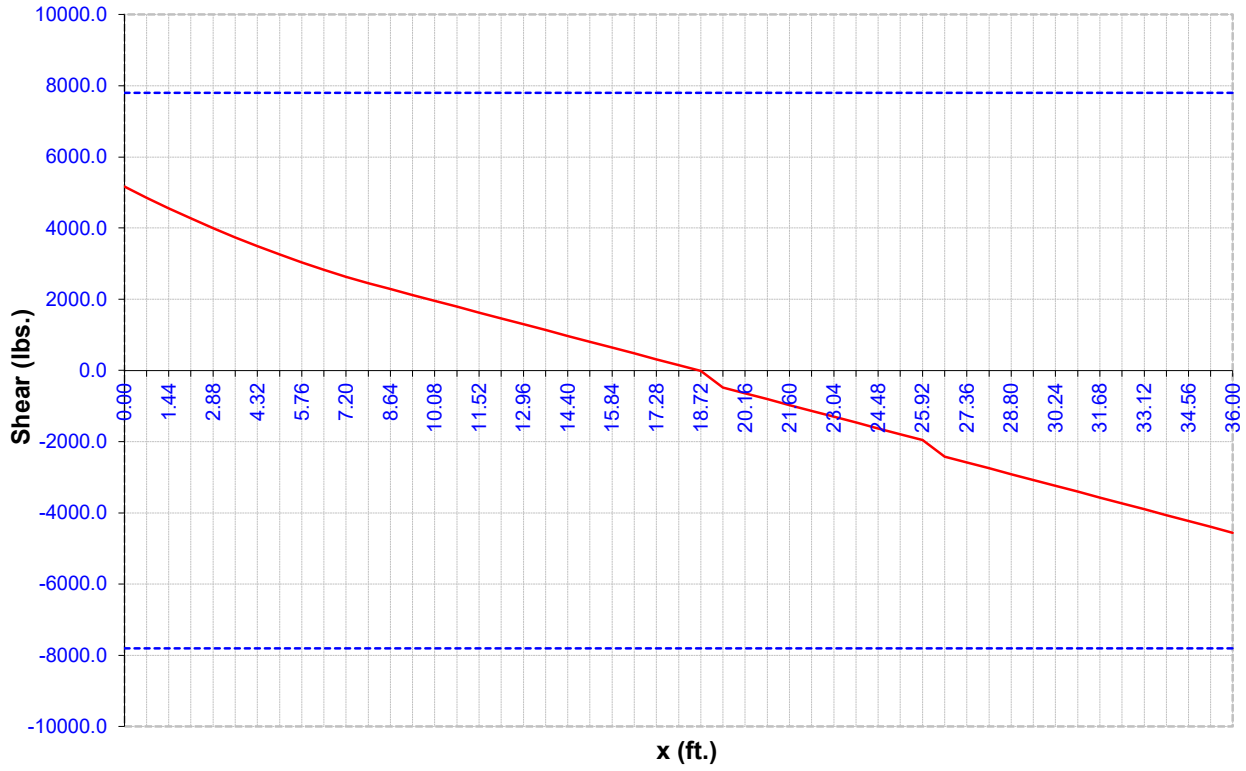
Maximum Stress Ratios:

S.R. = **0.663** for Shear @ x = 0.00 ft.

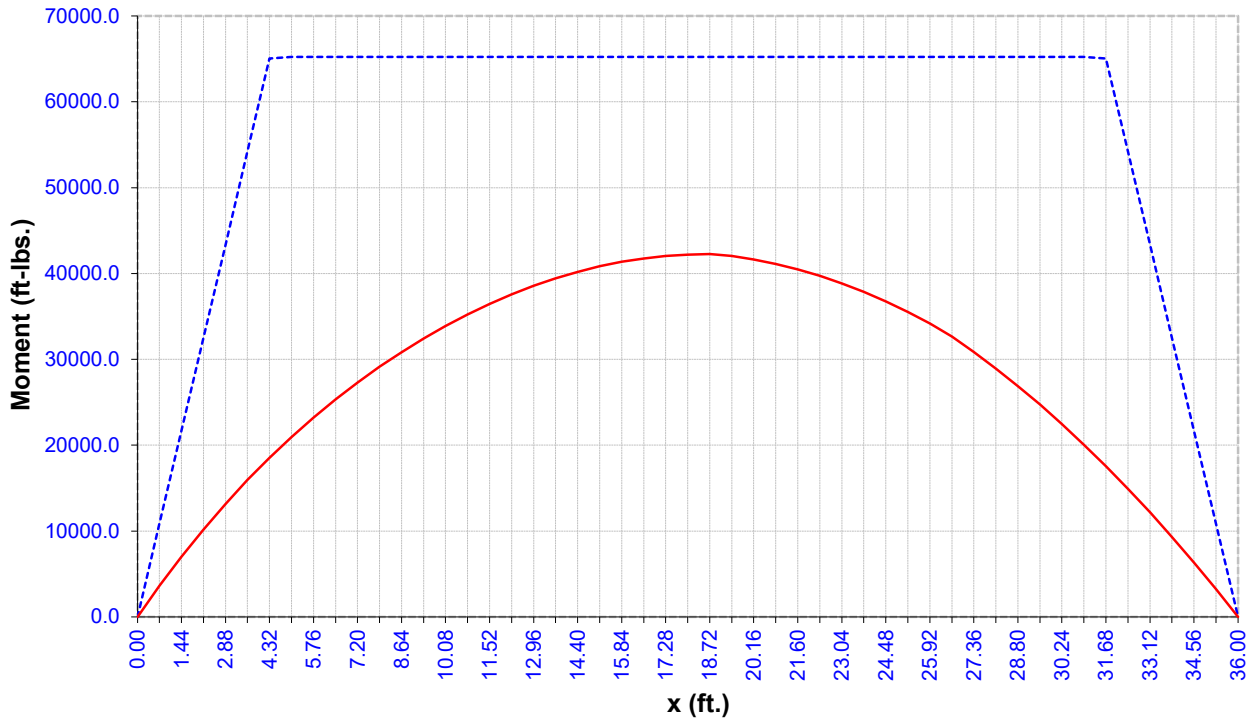
S.R. = **0.648** for Moment @ x = 18.72 ft.

Comments:

Shear Diagram



Moment Diagram



= curves for allowable capacity loads

= curves for actual design loads

GENERAL STANDARD JOIST ANALYSIS

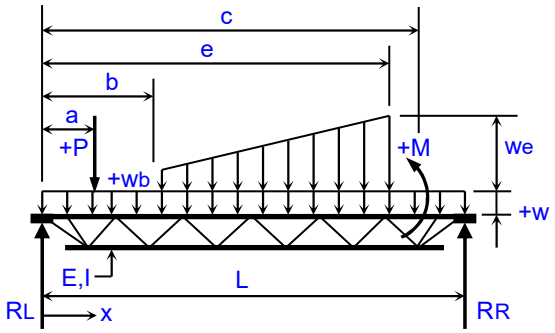
For Steel Joists Considered as Simple-Span Beams
Subjected to Non-Standard Loads

GENERAL STANDARD JOIST ANALYSIS

Input Data:

Joist Data: Joist Data & Capacities based on SJI 100-200

Designation =	K-series	26K7
Span, L =	36.0000	ft.
Modulus, E =	29000000	psi
Live Loads =	261	plf
Inertia, Ix =	317.0658982	in.^4



Nomenclature

Original Design or Capacity Loads:

Full Uniform:

w = 360 plf

Distributed:	Start b (ft.)	Wb (plf)	End e (ft.)	We (plf)
#1:				
#2:				
#3:				
#4:				
#5:				
#6:				
#7:				
#8:				

Moments:	c (ft.)	M (ft-lbs)
#1:		
#2:		
#3:		
#4:		

Point Loads:	a (ft.)	P (lbs.)
#1:		
#2:		
#3:		
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		

New Design Loads:

Roof Dead Load, D =	18	psf
Roof Flat Snow Load, Lr =	20	psf
Truss Joist Spacing =	6	ft

Full Uniform:

w = 228 plf

Weight of EVR:

wt. = 1300 lbs

Distributed:	Start b (ft.)	Wb (plf)	End e (ft.)	We (plf)
Snow Drift Loads	0.0000	216	8.5000	0
#2:				
#3:				
#4:				
#5:				
#6:				
#7:				
#8:				

Moments:	c (ft.)	M (ft-lbs)
#1:		
#2:		
#3:		
#4:		

New RTU Location

Note: Provide dimensions as shown to deterime RTU loading on existing joist

RTU Dimensions

a =	2.50
b =	2.50
c =	3.38
d =	3.38

Corner Factors

C1 =	0.25
C2 =	0.25
C3 =	0.25
C4 =	0.25
Unity check =	1

Location of RTU

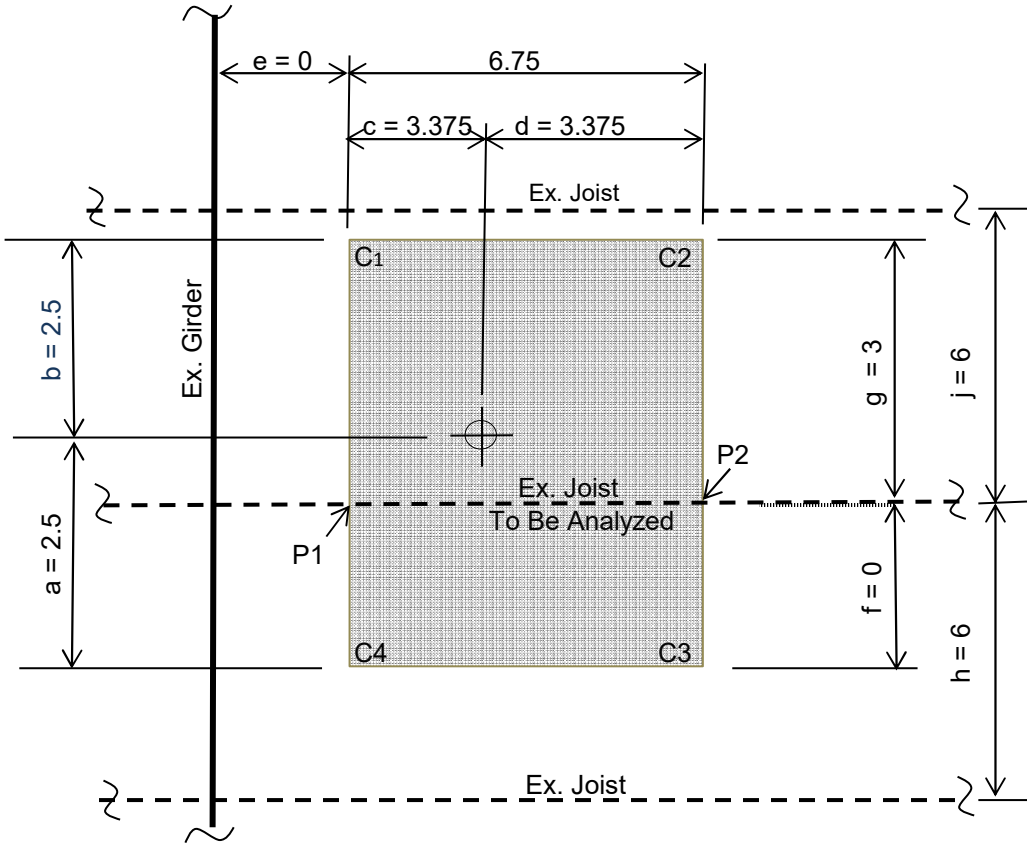
e =	0.00
f =	0.00
g =	3.00

P1 factor =	0.38
P2 factor =	0.38

Spacing of Joists @ RTU

h =	6.00
j =	6.00

Point Loads:	a (ft.)	P (lbs.)
From EVR P1:	0.00	350.00
From EVR P2:	6.75	350.00
#4:		
#5:		
#6:		
#7:		
#8:		
#9:		
#10:		
#11:		
#12:		
#13:		
#14:		
#15:		



Results of Joist Analysis:

Original Design or Capacity Loads:

End Reactions:

R_L = 6480.0 lbs. R_R = 6480.0 lbs.

Minimum Design Web Member Shear:

$V_{w(min)}$ = 1620 lbs. (25% of maximum end reaction for K-series and LH-series joists per SJI Spec's.)

Maximum Moments:

+Mx(max) = 58320.0 ft-lbs @ x = 18.00 ft.
-Mx(max) = 0.0 ft-lbs @ x = 0.00 ft.

***Maximum Deflections:**

-Δ(max) = -1.702 in. @ x = 18.00 ft.
+Δ(max) = 0.000 in. @ x = 0.00 ft.
Δ(ratio) = L/254

**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

New Design Loads:

End Reactions:

R_L = 5584.1 lbs. R_R = 4241.9 lbs.

Maximum Moments:

+Mx(max) = 39459.4 ft-lbs @ x = 17.40 ft.
-Mx(max) = 0.0 ft-lbs @ x = 0.00 ft.

***Maximum Deflections:**

-Δ(max) = -1.162 in. @ x = 17.83 ft.
+Δ(max) = 0.000 in. @ x = 0.00 ft.
Δ(ratio) = L/372

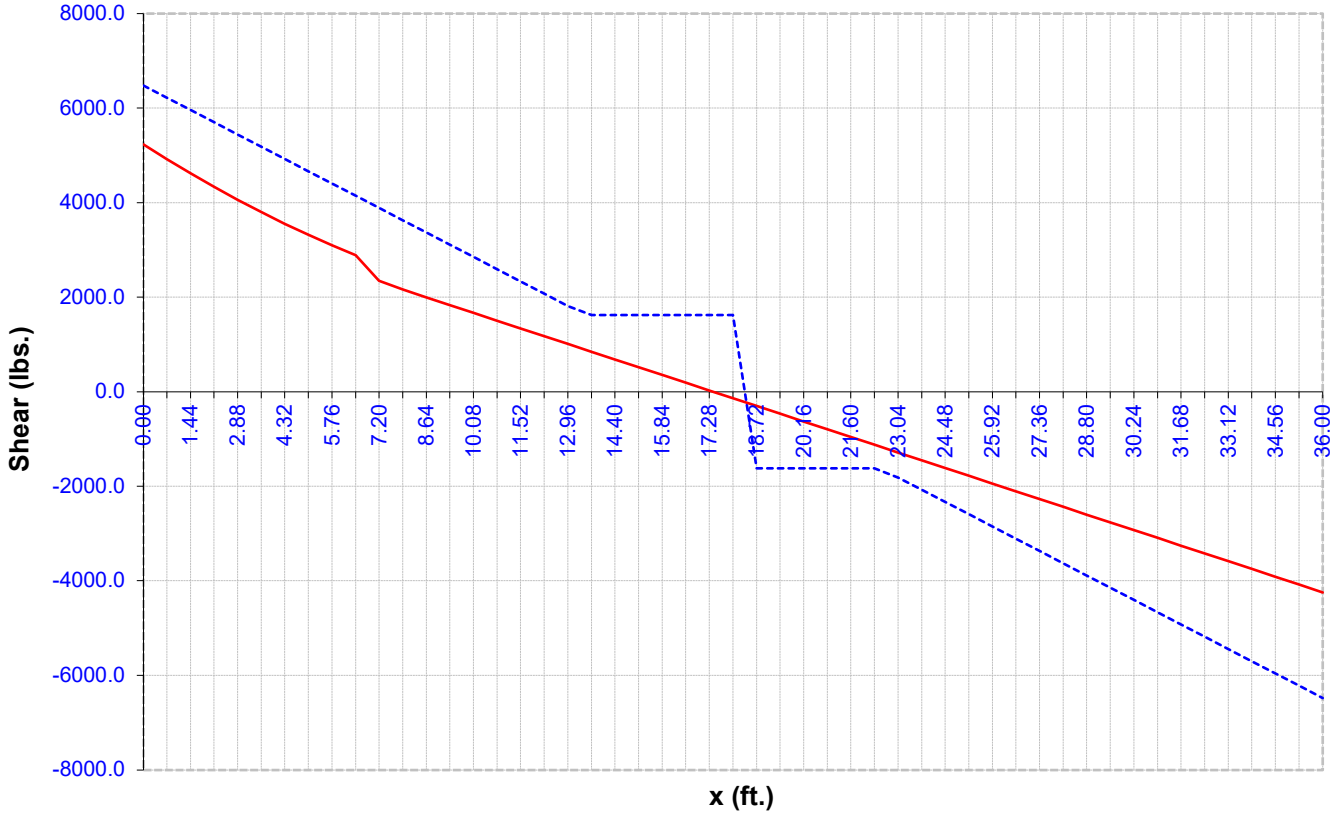
**Note: deflections shown above include a 15% increase above the values calculated using traditional "simple-beam" flexure in order to more closely match actual test results obtained by SJI.*

Maximum Stress Ratios:

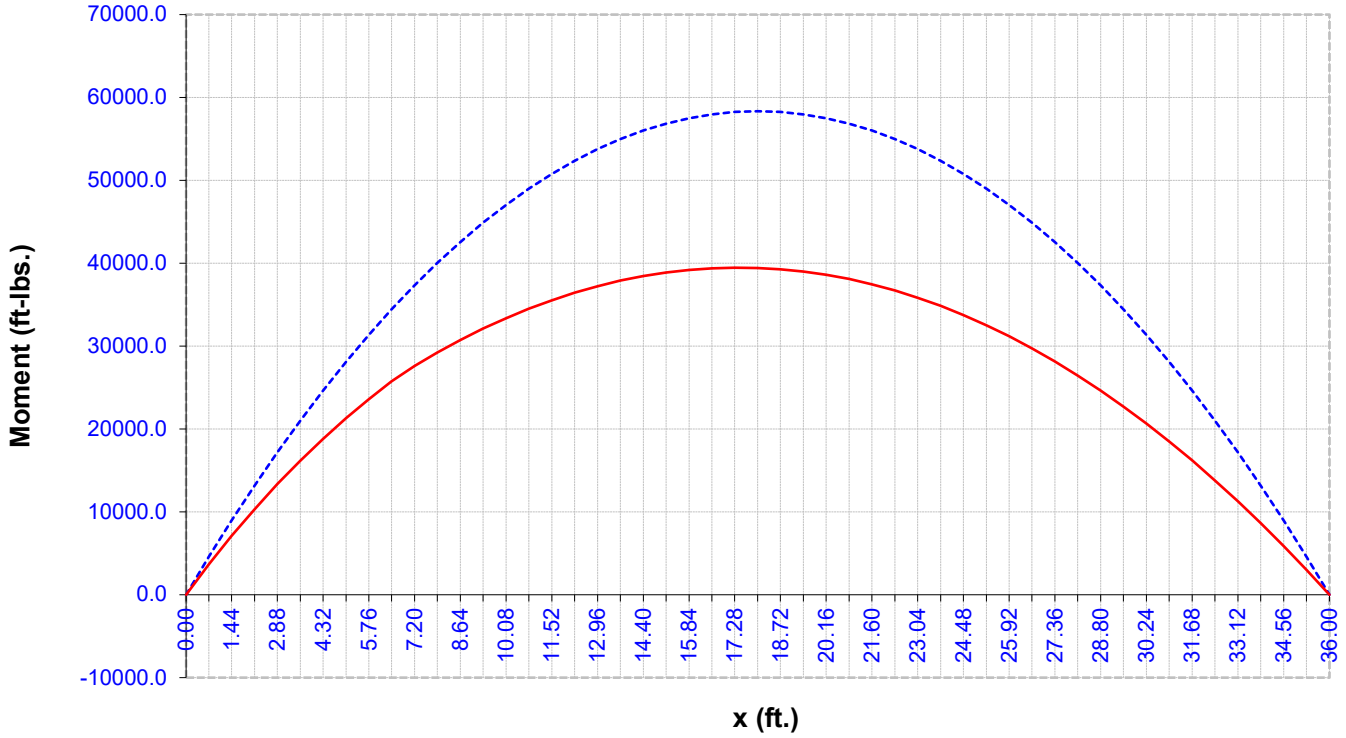
S.R. = **0.862** for Shear @ x = 0.00 ft.
S.R. = **0.799** for Moment @ x = 0.72 ft.

Comments:

Shear Diagram



Moment Diagram



= curves for original design or capacity loads

= curves for new design loads

Tabulation of Joist Shear, Moment, Slope, and Deflection for Original Design or Capacity Loads							
Point #	x (ft.)	Shear (lbs.)		Moment (ft-lbs.)		Slope or Rotation (deg.)	Deflection (in.)
1	0.0000	6480.0		0.0		-0.7222	0.0000
2	0.7200	6220.8		4572.3		-0.7205	-0.1088
3	1.4400	5961.6		8958.0		-0.7154	-0.2171
4	2.1600	5702.4		13157.0		-0.7072	-0.3244
5	2.8800	5443.2		17169.4		-0.6959	-0.4302
6	3.6000	5184.0		20995.2		-0.6817	-0.5342
7	4.3200	4924.8		24634.4		-0.6648	-0.6357
8	5.0400	4665.6		28086.9		-0.6452	-0.7345
9	5.7600	4406.4		31352.8		-0.6231	-0.8302
10	6.4800	4147.2		34432.1		-0.5986	-0.9223
11	7.2000	3888.0		37324.8		-0.5720	-1.0106
12	7.9200	3628.8		40030.8		-0.5432	-1.0947
13	8.6400	3369.6		42550.3		-0.5125	-1.1743
14	9.3600	3110.4		44883.1		-0.4800	-1.2492
15	10.0800	2851.2		47029.2		-0.4459	-1.3190
16	10.8000	2592.0		48988.8		-0.4102	-1.3836
17	11.5200	2332.8		50761.7		-0.3731	-1.4426
18	12.2400	2073.6		52348.0		-0.3348	-1.4960
19	12.9600	1814.4		53747.7		-0.2954	-1.5436
20	13.6800	1620.0		54960.8		-0.2550	-1.5851
21	14.4000	1620.0		55987.2		-0.2138	-1.6204
22	15.1200	1620.0		56827.0		-0.1718	-1.6495
23	15.8400	1620.0		57480.2		-0.1294	-1.6722
24	16.5600	1620.0		57946.8		-0.0865	-1.6885
25	17.2800	1620.0		58226.7		-0.0433	-1.6983
26	18.0000	1620.0		58320.0		0.0000	-1.7016
27	18.7200	-1620.0		58226.7		0.0433	-1.6983
28	19.4400	-1620.0		57946.8		0.0865	-1.6885
29	20.1600	-1620.0		57480.2		0.1294	-1.6722
30	20.8800	-1620.0		56827.0		0.1718	-1.6495
31	21.6000	-1620.0		55987.2		0.2138	-1.6204
32	22.3200	-1620.0		54960.8		0.2550	-1.5851
33	23.0400	-1814.4		53747.7		0.2954	-1.5436
34	23.7600	-2073.6		52348.0		0.3348	-1.4960
35	24.4800	-2332.8		50761.7		0.3731	-1.4426
36	25.2000	-2592.0		48988.8		0.4102	-1.3836
37	25.9200	-2851.2		47029.2		0.4459	-1.3190
38	26.6400	-3110.4		44883.1		0.4800	-1.2492
39	27.3600	-3369.6		42550.3		0.5125	-1.1743
40	28.0800	-3628.8		40030.8		0.5432	-1.0947
41	28.8000	-3888.0		37324.8		0.5720	-1.0106
42	29.5200	-4147.2		34432.1		0.5986	-0.9223
43	30.2400	-4406.4		31352.8		0.6231	-0.8302
44	30.9600	-4665.6		28086.9		0.6452	-0.7345
45	31.6800	-4924.8		24634.4		0.6648	-0.6357
46	32.4000	-5184.0		20995.2		0.6817	-0.5342
47	33.1200	-5443.2		17169.4		0.6959	-0.4302
48	33.8400	-5702.4		13157.0		0.7072	-0.3244
49	34.5600	-5961.6		8958.0		0.7154	-0.2171
50	35.2800	-6220.8		4572.3		0.7205	-0.1088
51	36.0000	-6480.0		0.0		0.7222	0.0000

Tabulation of Joist Shear, Moment, Slope, and Deflection for New Design Loads							
Point #	x (ft.)	Shear	S.R.	Moment	S.R.	Slope or Rotation (deg.)	Deflection (in.)

1	0.0000	5234.1	0.808	0.0	---	-0.5057	0.0000
2	0.7200	4921.0	0.791	3655.1	0.799	-0.5043	-0.0762
3	1.4400	4621.1	0.775	7089.4	0.791	-0.5003	-0.1520
4	2.1600	4334.4	0.760	10312.6	0.784	-0.4938	-0.2270
5	2.8800	4060.8	0.746	13334.1	0.777	-0.4850	-0.3008
6	3.6000	3800.4	0.733	16163.3	0.770	-0.4741	-0.3731
7	4.3200	3553.2	0.721	18809.8	0.764	-0.4611	-0.4437
8	5.0400	3319.1	0.711	21283.1	0.758	-0.4462	-0.5121
9	5.7600	3098.2	0.703	23592.5	0.752	-0.4295	-0.5781
10	6.4800	2890.5	0.697	25747.7	0.748	-0.4111	-0.6415
11	7.2000	2346.0	0.603	27600.5	0.739	-0.3913	-0.7020
12	7.9200	2164.6	0.597	29223.6	0.730	-0.3702	-0.7595
13	8.6400	1996.2	0.592	30720.8	0.722	-0.3479	-0.8136
14	9.3600	1832.0	0.589	32098.9	0.715	-0.3246	-0.8643
15	10.0800	1667.9	0.585	33358.9	0.709	-0.3002	-0.9115
16	10.8000	1503.7	0.580	34500.7	0.704	-0.2750	-0.9548
17	11.5200	1339.6	0.574	35524.3	0.700	-0.2490	-0.9944
18	12.2400	1175.4	0.567	36429.7	0.696	-0.2223	-1.0299
19	12.9600	1011.2	0.557	37216.9	0.692	-0.1949	-1.0614
20	13.6800	847.1	0.523	37885.9	0.689	-0.1670	-1.0887
21	14.4000	682.9	0.422	38436.7	0.687	-0.1386	-1.1117
22	15.1200	518.8	0.320	38869.3	0.684	-0.1099	-1.1304
23	15.8400	354.6	0.219	39183.7	0.682	-0.0809	-1.1448
24	16.5600	190.4	0.118	39379.9	0.680	-0.0517	-1.1548
25	17.2800	26.3	0.016	39457.9	0.678	-0.0224	-1.1604
26	18.0000	-137.9	0.085	39417.8	0.676	0.0069	-1.1616
27	18.7200	-302.0	0.186	39259.4	0.674	0.0361	-1.1583
28	19.4400	-466.2	0.288	38982.8	0.673	0.0652	-1.1507
29	20.1600	-630.4	0.389	38588.1	0.671	0.0940	-1.1387
30	20.8800	-794.5	0.490	38075.1	0.670	0.1225	-1.1224
31	21.6000	-958.7	0.592	37444.0	0.669	0.1506	-1.1018
32	22.3200	-1122.8	0.693	36694.6	0.668	0.1781	-1.0770
33	23.0400	-1287.0	0.709	35827.1	0.667	0.2051	-1.0481
34	23.7600	-1451.2	0.700	34841.3	0.666	0.2313	-1.0152
35	24.4800	-1615.3	0.692	33737.4	0.665	0.2568	-0.9783
36	25.2000	-1779.5	0.687	32515.3	0.664	0.2814	-0.9377
37	25.9200	-1943.6	0.682	31175.0	0.663	0.3051	-0.8935
38	26.6400	-2107.8	0.678	29716.5	0.662	0.3277	-0.8458
39	27.3600	-2272.0	0.674	28139.7	0.661	0.3492	-0.7947
40	28.0800	-2436.1	0.671	26444.8	0.661	0.3695	-0.7405
41	28.8000	-2600.3	0.669	24631.7	0.660	0.3885	-0.6833
42	29.5200	-2764.4	0.667	22700.4	0.659	0.4061	-0.6234
43	30.2400	-2928.6	0.665	20651.0	0.659	0.4222	-0.5609
44	30.9600	-3092.8	0.663	18483.3	0.658	0.4367	-0.4962
45	31.6800	-3256.9	0.661	16197.4	0.658	0.4496	-0.4293
46	32.4000	-3421.1	0.660	13793.3	0.657	0.4608	-0.3606
47	33.1200	-3585.2	0.659	11271.0	0.656	0.4701	-0.2904
48	33.8400	-3749.4	0.658	8630.6	0.656	0.4775	-0.2190
49	34.5600	-3913.6	0.656	5871.9	0.655	0.4829	-0.1465
50	35.2800	-4077.7	0.655	2995.1	0.655	0.4862	-0.0734
51	36.0000	-4241.9	0.655	0.0	0.000	0.4873	0.0000