structural
DESIGN STUDIO

STRUCTURAL CALCULATIONS

Ogden Francom Facility

Project No. 24071

2186 Lincoln Avenue

Ogden, Utah

PREPARED FOR:

VBFA, Inc.

2225 E. Murray Holladay Rd., Suite 110 :: Salt Lake City, Utah 84117 :: 801.274.3950 :: structuralds.com

PROJECT DESIGN CRITERIA

structural DESIGN STUDIO

General Project Information

Project Name:	Ogden Francom Facility	Client Name:	VBFA, Inc.
Street Address:	2186 Lincoln Avenue	Governing Code:	2021 INTERNATIONAL BUILDING CODE (IB
City, State:	Ogden, Utah	Risk Category:	Risk Category III (Substantial Hazard)

Project Description:

Structural Loads and Criteria

LIVE LOADS		WIND LOADS		SEISMIC LOADS	
Roof Live Load:	20 psf	Wind Speed:	110 mph	Site Classification:	Site Class-D (Defa
Floor Live Load:		Wind Exposure:	Exposure C (All Others)	Short Period (Ss):	1.361 g
Flat Roof Snow Load:	36 psf	Enclosure:	Enclosed	Long Period (S1):	0.496 g
Misc. Load:	N/A	Analysis Method:	Directional	Design Category:	D

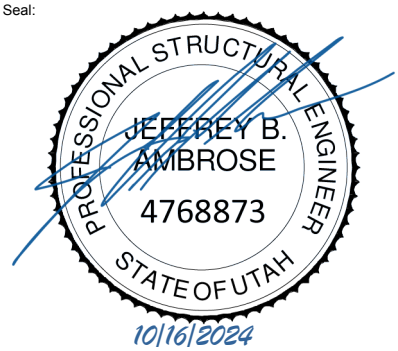
Structural Material Properties

SOILS		MASONRY		CONCRETE	
Soil Type:	Site Class-D (Default)	Compression (f'm):	N/A	Compression (f'c):	3000 psi
Bearing:	3000 psf	Mortar Type:	N/A	Steel Reinforcing:	A615
Sliding:	0.45	Grout:	N/A	w/c ratio:	0.45
Short Tem Increase:	33%	CMU Type:	N/A	Air Content:	6.00%

STEEL		WOOD		LATERAL FORCE RESISTING SYSTEM	
Beams:	A992	Sawn Lumber:	N/A	Special steel moment frames	
Columns:	A500	Glulam Lumber:	N/A	R-Factor:	8.00
Plates:	A36	Sheathing:	N/A	Omega (Wo):	3.00
Anchor Bolts:	N/A	All Thread:	N/A	Amplification (Cd):	5.50

Calculation Set Table of Contents

Seal:



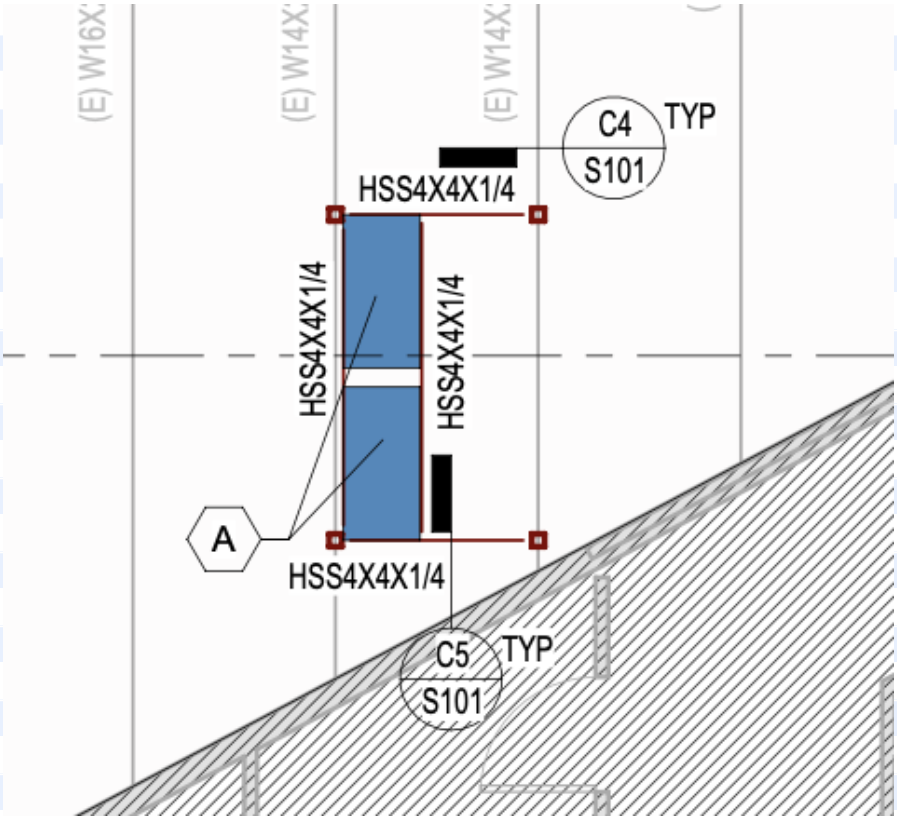
This signed engineering seal is intended only for this single project and applies only to the project scope as listed above. This seal only applies to the attached calculation set for this project and applies to no other documentation or aspects of the project.

STRUCTURAL SUMMARY DESIGN SHEET

Ogden Francom Facility

Adding (2) new 800 pound units to an existing roof. This is being placed on the low roof where there is substantial snow drift. The roof structure is supported on wide flange beams which have adequate capacity to support these new loads.

We used the original design snow loads to verify capacity as well as the reduced snow loads for actual code compliance. Under both scenarios the beams have adequate capacity to support these units.



PROJECT LOADING CRITERIA

Ogden Francom Facility

structural DESIGN STUDIO

ROOF LOADING

DEAD LOADS			LIVE LOADS	
Roof System:	1.00 psf	Membrane System	Roof Live Load:	20.00 psf
Roof Insulation:	1.20 psf	3" Rigid insulation	Flat Roof Snow Load:	36.00 psf
Roof Deck Collateral:	0.80 psf		Sloped Roof Snow Load:	36.00 psf
Roof Deck:	3.00 psf	Steel roof deck	Roof Wind Load:	0.00 psf
Elec/Mech/Piping:	5.00 psf		Elevation:	4300 ft
Ceiling Finishes:	3.00 psf	Acoustical Ceiling System		
Misc Collateral:	2.00 psf			
Other:			Total Roof Decking DEAD Load:	6.00 psf
Roof Joists:	2.00 psf		Total Roof Joist DEAD Load:	18.00 psf
Roof Girders:	2.00 psf		Total Roof Girder DEAD Load:	20.00 psf
TOTAL LOAD:	**20.00 psf**			
TOTAL MODEL LOAD:	16.00 psf	<- When self weight is calculated by software.	**TOTAL ROOF SEISMIC MASS:**	**27.20 psf**

FLOOR LOADING

DEAD LOADS			LIVE LOADS	
Floor Finishes:	0.00 psf	NONE	Floor Live Load:	
Deflected Concrete:			Floor Partition Load:	
Floor Deck Collateral:			Is Live Load a Storage Load:	
Floor Decking:	0.00 psf	NONE	Floor Cooridor Load:	
Elec/Mech/Piping:			Construction Live Load:	
Ceiling Finishes:	0.00 psf	NONE		
Misc Collateral:				
Other:			Pre-Composite DEAD:	0.00 psf
Floor Joists:			Pre-Composite LIVE:	
Floor Girders:			Superimposed DEAD:	0.00 psf
TOTAL LOAD:	**0.00 psf**		Superimposed LIVE:	0.00 psf
TOTAL MODEL LOAD:	0.00 psf	<- When SW+Deck is calculated by software.	**TOTAL FLOOR SEISMIC MASS:**	**0.00 psf**

WALL LOADING

DEAD LOADS

WALL TYPE 1			**TOTAL WALL WEIGHT:**	**0.00 psf**
Exterior Finish:	0.00 psf	NONE	Wall Height:	0.00 ft
Insulation:	0.00 psf	NONE	Total Wall Mass:	0 plf
Structure:	0.00 psf	NONE		
Interior Finish:	0.00 psf	NONE		
Other:				

WALL TYPE 2			**TOTAL WALL WEIGHT:**	**0.00 psf**
Exterior Finish:	0.00 psf	NONE	Wall Height:	0.00 ft
Insulation:	0.00 psf	NONE	Total Wall Mass:	0 plf
Structure:	0.00 psf	NONE		
Interior Finish:	0.00 psf	NONE		
Other:				

SNOW LOADING + DRIFT

Ogden Francom Facility

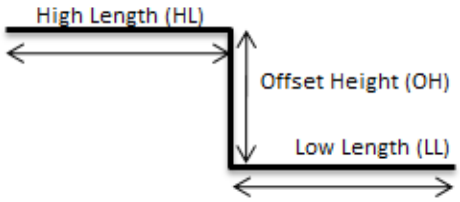
Designation:		County:	Davis
Risk Category:	Risk Category III (Substantial Hazard)	Elevation:	4300 ft
Roof Exposure:	Partially Exposed	Ground Snow Load:	46 psf
Terrain Category:	Exposure C (All Others)	Roof Slope:	0 deg
Roof Thermal Type:	All Other Structures	Roofing Material:	Slippery Surface
Load Type:	Utah Snow Load Study		
	[[Utah Ground Snow Load Map]]		

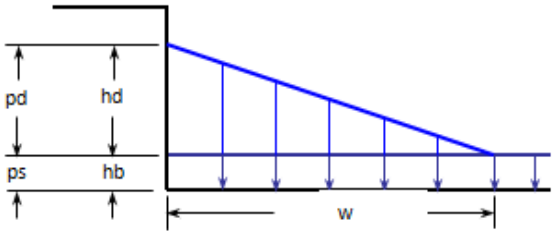
Original Ground Snow = 46

Current Ground Snow = 37

Ground Snow Load (pg):	46 psf	
Exposure Factor (Ce):	1.00	*Table 7.3-1*
Thermal Factor (Ct):	1.00	*Table 7.3-2*
Importance Factor (I):	1.10	*Table 1.5-2*
Flat Roof Snow Load (pf):	35 psf	*Equation 7.3-1*
Sloped Roof Factor (Cs):	1.00	*Figure 7-2*
Sloped Roof Snow Load (ps):	35 psf	*Equation 7.4-1*
Snow Density (g):	20.0 pcf	*Equation 7.7-1*
Flat Roof Snow Depth (hb):	1.8 ft	

Roof Step Drifting Design





Drift Designation	HL	OH	LL	Parapet/RTU	Drift Load (pd)	Drift Length (w)	Wind/Leeward
A	150.00 ft	20.00 ft	200.00 ft	N	113 psf	22.6 ft	Windward
					0 psf	0.0 ft	N/A
					0 psf	0.0 ft	N/A
					0 psf	0.0 ft	N/A
					0 psf	0.0 ft	N/A
					0 psf	0.0 ft	N/A

IBC 2018 SEISMIC DESIGN & LOADING

Ogden Francom Facility

Section 11.4-Seismic Ground Motions

Short Period Map Acceleration (Ss): 1.36 g TL: 8.00 s

1-Sec Period Map Acceleration (S1): 0.50 g

Site Class: Site Class-D (Default)

Soil Modification (Fa): 1.20

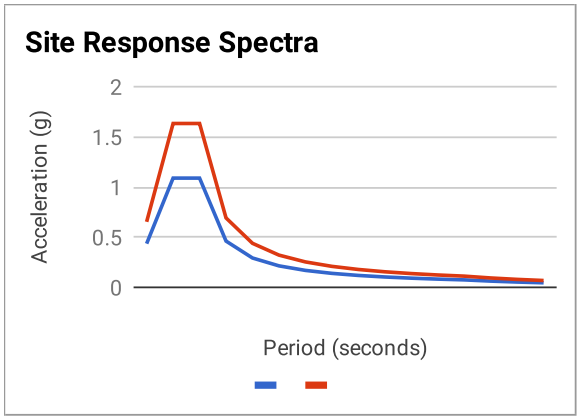
Soil Modification (Fv): 1.80

Design Spectral Accelerations

SDS: 1.09 g

SD1: 0.60 g

Use Exception (11.4.8): Exception 2



Section 11.5-Importance and Occupancy

Risk Category: Risk Category III (Substantial Hazard)

Importance (I): 1.25

Section 11.6-Seismic Design Category

Design Category: D

Section 12.2-Structural System

Framing System: C-Moment-Resisting Frame Systems

Lateral System: Special steel moment frames

R	Wo	CD
8.00	3.00	5.50

Section 12.3-Redundancy Factor

Building Design: None of the Above

Redundancy-r: 1.30

Section 12.8-Equivalent Lateral Force

Fundamental Period (T): 0.54 s

Seismic Coefficient (Cs): 0.170

Base Shear (Qe): 0.00 kips

Base Shear (E): 0.00 kips

Amplified Base Shear (WoQe): 0 kips

Section 12.8.3: Vertical Distribution of Seismic Forces

# of Diaphragm Levels: 2

Period Factor-k: 1.02

Diaphragm / Floor Level	Story Height	Height abv Base	Diaphragm Area	Diaphragm Weight	Perimeter Wall Length	Perimeter Wall Wt.	Seismic Wt (kips)	Force @ Floor Lvl	Story Shear	Diaphragm Force
ROOF	20 ft	40 ft		27 psf			0 kips	#DIV/0!	#DIV/0!	#DIV/0!
LEVEL 1	20 ft	20 ft		0 psf			0 kips	#DIV/0!	#DIV/0!	#DIV/0!
BASE		0 ft					0 kips	#DIV/0!	#DIV/0!	#DIV/0!
	TOTALS	**40 ft**	**0 ft2**	**#DIV/0!**			**0.00 kips**	**#DIV/0!**	**#DIV/0!**	

SEISMIC DESIGN OF NON-STRUCTURAL ANCHORAGE

Ogden Francom Facility

structural DESIGN STUDIO

Nonstructural Component Classification - Table 13.5-1 + 13.6-1

Architectural Component:	Choose Component - Table 13.5-1
Mechanical Component:	Air coolers, air cooled, heat exchangers, condensing unites, radiators, and other mechanical components elevated on integral structural steel support

Nonstructural Component Importance Factor ASCE 7 - 13.1.3

Occupancy Category:	Risk Category III (Substantial Hazard)
Component Required to function for Lifesafety after earthquake, including fire protection sprinkler	N
Component contains hazardous materials:	N
Component is in or attached to an Occupancy Category IV structure AND it is needed for continued operation of the facility or its failure could impart in the continued operation of the facility.	N

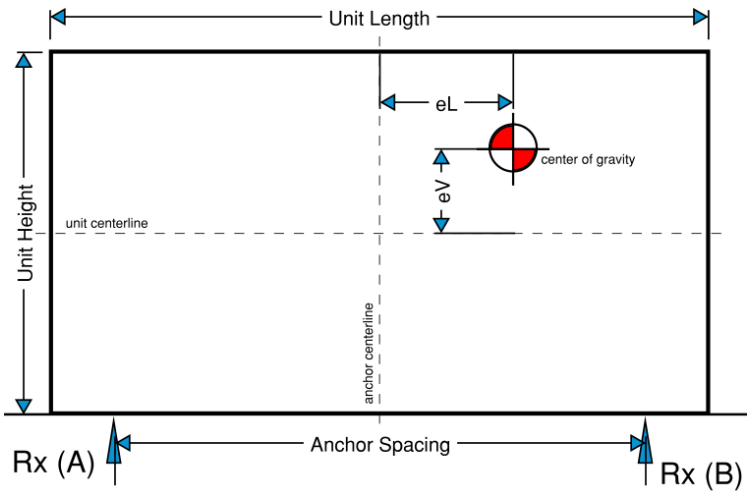
Equipment Geometry & Information

*Anchor Spacing must be symetrical

Unit Length:	4.00 ft
Unit Height:	6.00 ft
Anchor Spacing:	4.00 ft
Unit Weight:	800 lbs
Offset (eL):	0.00 ft
Offset (eV):	0.00 ft
Total # of Anchors:	4

Seismic Parameters:

SDS:	1.09
z (ht of anchor from Ground):	20.00 ft
h (overall ht of building):	40.00 ft



SEISMIC ANALYSIS

ap:	2.5
Rp:	3.0
Ωo:	1.5
Wp:	800 lb
Ip:	1.25
z/h:	0.50
Fp:	726 lb
Fp min:	327 lb
Fp max:	1742 lb
E:	**726 lb**

SHEAR ANALYSIS

Total Shear:	726
Anchor Shear:	181

OVERTURNING ANALYSIS

Mu: 2,178

Positive E (to right)		Negative E (to left)	
Rx (A):	-184	Rx (A):	944
Rx (B):	944	Rx (B):	-184
(-) Means Uplift		**(-) Means Uplift**	

MAX ANCHOR DESIGN

Max Tu:	**-184**
Max Vu:	**181**

*Loads above do not include Ω

DESIGN MODULE - SIMPLE BEAM DESIGN

Ogden Francom Facility

ID KEY: 1l-QtzcsvQTTi_ <-Truncated ID

LOADS FROM MODEL

	ROOF	FLOOR
DEAD:	20.00 psf	0.00 psf
LIVE:	0	0.00 psf
SNOW/Lr:	36.00 psf	0

BEAM ID	SPAN	ROOF / FLOOR	TRIB / SPACING	MATERIAL	L/X	UNIFORM LOADS		STATUS
						DEAD	LIVE/SNOW	
B1	8.00 ft	ROOF	0.00 ft	STEEL	L/360	12 plf	0 plf	0.232
B2	6.00 ft	ROOF	0.00 ft	STEEL	L/360	12 plf	0 plf	0.141
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!
						0 plf	0 plf	#DIV/0!

BEAM SCHEDULE

MARK	SPAN	MATERIAL	L/X	DELTA	SECTION
B1	8.00 ft	STEEL	L/750	**.13 in**	**HSS4X4X1/4**
B2	6.00 ft	STEEL	L/1,622	**.04 in**	**HSS4X4X1/4**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**
			#DIV/0!	**#DIV/0!**	**0x0 -**

SIMPLE SPAN - BEAM DESIGN

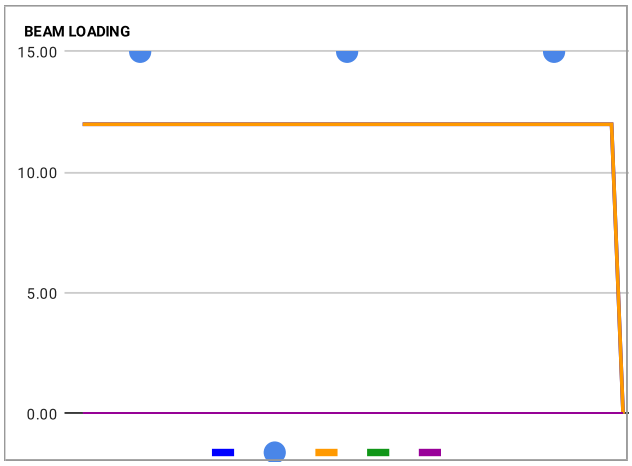
Ogden Francom Facility

BEAM ID# B1

structural DESIGN STUDIO

DESIGN CRITERIA

Length (ft):	8.00	Spacing (ft):	0.00
Deflect (L/x):	360	Dead (psf):	20.00
Roof/Floor:	ROOF	Live/Snow (psf):	36.00
		EQ/W (psf):	

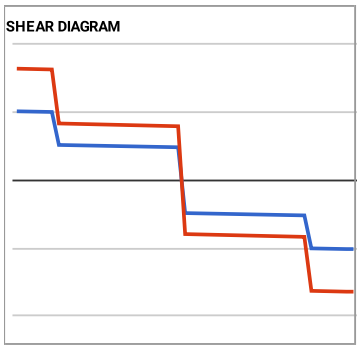


DISTRIBUTED	LOAD 1	LOAD 2	LOAD 3
Start Location	0.00		
End Location	8.00		
Dead Load Start	12		
Dead Load End	12		
Live/Snow Start	0		
Live/Snow End	0		
EQ/W Start	0		
EQ/W End	0		

POINT LOADS	LOAD 1	LOAD 2	LOAD 3
Location	1.00	4.00	7.00
Dead Load			
Live/Snow Load	200	400	200
EQ/W Load	472	944	472

Be sure to use the same units throughout, either plf and pounds or klf and kips. Never mix the two. For the Design Options to properly work, be sure to use PLF and POUNDS.

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	48	400	944	1,014	**1,642**
RIGHT:	48	400	944	1,014	**1,642**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	48	400	944	1,014	**1,642**
MAX MOMENT:	96	1000	2360	2,512	**4,075**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	12	100	236	254	**410**
MOMENT:	12	125	295	314	**509**



STEEL SECTION		CONCRETE SECTION		WOOD SECTION	
Type:	HSS	Width (in):		Width (in):	
Trial Section:	HSS4X4X1/4	Depth (in):		Depth (in):	
Max Depth:		f'c (psi):		Member Type:	
FyZx min:	54	Bar Size (#):		Wood Type:	
Ix min:	4	Min Depth:	#DIV/0!	Wood Grade:	
phi Mn:	17,588	phi Mn:	#N/A	phi Mn:	0
Mn Interaction:	**0.232**	Mn Interaction:	#N/A	Mn Interaction:	#DIV/0!
Deflection (L/x):	L/750	Deflection (L/x):	#DIV/0!	Deflection (L/x):	#DIV/0!
Deflection:	.13 in	Deflection:	#DIV/0!	Deflection:	#DIV/0!
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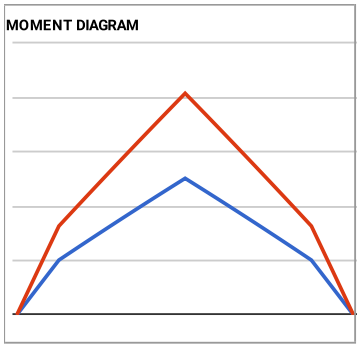


SIMPLE SPAN - BEAM DESIGN

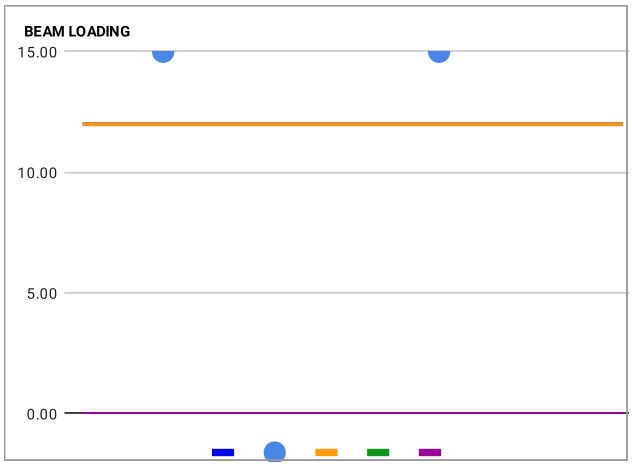
Ogden Francom Facility

BEAM ID# B2

structural DESIGN STUDIO

DESIGN CRITERIA

Length (ft):	6.00	Spacing (ft):	0.00
Deflect (L/x):	360	Dead (psf):	20.00
Roof/Floor:	ROOF	Live/Snow (psf):	36.00
		EQ/W (psf):	

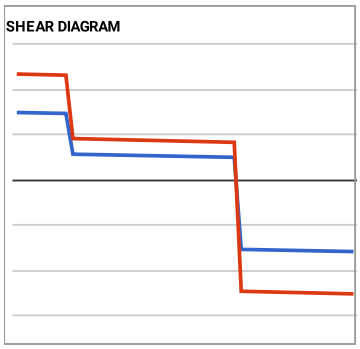


DISTRIBUTED	LOAD 1	LOAD 2	LOAD 3
Start Location	0.00		
End Location	6.00		
Dead Load Start	12		
Dead Load End	12		
Live/Snow Start	0		
Live/Snow End	0		
EQ/W Start	0		
EQ/W End	0		

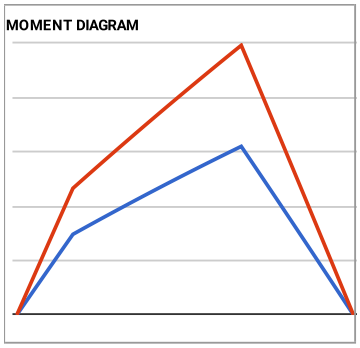
POINT LOADS	LOAD 1	LOAD 2	LOAD 3
Location	1.00	4.00	
Dead Load	48	48	
Live/Snow Load	400	400	
EQ/W Load		944	

Be sure to use the same units throughout, either plf and pounds or klf and kips. Never mix the two. For the Design Options to properly work, be sure to use PLF and POUNDS.

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	92	467	315	747	**1,172**
RIGHT:	76	333	629	787	**1,254**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	92	467	629	787	**1,254**
MAX MOMENT:	129	667	1259	1,550	**2,479**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	31	156	210	262	**418**
MOMENT:	29	148	280	344	**551**



STEEL SECTION		CONCRETE SECTION		WOOD SECTION	
Type:	HSS	Width (in):		Width (in):	
Trial Section:	HSS4X4X1/4	Depth (in):		Depth (in):	
Max Depth:		f'c (psi):		Member Type:	
FyZx min:	33	Bar Size (#):		Wood Type:	
Ix min:	2	Min Depth:	#DIV/0!	Wood Grade:	
phi Mn:	17,588	phi Mn:	#N/A	phi Mn:	0
Mn Interaction:	**0.141**	Mn Interaction:	#N/A	Mn Interaction:	#DIV/0!
Deflection (L/x):	L/1,622	Deflection (L/x):	#DIV/0!	Deflection (L/x):	#DIV/0!
Deflection:	.04 in	Deflection:	#DIV/0!	Deflection:	#DIV/0!
SECTION :	**HSS4X4X1/4**	**SECTION:**	**#N/A**	**SECTION:**	**0x0 -**



SIMPLE SPAN - BEAM DESIGN

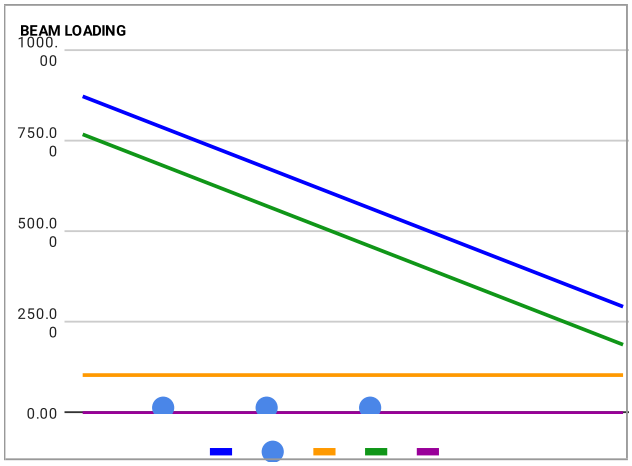
Beam (1) - Existing W14x22

structural DESIGN STUDIO

ID: Ti_4dnltk-1ydyKwblHw0Q <-

DESIGN CRITERIA

Length (ft):	22.00	SPACING:	5.25
Deflect (L/x):	240	DL:	20.00
		LL	36.00

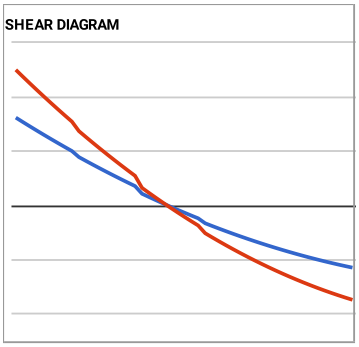


DISTRIBUTED	LOAD 1	LOAD 2	LOAD 3
Start Location	0.00	0.00	
End Location	22.00	22.00	
Dead Load Start	105	0	
Dead Load End	105	0	
Live/Snow Start	189	593	
Live/Snow End	189	0	
EQ/W Start			
EQ/W End			

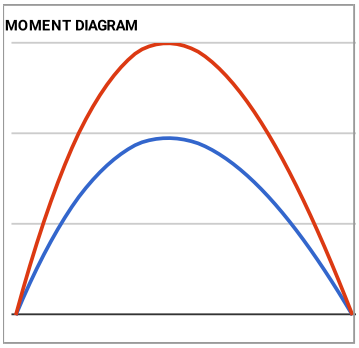
POINT LOADS	LOAD 1	LOAD 2	LOAD 3
Location	4.00	8.00	12.00
Dead Load			
Live/Snow Load	200	400	200
EQ/W Load			

Be sure to use the same units throughout, either plf and pounds or klf and kips. Never mix the two. For the Design Options to properly work, be sure to use PLF and POUNDS.

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	1155	6939	0	8,094	**12,488**
RIGHT:	1155	4545	0	5,700	**8,658**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	1155	6939	0	8,094	**12,488**
MAX MOMENT:	6353	32787	0	39,068	**59,985**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	105	631	0	736	**1,135**
MOMENT:	105	542	0	646	**991**



STEEL SECTION		CONCRETE SECTION		WOOD SECTION	
Type:	W	Width (in):		Width (in):	
Trial Section:	W14x22	Depth (in):		Depth (in):	
Max Depth:		f'c (psi):		Member Type:	Choose
FyZx min:	800	Bar Size (#):		Wood Type:	Choose
Ix min:	107	Min Depth:	#DIV/0!	Wood Grade:	Choose
phi Mn:	124,500	phi Mn:	#N/A	phi Mn:	0
Mn Interaction:	**0.482**	Mn Interaction:	#N/A	Mn Interaction:	#DIV/0!
Deflection (L/x):	L/448	Deflection (L/x):	#DIV/0!	Deflection (L/x):	#DIV/0!
Deflection:	.59 in	Deflection:	#DIV/0!	Deflection:	#DIV/0!
SECTION :	**W14X22**	**SECTION:**	**#N/A**	**SECTION:**	**0x0 - Choose**



SIMPLE SPAN - 5% BEAM EVALUATION

Beam (1) - Existing W14x22

structural DESIGN STUDIO

ANALYSIS FROM ORIGINAL CONDITION (paste from original analysis)

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	1155	6430	0	7,585	**11,673**
RIGHT:	1155	4254	0	5,409	**8,193**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	1155	6430	0	7,585	**11,673**
MAX MOMENT:	6353	29676	0	35,984	**55,052**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	105	585	0	690	**1,061**
MOMENT:	105	491	0	595	**910**

Notes:

Original Design Load of 20 PSF (includes 5 psf for mechanical and original 35 psf design snow loads)

ANALYSIS FROM MODIFIED CONDITION (from active analysis)

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	1155	6939	0	8,094	**12,488**
RIGHT:	1155	4545	0	5,700	**8,658**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	1155	6939	0	8,094	**12,488**
MAX MOMENT:	6353	32787	0	39,068	**59,985**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	105	631	0	736	**1,135**
MOMENT:	105	542	0	646	**991**

Notes:

Using current snow loads and full original design drift plus the equipment we are both within tolerance and within beam capacity

5% COMPARISSON FROM ORIGINAL

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	100.0%	107.9%	#DIV/0!	106.7%	**107.0%**
RIGHT:	100.0%	106.8%	#DIV/0!	105.4%	**105.7%**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	100.0%	107.9%	#DIV/0!	106.7%	**107.0%**
MAX MOMENT:	100.0%	110.5%	#DIV/0!	108.6%	**109.0%**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	100.0%	107.9%	#DIV/0!	106.7%	**107.0%**
MOMENT:	100.0%	110.5%	#DIV/0!	108.6%	**109.0%**

JOIST SIZE:	W14X22	ACTUAL	STATUS
LL Capcaity:	1,285.00	630.78	OK
TL Capacity:	1,285.00	735.78	OK

Regardless, the beam has adequate capacity to carry these additional loads

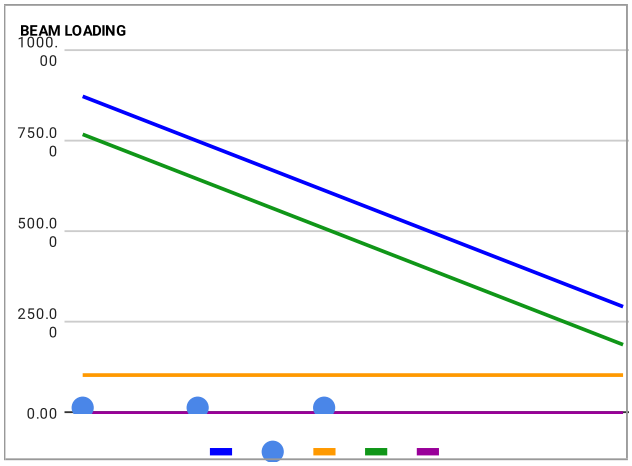
SIMPLE SPAN - BEAM DESIGN

Beam (2) - Existing W14x22

ID: Ti_4dnltk-1ydyKwblHw0Q <-

DESIGN CRITERIA

Length (ft):	18.50	SPACING:	5.25
Deflect (L/x):	240	DL:	20.00
		LL	36.00



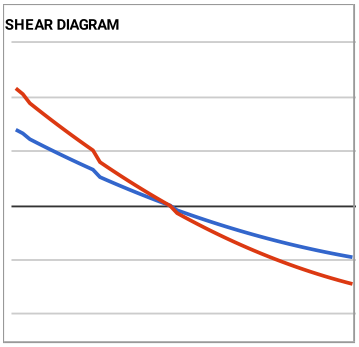
DISTRIBUTED	LOAD 1	LOAD 2	LOAD 3
Start Location	0.00	0.00	
End Location	18.50	18.50	
Dead Load Start	105	0	
Dead Load End	105	0	
Live/Snow Start	189	593	
Live/Snow End	189	0	
EQ/W Start			
EQ/W End			

POINT LOADS	LOAD 1	LOAD 2	LOAD 3
Location	0.50	4.50	8.50
Dead Load			
Live/Snow Load	200	400	200
EQ/W Load			

Be sure to use the same units throughout, either plf and pounds or klf and kips. Never mix the two. For the Design Options to properly work, be sure to use PLF and POUNDS.

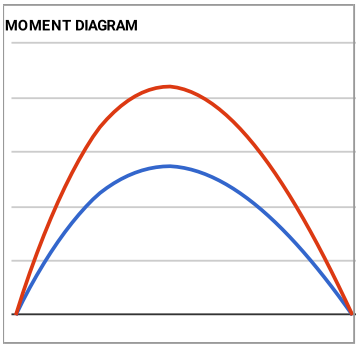
REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	971	6012	0	6,983	**10,785**
RIGHT:	971	3772	0	4,743	**7,201**
FORCES	DL	LL	EQ/W	SERVICE	DESIGN
MAX SHEAR:	971	6012	0	6,983	**10,785**
MAX MOMENT:	4492	22931	0	27,391	**42,042**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	DESIGN
SHEAR:	105	650	0	755	**1,166**
MOMENT:	105	536	0	640	**983**

SHEAR DIAGRAM



STEEL SECTION		CONCRETE SECTION		WOOD SECTION	
Type:	W	Width (in):		Width (in):	
Trial Section:	W14x22	Depth (in):		Depth (in):	
Max Depth:		f'c (psi):		Member Type:	Choose
FyZx min:	561	Bar Size (#):		Wood Type:	Choose
Ix min:	63	Min Depth:	#DIV/0!	Wood Grade:	Choose
phi Mn:	124,500	phi Mn:	#N/A	phi Mn:	0
Mn Interaction:	**0.338**	Mn Interaction:	#N/A	Mn Interaction:	#DIV/0!
Deflection (L/x):	L/759	Deflection (L/x):	#DIV/0!	Deflection (L/x):	#DIV/0!
Deflection:	.29 in	Deflection:	#DIV/0!	Deflection:	#DIV/0!
SECTION :	**W14X22**	**SECTION:**	**#N/A**	**SECTION:**	**0x0 - Choose**

MOMENT DIAGRAM



SIMPLE SPAN - 5% BEAM EVALUATION

Beam (2) - Existing W14x22

structural DESIGN STUDIO

ANALYSIS FROM ORIGINAL CONDITION (paste from original analysis)

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	971	5407	0	6,378	**9,816**
RIGHT:	971	3577	0	4,549	**6,889**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	971	5407	0	6,378	**9,816**
MAX MOMENT:	4492	20985	0	25,446	**38,929**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	105	585	0	690	**1,061**
MOMENT:	105	491	0	595	**910**

Notes:

Original Design Load of 20 PSF (includes 5 psf for mechanical and original 35 psf design snow loads)

ANALYSIS FROM MODIFIED CONDITION (from active analysis)

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	971	6012	0	6,983	**10,785**
RIGHT:	971	3772	0	4,743	**7,201**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	971	6012	0	6,983	**10,785**
MAX MOMENT:	4492	22931	0	27,391	**42,042**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	105	650	0	755	**1,166**
MOMENT:	105	536	0	640	**983**

Notes:

Using current snow loads and full original design drift plus the equipment we are both within tolerance and within beam capacity

5% COMPARISSON FROM ORIGINAL

REACTIONS	DL	LL	EQ/W	SERVICE	DESIGN
LEFT:	100.0%	111.2%	#DIV/0!	109.5%	**109.9%**
RIGHT:	100.0%	105.4%	#DIV/0!	104.3%	**104.5%**
FORCES	DL	LL	EQ/W	SERVICE	**DESIGN**
MAX SHEAR:	100.0%	111.2%	#DIV/0!	109.5%	**109.9%**
MAX MOMENT:	100.0%	109.3%	#DIV/0!	107.6%	**108.0%**
EQUIV (PLF)	DL	LL	EQ/W	SERVICE	**DESIGN**
SHEAR:	100.0%	111.2%	#DIV/0!	109.5%	**109.9%**
MOMENT:	100.0%	109.3%	#DIV/0!	107.6%	**108.0%**

JOIST SIZE:	W14X22	ACTUAL	STATUS
LL Capcaity:	1,635.00	649.95	OK
TL Capacity:	1,635.00	754.95	OK

Regardless, the beam has adequate capacity to carry these additional loads