IDA STRUCTURAL ENGINEERS

Structural Calculations

COLLEGE OF MARIN
Indian Valley Campus
Building 11 - Renovation
Novato, California

IDA Project No. 17019.1
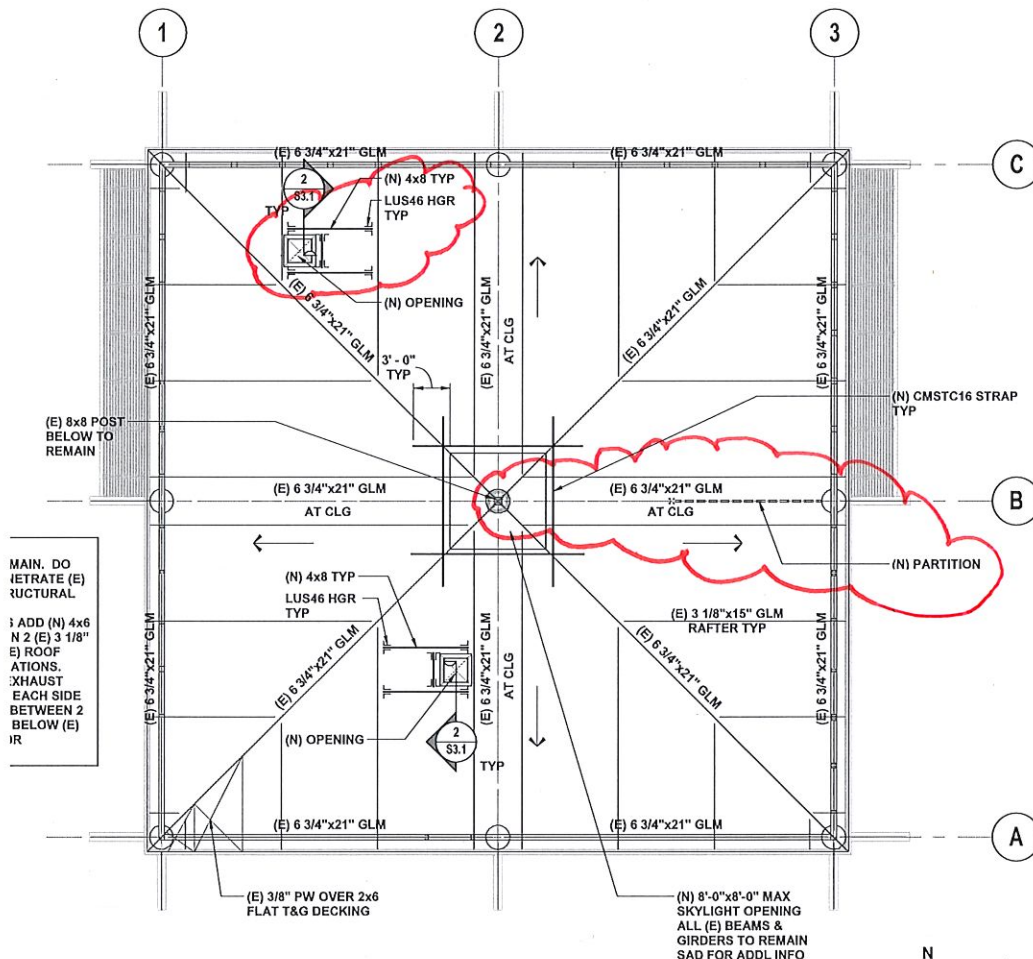
Registered Professional Engineer
Stephen R. DeJesse
No. S03527
Structural
State of California

Table of Contents

100% CD/Bid Submittal   **10 March 2017**

ROOF FRAMING PLAN

3
S2.1   1/8" = 1'-0"

(E) 6 3/4"x21" GLM

(N) 4x8 TYP

LUS46 HGR
TYP

2
S3.1
TYP

(N) OPENING

(E) 6 3/4"x21" GLM

(E) 6 3/4"x21" GLM

3' - 0"
TYP

(E) 8x8 POST
BELOW TO
REMAIN

(E) 6 3/4"x21" GLM
AT CLG

(N) CMSTC16 STRAP
TYP

(E) 6 3/4"x21" GLM
AT CLG

(N) PARTITION

(N) 4x8 TYP

LUS46 HGR
TYP

(E) 3 1/8"x15" GLM
RAFTER TYP

(N) OPENING

2
S3.1
TYP

(E) 6 3/4"x21" GLM

(E) 6 3/4"x21" GLM

(E) 3/8" PW OVER 2x6
FLAT T&G DECKING

(N) 8'-0"x8'-0" MAX
SKYLIGHT OPENING
ALL (E) BEAMS &
GIRDERS TO REMAIN
SAD FOR ADDL INFO

MAIN. DO
ETRATE (E)
RUCTURAL

S ADD (N) 4x6
N 2 (E) 3 1/8"
E) ROOF
ATIONS.
XHAUST
EACH SIDE
BETWEEN 2
BELOW (E)
R

1   2   3

A   B   C

N

(E) ceiling GLM BM w/ (N) Hanging Partition
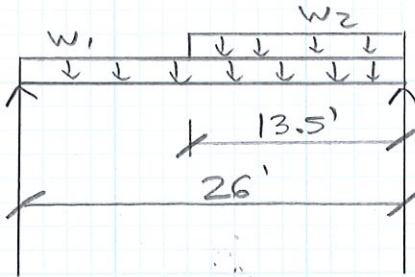
W_1 — existing ceiling load

$w_1 = (10 + 20 \, psf) \times 28' = 280 + 560 \, plf$

W_2 — new ceiling load

$w_2 = 7.3 \, psf \times 9' = 70 \, plf$

When folded: $P = 70 \, plf \times 13.5' = 945 \, lb$ @ midspan
(in lieu of w_2)

(E) GLM BM ($6\frac{3}{4}" \times 21"$) can support new partition
(see attached calculation

(N) Beam at Opening

Span = 8'-0"

Trib. width = 2'-0"

$w = (50 + 20 \, psf) \times 2' = 100 + 40 \, plf$

4x6 DF #1 Minimum

Title Block Line 1
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and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID:

Wood Beam

Licensee : IDA Structural Engineers, Inc.

Description :   (E) Ceiling GLM with (N) hanging partition

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
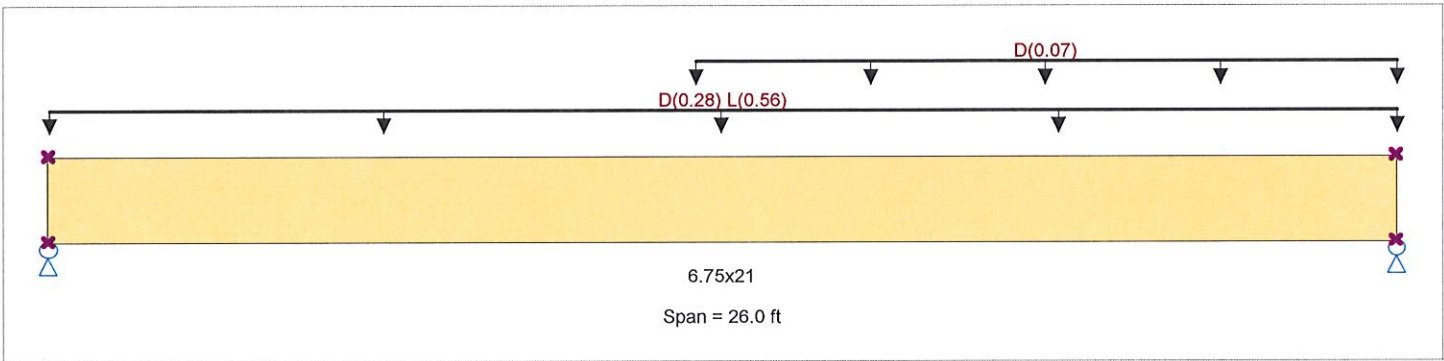Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination IBC 2015	Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Species : DF/DF	Fv	265.0 psi	Eminbend - yy	850.0 ksi
Wood Grade : 24F - V4	Ft	1,100.0 psi	Density	31.20 pcf
Beam Bracing : Completely Unbraced				

6.75x21

Span = 26.0 ft

Applied Loads

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

Beam self weight calculated and added to loads
  Uniform Load : D = 0.280, L = 0.560 , Tributary Width = 1.0 ft
  Uniform Load : D = 0.070 k/ft, Extent = 12.50 -->> 26.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.859 : 1	Maximum Shear Stress Ratio	=	0.416 : 1
Section used for this span		6.75x21	Section used for this span		6.75x21
fb : Actual	=	1,857.08 psi	fv : Actual	=	110.18 psi
FB : Allowable	=	2,161.08 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	13.190 ft	Location of maximum on span	=	24.292 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
  Max Downward Transient Deflection   0.618 in Ratio =   505 >=360
  Max Upward Transient Deflection   0.000 in Ratio =   0 <360
  Max Downward Total Deflection   1.001 in Ratio =   311 >=180
  Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.367	0.181	0.90	0.900	1.00	1.00	1.00	1.00	0.98	29.49	713.38	1944.97	4.09	43.27	238.50
+D+L+H					0.900	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.859	0.416	1.00	0.900	1.00	1.00	1.00	1.00	0.98	76.78	1,857.08	2161.08	10.41	110.18	265.00
+D+Lr+H					0.900	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.264	0.131	1.25	0.900	1.00	1.00	1.00	1.00	0.97	29.49	713.38	2701.35	4.09	43.27	331.25
+D+S+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.287	0.142	1.15	0.900	1.00	1.00	1.00	1.00	0.97	29.49	713.38	2485.24	4.09	43.27	304.75
+D+0.750Lr+0.750L+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.582	0.282	1.25	0.900	1.00	1.00	1.00	1.00	0.97	64.95	1,571.05	2701.35	8.83	93.45	331.25

Title Block Line 1
You can change this area
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and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID:

Printed: 10 MAR 2017, 10:29AM

Wood Beam

File = H:\2017JO~1\17019~1.1CO\Calcs\170191~1.EC6
ENERCALC, INC. 1983-2016, Build:6.16.6.7, Ver:6.16.6.7

Lic. # : KW-06001846

Licensee : IDA Structural Engineers, Inc.

Description : (E) Ceiling GLM with (N) hanging partition

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.632	0.307	1.15	0.900	1.00	1.00	1.00	1.00	0.97	64.95	1,571.05	2485.24	8.83	93.45	304.75
+D+0.60W+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.206	0.102	1.60	0.900	1.00	1.00	1.00	1.00	0.95	29.49	713.38	3457.73	4.09	43.27	424.00
+D+0.70E+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.206	0.102	1.60	0.900	1.00	1.00	1.00	1.00	0.95	29.49	713.38	3457.73	4.09	43.27	424.00
+D+0.750Lr+0.750L+0.450W+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.454	0.220	1.60	0.900	1.00	1.00	1.00	1.00	0.95	64.95	1,571.05	3457.73	8.83	93.45	424.00
+D+0.750L+0.750S+0.450W+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.454	0.220	1.60	0.900	1.00	1.00	1.00	1.00	0.95	64.95	1,571.05	3457.73	8.83	93.45	424.00
+D+0.750L+0.750S+0.5250E+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.454	0.220	1.60	0.900	1.00	1.00	1.00	1.00	0.95	64.95	1,571.05	3457.73	8.83	93.45	424.00
+0.60D+0.60W+0.60H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.124	0.061	1.60	0.900	1.00	1.00	1.00	1.00	0.95	17.70	428.03	3457.73	2.45	25.96	424.00
+0.60D+0.70E+0.60H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.124	0.061	1.60	0.900	1.00	1.00	1.00	1.00	0.95	17.70	428.03	3457.73	2.45	25.96	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	1.0013	13.095		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	11.565	12.019
Overall MINimum	2.571	2.843
+D+H	4.285	4.739
+D+L+H	11.565	12.019
+D+Lr+H	4.285	4.739
+D+S+H	4.285	4.739
+D+0.750Lr+0.750L+H	9.745	10.199
+D+0.750L+0.750S+H	9.745	10.199
+D+0.60W+H	4.285	4.739
+D+0.70E+H	4.285	4.739
+D+0.750Lr+0.750L+0.450W+H	9.745	10.199
+D+0.750L+0.750S+0.450W+H	9.745	10.199
+D+0.750L+0.750S+0.5250E+H	9.745	10.199
+0.60D+0.60W+0.60H	2.571	2.843
+0.60D+0.70E+0.60H	2.571	2.843
D Only	4.285	4.739
Lr Only		
L Only	7.280	7.280
S Only		
W Only		
E Only		
H Only		

Project Title:
Engineer:
Project Descr:

Project ID:

Wood Beam

Licensee : IDA Structural Engineers, Inc.

Description :   (E) Ceiling GLM with (N) hanging partition - folded

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2015

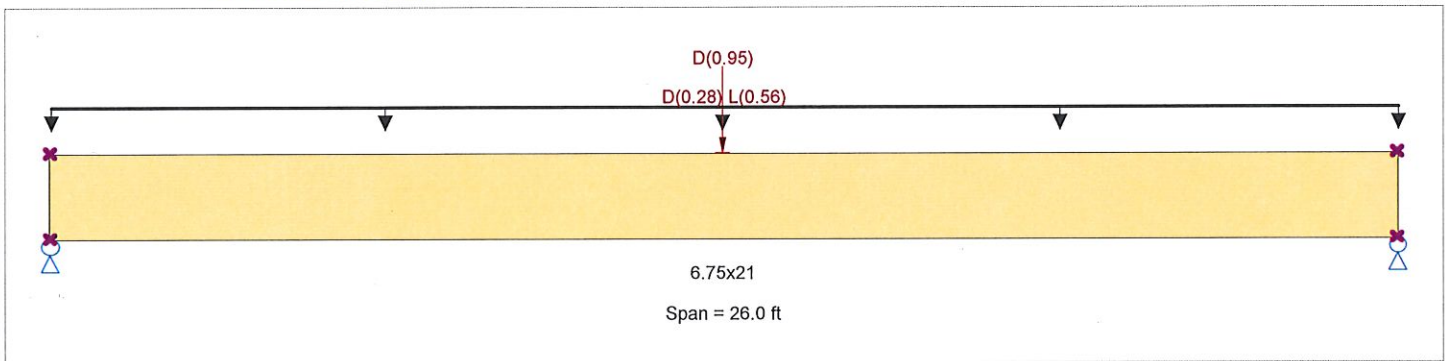### Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2015

Wood Species   : DF/DF
Wood Grade   : 24F - V4

Beam Bracing   : Completely Unbraced

F_b - Tension	2,400.0 psi	E : Modulus of Elasticity	
F_b - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
F_c - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
F_c - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
F_v	265.0 psi	Eminbend - yy	850.0 ksi
F_t	1,100.0 psi	Density	31.20 pcf

D(0.95)
D(0.28) L(0.56)

6.75x21

Span = 26.0 ft

Applied Loads

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

Beam self weight calculated and added to loads
   Uniform Load : D = 0.280, L = 0.560 , Tributary Width = 1.0 ft
   Point Load : D = 0.950 k @ 13.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.893** 1	Maximum Shear Stress Ratio	=	**0.412** : 1
Section used for this span		**6.75x21**	Section used for this span		**6.75x21**
fb : Actual	=	1,928.95 psi	fv : Actual	=	109.07 psi
FB : Allowable	=	2,161.08 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	13.000 ft	Location of maximum on span	=	24.292 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.618 in	Ratio =	505	>=360
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360
Max Downward Total Deflection	1.025 in	Ratio =	304	>=180
Max Upward Total Deflection	0.000 in	Ratio =	0	<180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.403	0.177	0.90	0.900	1.00	1.00	1.00	1.00	0.98	32.43	784.40	1944.97	3.98	42.15	238.50
+D+L+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.893	0.412	1.00	0.900	1.00	1.00	1.00	1.00	0.98	79.75	1,928.95	2161.08	10.31	109.07	265.00
+D+Lr+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.290	0.127	1.25	0.900	1.00	1.00	1.00	1.00	0.97	32.43	784.40	2701.35	3.98	42.15	331.25
+D+S+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.316	0.138	1.15	0.900	1.00	1.00	1.00	1.00	0.97	32.43	784.40	2485.24	3.98	42.15	304.75
+D+0.750Lr+0.750L+H													0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.608	0.279	1.25	0.900	1.00	1.00	1.00	1.00	0.97	67.92	1,642.82	2701.35	8.73	92.34	331.25

Title Block Line 1
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Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

C6
Project ID:

Wood Beam

Licensee : IDA Structural Engineers, Inc.

Description :   (E) Ceiling GLM with (N) hanging partition - folded

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.661	0.303	1.15	0.900	1.00	1.00	1.00	1.00	0.97	67.92	1,642.82	2485.24	8.73	92.34	304.75
+D+0.60W+H					0.900	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.227	0.099	1.60	0.900	1.00	1.00	1.00	1.00	0.95	32.43	784.40	3457.73	3.98	42.15	424.00
+D+0.70E+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.227	0.099	1.60	0.900	1.00	1.00	1.00	1.00	0.95	32.43	784.40	3457.73	3.98	42.15	424.00
+D+0.750Lr+0.750L+0.450W+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.475	0.218	1.60	0.900	1.00	1.00	1.00	1.00	0.95	67.92	1,642.82	3457.73	8.73	92.34	424.00
+D+0.750L+0.750S+0.450W+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.475	0.218	1.60	0.900	1.00	1.00	1.00	1.00	0.95	67.92	1,642.82	3457.73	8.73	92.34	424.00
+D+0.750L+0.750S+0.5250E+H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.475	0.218	1.60	0.900	1.00	1.00	1.00	1.00	0.95	67.92	1,642.82	3457.73	8.73	92.34	424.00
+0.60D+0.60W+0.60H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.136	0.060	1.60	0.900	1.00	1.00	1.00	1.00	0.95	19.46	470.64	3457.73	2.39	25.29	424.00
+0.60D+0.70E+0.60H					0.900	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 26.0 ft	1	0.136	0.060	1.60	0.900	1.00	1.00	1.00	1.00	0.95	19.46	470.64	3457.73	2.39	25.29	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	1.0248	13.095		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	11.794	11.794
Overall MINimum	2.709	2.709
+D+H	4.514	4.514
+D+L+H	11.794	11.794
+D+Lr+H	4.514	4.514
+D+S+H	4.514	4.514
+D+0.750Lr+0.750L+H	9.974	9.974
+D+0.750L+0.750S+H	9.974	9.974
+D+0.60W+H	4.514	4.514
+D+0.70E+H	4.514	4.514
+D+0.750Lr+0.750L+0.450W+H	9.974	9.974
+D+0.750L+0.750S+0.450W+H	9.974	9.974
+D+0.750L+0.750S+0.5250E+H	9.974	9.974
+0.60D+0.60W+0.60H	2.709	2.709
+0.60D+0.70E+0.60H	2.709	2.709
D Only	4.514	4.514
Lr Only		
L Only	7.280	7.280
S Only		
W Only		
E Only		
H Only		

Panelfold, Inc.

PHYSICAL/CHEMICAL PROPERTIES

Test reports are available to qualified design professionals upon request.

FIRE PERFORMANCE

Fire Performance varies depending on surface finish material. Consult manufacturer.

SOUND PERFORMANCE

- Sonicwal - STC 38 – 50 with sound absorption to NRC 0.70
- Scale/8 and Scale/12 - STC 25 – 30
- Fabricwal - STC 39 and 40

5. Installation

PREPARATORY WORK

Handle and store product according to Panelfold recommendations.

Deliver materials to jobsite and protect unsealed materials from abrasion. Identify each container with material name and identification number. Store materials under cover, protected from weather and construction activities.

Before installation, inspect the door opening. Surfaces must be clean and dry, concrete surfaces must be free of excess mortar and lumps, and wood surfaces must be well nailed and/or glued, nail heads driven flush and wood free of voids. Metal surfaces must be free of grease, oil, dirt, rust, corrosion and welding slag without sharp edges. Verify that rough opening is correct and has been prepared in conformance with ASTM E557.

METHODS

Complete installation recommendations are available from the manufacturer.

Apply perimeter caulking and trim as required. Adjust locking hardware for accurate fit. Clean all wood, vinyl, wall carpet, panel fabric and plastic laminate surfaces to remove soil without using abrasive cleaners or solutions containing corrosive solvents. After all adjustments, lubrication and cleanup, the installer should verify proper operation and function and communicate maintenance procedures for the walls to the owner.

PRECAUTIONS

Conform with all applicable jobsite safety recommendations and procedures.

BUILDING CODES

Current data on building code requirements and product compliance may be obtained from Panelfold technical support specialists. Installation must comply with the requirements of all applicable local, state and national code jurisdictions.

TABLE 1 SONICWAL PRODUCT SELECTION

	Sonicwal/1212		Sonicwal/88		Sonicwal/66		
Sound Transmission Classification (STC)	50	45	44	42	44	42	38
Hanging Weight, psf (kg/m²)	7.3 (36)	6.7 (33)	7.3 (36)	6.7 (33)	7.3 (36)	6.7 (33)	5.5 (27)
Height (max), ft-in (m)	18-1 (6)	18-1 (6)	18-1 (6)	18-1 (6)	18-1 (6)	18-1 (6)	18-1 (6)
NRC 0.70 Option	N/A	N/A	–	Yes	–	Yes	–
Carved or Carpeted Panel Options	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Electrical Operation Option	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Interior Steel Hinge Support System Option	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Adjustable Sonicsweeps	Standard	Standard	Standard	Standard	Standard	Standard	Standard

6. Availability & Cost

AVAILABILITY

Panelfold products are manufactured in a modern 140,000 square foot plant in Miami, Florida, USA, and sold by local installing distributors in major cities. See local telephone Yellow Pages under Doors or Partitions or contact manufacturer for the nearest distributor. With a network of licensed manufacturers and distributors in more than 54 countries, Panelfold is represented worldwide. All current sales outlets are listed on Panelfold's website.

COST

Budget installed cost information may be obtained from a local Panelfold distributor or through the manufacturer at the above telephone number.

7. Warranty

Panelfold warrants each new Panelfold folding door, folding partition, operable wall, relocatable wall and accessory to be free from defects in material and workmanship under normal use and service. Panelfold assumes no obligation to correct defects caused by improper installation or unreasonable use, including physical abuse or lack of maintenance. Panelfold's obligations under this warranty are limited to the repair, free of charge, of any defective part which within 1 year of shipment from Panelfold is returned prepaid to the factory. Obtain further information from the manufacturer.

8. Maintenance

These walls are designed to require little maintenance. Operate according to manufacturer recommendations. Clean and lubricate track once per year. Surfacing material maintenance requirements vary. Vinyls should be cleaned with a damp cloth and mild household cleaner.

9. Technical Services

A staff of factory trained service personnel offers design assistance and technical support. For technical assistance, contact Panelfold, Inc., or a local distributor.

10. Filing Systems

- First Source for Products
- MANU-SPEC®
- Sweet's Catalog Files
- Additional product information is available from the manufacturer upon request.

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

C8

Project ID:

Wood Beam

Lic. # : KW-06001846   Licensee : IDA Structural Engineers, Inc.

Description :   New Beam at Opening

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
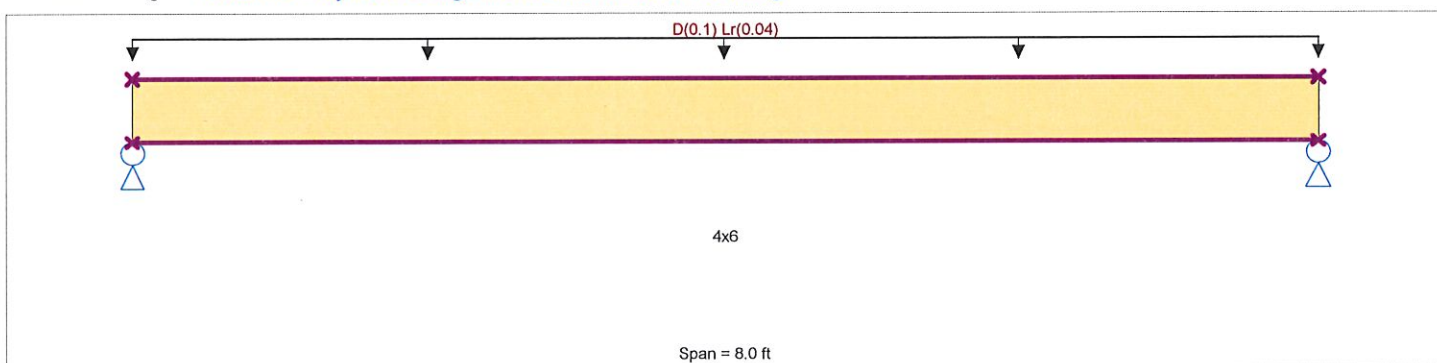Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension	1,000.0 psi	E : Modulus of Elasticity
Load Combination IBC 2015	F_b - Compr	1,000.0 psi	Ebend- xx 1,700.0 ksi
	F_c - Prll	1,500.0 psi	Eminbend - xx 620.0 ksi
	F_c - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	F_v	180.0 psi	
Wood Grade : No.1	F_t	675.0 psi	Density 31.20 pcf

Beam Bracing   :   Beam is Fully Braced against lateral-torsional buckling

D(0.1) Lr(0.04)

4x6

Span = 8.0 ft

Applied Loads

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

Beam self weight calculated and added to loads
   Uniform Load : D = 0.10, Lr = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.484 : 1	Maximum Shear Stress Ratio	=	0.178 : 1
Section used for this span		4x6	Section used for this span		4x6
f_b : Actual	=	566.73 psi	f_v : Actual	=	28.91 psi
FB : Allowable	=	1,170.00 psi	Fv : Allowable	=	162.00 psi
Load Combination		+D+H	Load Combination		+D+H
Location of maximum on span	=	4.000 ft	Location of maximum on span	=	7.562 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.045 in	Ratio =	2135	>=360
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360
Max Downward Total Deflection	0.162 in	Ratio =	592	>=180
Max Upward Total Deflection	0.000 in	Ratio =	0	<180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.484	0.178	0.90	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	1170.00	0.37	28.91	162.00
+D+L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.436	0.161	1.00	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	1300.00	0.37	28.91	180.00
+D+Lr+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	225.00
Length = 8.0 ft	1	0.483	0.178	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.15	784.34	1625.00	0.51	40.02	225.00
+D+S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.379	0.140	1.15	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	1495.00	0.37	28.91	207.00
+D+0.750Lr+0.750L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	225.00
Length = 8.0 ft	1	0.449	0.166	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.07	729.94	1625.00	0.48	37.24	225.00
+D+0.750L+0.750S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

Description :   New Beam at Opening

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
Length = 8.0 ft	1	0.379	0.140	1.15	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	1495.00	0.37	28.91	207.00
+D+0.60W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.272	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	2080.00	0.37	28.91	288.00
+D+0.70E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.272	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	2080.00	0.37	28.91	288.00
+D+0.750Lr+0.750L+0.450W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.351	0.129	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.07	729.94	2080.00	0.48	37.24	288.00
+D+0.750L+0.750S+0.450W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.272	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	2080.00	0.37	28.91	288.00
+D+0.750L+0.750S+0.5250E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.272	0.100	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.83	566.73	2080.00	0.37	28.91	288.00
+0.60D+0.60W+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.163	0.060	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.50	340.04	2080.00	0.22	17.35	288.00
+0.60D+0.70E+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.163	0.060	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.50	340.04	2080.00	0.22	17.35	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.1620	4.029		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.577	0.577
Overall MINimum	0.160	0.160
+D+H	0.417	0.417
+D+L+H	0.417	0.417
+D+Lr+H	0.577	0.577
+D+S+H	0.417	0.417
+D+0.750Lr+0.750L+H	0.537	0.537
+D+0.750L+0.750S+H	0.417	0.417
+D+0.60W+H	0.417	0.417
+D+0.70E+H	0.417	0.417
+D+0.750Lr+0.750L+0.450W+H	0.537	0.537
+D+0.750L+0.750S+0.450W+H	0.417	0.417
+D+0.750L+0.750S+0.5250E+H	0.417	0.417
+0.60D+0.60W+0.60H	0.250	0.250
+0.60D+0.70E+0.60H	0.250	0.250
D Only	0.417	0.417
Lr Only	0.160	0.160
L Only		
S Only		
W Only		
E Only		
H Only		

MAT SLAB @ GENERATOR

GENERATOR WEIGHT = 32,000 LBS
FUEL WEIGHT =   5,000 LBS
              TOTAL = 37,000 LBS

MAT SLAB SIZE : 35'-6" x 17'-10"

TRY 18" DEEP MAT

Seismic lateral load :

$$F_P = \frac{0.4\, a_P\, S_{DS}\, W_P}{R_P / I_P} \left(1 + 2\,\frac{z}{h}\right)$$

$$F_P = \frac{0.4 \times 1 \times 1 \times W}{2.5 / 1.5} \left(1 + 2 \times 0\right) = 0.24\, W$$

$$F_{P,min} = 0.35 \times 1 \times 1.5 \; W = 0.53\, W \;\; —governs$$

$F_P = 0.53 \times 37k = 19.6\,k$ assume 3 ft above mat

$M_{EQ} = 3' \times 19.6\,k = 60\; k\text{-}ft$

18" MAT SLAB w/ #6 @ 12" OC EACH WAY T&B

(see attached)

Please see below and let me know if you need any further info:

- For a basic weather house enclosure, weight would be approximately 25,500 lbs. OR
- For a Sound Enclosed package, weight would be 32,000 lbs

Plus if we were to have a belly tank sized at 660gallons, the fuel weight would be 4,750 lbs(7.2 lbs/gal).

-Harj

Harj Sidhu, PE
Senior Associate

PAE
415.544.7707 d
Portland | San Francisco | Seattle
pae-engineers.com

C12

≋USGS   Design Maps Summary Report

User–Specified Input

Report Title   College of Marin IVC Bldg 11
Tue February 28, 2017 17:07:09 UTC

Building Code Reference Document   2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates   37.95445°N, 122.54841°W
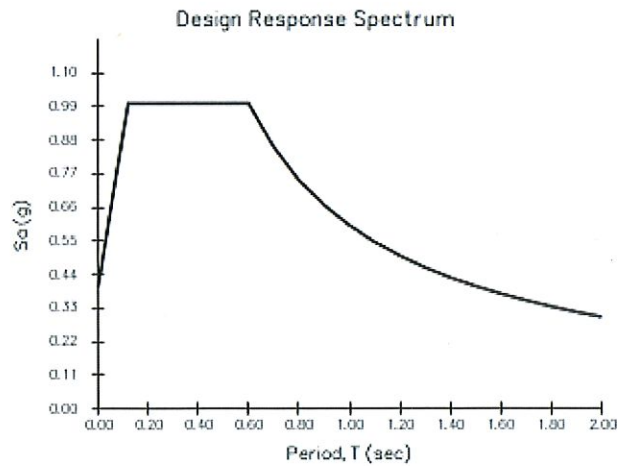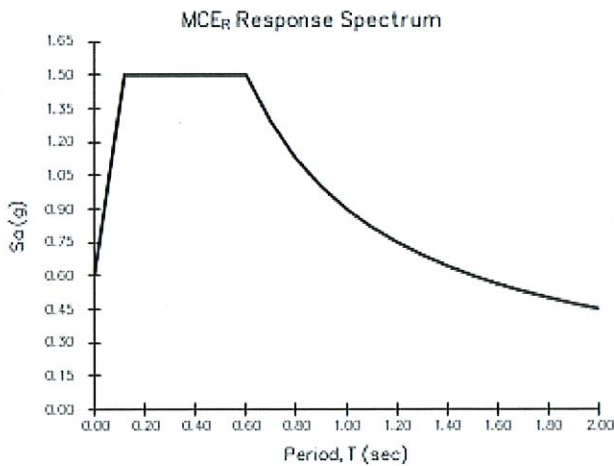
Site Soil Classification   Site Class D – "Stiff Soil"

Risk Category   I/II/III

USGS–Provided Output

S_S = 1.500 g	S_{MS} = 1.500 g	S_{DS} = 1.000 g
S_1 = 0.601 g	S_{M1} = 0.901 g	S_{D1} = 0.601 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

Title Block Line 1
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Title Block Line 6

Project Title:
Engineer:
Project Descr:

C13
Project ID:

General Footing

Printed: 28 FEB 2017, 4:15PM

Description : **Mat at Generator**

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Material Properties				**Soil Design Values**		
f'c : Concrete 28 day strength	=	3.0 ksi		Allowable Soil Bearing	=	1.50 ksf
fy : Rebar Yield	=	60.0 ksi		Increase Bearing By Footing Weight	=	Yes
Ec : Concrete Elastic Modulus	=	3,122.0 ksi		Soil Passive Resistance (for Sliding)	=	100.0 pcf
Concrete Density	=	145.0 pcf		Soil/Concrete Friction Coeff.	=	0.30
φ Values Flexure	=	0.90				
Shear	=	0.750		**Increases based on footing Depth**		

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.0 : 1	
Min. Sliding Safety Factor	=	1.0 : 1	
Add Ftg Wt for Soil Pressure	:	Yes	
Use ftg wt for stability, moments & shears	:	Yes	
Add Pedestal Wt for Soil Pressure	:	No	
Use Pedestal wt for stability, mom & shear	:	No	

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension
Allowable pressure increase per foot of depth

when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	26.0 ft
Length parallel to Z-Z Axis	=	8.50 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in
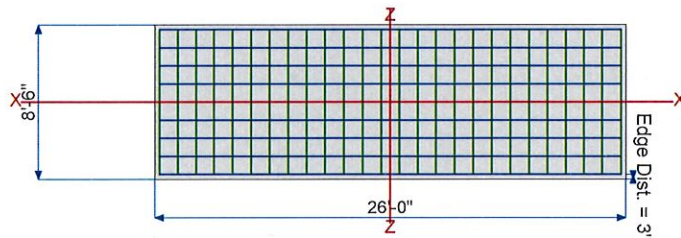
Reinforcing

Bars parallel to X-X Axis

Number of Bars	=	9.0
Reinforcing Bar Size	=	# 6

Bars parallel to Z-Z Axis

Number of Bars	=	26.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation		ıg Z-Z Axis
# Bars required within zone		49.3 %
# Bars required on each side of zone		50.7 %

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	37.0							k
OB : Overburden	=								ksf
M-xx	=						60.0		k-ft
M-zz	=						60.0		k-ft
V-x	=						19.60		k
V-z	=						19.60		k

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and then using the "Printing &
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Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

Lic. # : KW-06001846

Description : Mat at Generator

DESIGN SUMMARY

<div style="text-align:right">**Design OK**</div>

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3386	Soil Bearing	0.5815 ksf	1.718 ksf	+D+0.70E+H about X-X axis
PASS	3.466	Overturning - X-X	62.580 k-ft	216.922 k-ft	+0.60D+0.70E+0.60H
PASS	10.603	Overturning - Z-Z	62.580 k-ft	663.53 k-ft	+0.60D+0.70E+0.60H
PASS	1.116	Sliding - X-X	13.720 k	15.312 k	+0.60D+0.70E+0.60H
PASS	1.116	Sliding - Z-Z	13.720 k	15.312 k	+0.60D+0.70E+0.60H
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.7292	Z Flexure (+X)	22.234 k-ft	30.490 k-ft	+1.20D+0.50L+0.70S+E+1.60H
PASS	0.7292	Z Flexure (-X)	22.234 k-ft	30.490 k-ft	+1.20D+0.50L+0.70S-E+1.60H
PASS	0.1225	X Flexure (+Z)	3.533 k-ft	28.846 k-ft	+1.20D+0.50L+0.70S+E+1.60H
PASS	0.1225	X Flexure (-Z)	3.533 k-ft	28.846 k-ft	+1.20D+0.50L+0.70S-E+1.60H
PASS	0.1996	1-way Shear (+X)	16.396 psi	82.158 psi	+1.20D+0.50L+0.70S+E+1.60H
PASS	0.1996	1-way Shear (-X)	16.396 psi	82.158 psi	+1.20D+0.50L+0.70S-E+1.60H
PASS	0.07775	1-way Shear (+Z)	6.388 psi	82.158 psi	+1.20D+0.50L+0.70S+E+1.60H
PASS	0.07775	1-way Shear (-Z)	6.388 psi	82.158 psi	+1.20D+0.50L+0.70S-E+1.60H
PASS	0.3487	2-way Punching	57.30 psi	164.317 psi	+1.40D+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+L+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+Lr+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+S+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.60W+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.70E+H	1.718	n/a	8.828	0.1884	0.5815	n/a	n/a	0.339
X-X, +D+0.750Lr+0.750L+0.450W+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.750L+0.750S+0.450W+H	1.718	n/a	0.0	0.3849	0.3849	n/a	n/a	0.224
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	6.621	0.2375	0.5323	n/a	n/a	0.310
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.2310	0.2310	n/a	n/a	0.135
X-X, +0.60D+0.70E+0.60H	1.718	n/a	14.713	0.03440	0.4275	n/a	n/a	0.249
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.70E+H	1.718	8.828	n/a	n/a	n/a	0.3207	0.4492	0.262
Z-Z, +D+0.750Lr+0.750L+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.750L+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.3849	0.3849	0.224
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	6.621	n/a	n/a	n/a	0.3367	0.4331	0.252
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.2310	0.2310	0.135
Z-Z, +0.60D+0.70E+0.60H	1.718	14.713	n/a	n/a	n/a	0.1667	0.2952	0.172

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	None	0.0 k-ft	Infinity	OK
X-X, +D+L+H	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr+H	None	0.0 k-ft	Infinity	OK
X-X, +D+S+H	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750L+0.750S+H	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W+H	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E+H	62.580 k-ft	361.537 k-ft	5.777	OK
X-X, +D+0.750Lr+0.750L+0.450W+H	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750L+0.750S+0.450W+H	None	0.0 k-ft	Infinity	OK

General Footing

Lic. # : KW-06001846　　　　　　　　　　　　**Licensee : IDA Structural Engineers, Inc.**

Description :　　Mat at Generator

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+0.750L+0.750S+0.5250E+H	46.935 k-ft	361.537 k-ft	7.703	OK
X-X, +0.60D+0.60W+0.60H	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E+0.60H	62.580 k-ft	216.922 k-ft	3.466	OK
Z-Z, +D+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+S+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.750S+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E+H	62.580 k-ft	1,105.88 k-ft	17.671	OK
Z-Z, +D+0.750Lr+0.750L+0.450W+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.750S+0.450W+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.750S+0.5250E+H	46.935 k-ft	1,105.88 k-ft	23.562	OK
Z-Z, +0.60D+0.60W+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E+0.60H	62.580 k-ft	663.53 k-ft	10.603	OK

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
X-X, +D+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+L+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+Lr+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+S+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.750Lr+0.750L+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.750L+0.750S+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.60W+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.70E+H	13.720 k	25.520 k	1.860	OK
X-X, +D+0.750Lr+0.750L+0.450W+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.750L+0.750S+0.450W+H	0.0 k	25.520 k	No Sliding	OK
X-X, +D+0.750L+0.750S+0.5250E+H	10.290 k	25.520 k	2.480	OK
X-X, +0.60D+0.60W+0.60H	0.0 k	15.312 k	No Sliding	OK
X-X, +0.60D+0.70E+0.60H	13.720 k	15.312 k	1.116	OK
Z-Z, +D+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+L+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+Lr+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+S+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+0.750Lr+0.750L+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+0.750L+0.750S+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+0.750L+0.750S+0.450W+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+0.750L+0.750S+0.5250E+H	10.290 k	25.520 k	2.480	OK
Z-Z, +0.60D+0.60W+0.60H	0.0 k	15.312 k	No Sliding	OK
Z-Z, +0.60D+0.70E+0.60H	13.720 k	15.312 k	1.116	OK
Z-Z, +D+0.60W+H	0.0 k	25.520 k	No Sliding	OK
Z-Z, +D+0.70E+H	13.720 k	25.520 k	1.860	OK
Z-Z, +D+0.750Lr+0.750L+0.450W+H	0.0 k	25.520 k	No Sliding	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	2.117	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.40D+1.60H	2.117	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

Lic. # : KW-06001846   Licensee : IDA Structural Engineers, Inc.

Description : **Mat at Generator**

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S+0.50W+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	1.814	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	1.814	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	3.533	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	0.09567	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.70S-E+1.60H	0.09567	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +1.20D+0.50L+0.70S-E+1.60H	3.533	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D+W+0.90H	1.361	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D+W+0.90H	1.361	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D+E+0.90H	3.080	+Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D+E+0.90H	0.3579	-Z	Top	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D-E+0.90H	0.3579	+Z	Top	0.3888	Min Temp %	0.440	28.846	OK
X-X, +0.90D-E+0.90H	3.080	-Z	Bottom	0.3888	Min Temp %	0.440	28.846	OK
Z-Z, +1.40D+1.60H	19.806	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.40D+1.60H	19.806	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	16.976	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	16.976	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	11.719	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	22.234	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.70S-E+1.60H	22.234	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +1.20D+0.50L+0.70S-E+1.60H	11.719	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D+W+0.90H	12.732	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D+W+0.90H	12.732	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D+E+0.90H	7.475	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D+E+0.90H	17.990	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D-E+0.90H	17.990	-X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK
Z-Z, +0.90D-E+0.90H	7.475	+X	Bottom	0.3888	Min Temp %	0.4659	30.490	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	15.235 psi	15.235 psi	3.874 psi	3.874 psi	15.235 psi	82.158 psi	0.1854	OK
+1.20D+0.50Lr+1.60L+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+1.60L+0.50S+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+1.60Lr+0.50L+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+1.60Lr+0.50W+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+0.50L+1.60S+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+1.60S+0.50W+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+0.50Lr+0.50L+W+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+0.50L+0.50S+W+1.60H	13.059 psi	13.059 psi	3.321 psi	3.321 psi	13.059 psi	82.158 psi	0.1589	OK
+1.20D+0.50L+0.70S+E+1.60H	9.721 psi	16.396 psi	0.2529 psi	6.388 psi	16.396 psi	82.158 psi	0.1996	OK
+1.20D+0.50L+0.70S-E+1.60H	16.396 psi	9.721 psi	6.388 psi	0.2529 psi	16.396 psi	82.158 psi	0.1996	OK
+0.90D+W+0.90H	9.794 psi	9.794 psi	2.49 psi	2.49 psi	9.794 psi	82.158 psi	0.1192	OK
+0.90D+E+0.90H	6.457 psi	13.131 psi	0.5773 psi	5.558 psi	13.131 psi	82.158 psi	0.1598	OK
+0.90D-E+0.90H	13.131 psi	6.457 psi	5.558 psi	0.5773 psi	13.131 psi	82.158 psi	0.1598	OK

Title Block Line 1
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Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

General Footing

Description :   Mat at Generator

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	57.3 psi	164.317 psi	0.3487	OK
+1.20D+0.50Lr+1.60L+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+1.60L+0.50S+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+1.60Lr+0.50L+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+1.60Lr+0.50W+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+0.50L+1.60S+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+1.60S+0.50W+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+0.50Lr+0.50L+W+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+0.50L+0.50S+W+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+0.50L+0.70S+E+1.60H	49.114 psi	164.317 psi	0.2989	OK
+1.20D+0.50L+0.70S-E+1.60H	49.114 psi	164.317 psi	0.2989	OK
+0.90D+W+0.90H	36.836 psi	164.317 psi	0.2242	OK
+0.90D+E+0.90H	36.836 psi	164.317 psi	0.2242	OK
+0.90D-E+0.90H	36.836 psi	164.317 psi	0.2242	OK

Table Notes

1. Five pounds per square foot (psf), 7.5 psf, and 10 psf loads have **not** been reduced for strength or deflection checks; full lateral load is applied.

2. Limiting heights are based on steel properties only (non-composite) without the contribution of sheathing to strength and stiffness of the assembly. Properly fastened sheathing is still required for members to be considered fully braced.

3. Web crippling check based on 1" end bearing.

4. Studs are assumed to be adequately braced at maximum spacing of L_u to develop full allowable moment.

5. See page 5 for additional table notes.

Section	Fy (ksi)	L_u (in)	Spacing (in) oc	5 psf			7.5 psf			10 psf		
				L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
162S125-18	33	29.0	12	9' 0"	7' 8"	6' 8"	7' 4"	6' 8"	5' 10"	6' 4"	6' 1"	5' 4"
			16	7' 9"	6' 11"	6' 1"	6' 4"	6' 1"	5' 4"	5' 6"	5' 6"	4' 10"
			24	6' 4"	6' 1"	5' 4"	5' 2"	5' 2"	4' 8"	4' 6"	4' 6"	4' 3"
162S125-27	33	29.1	12	11' 3"	8' 11"	7' 10"	9' 8"	7' 10"	6' 10"	8' 4"	7' 1"	6' 3"
			16	10' 3"	8' 2"	7' 1"	8' 4"	7' 1"	6' 3"	7' 3"	6' 5"	5' 8"
			24	8' 4"	7' 1"	6' 3"	6' 10"	6' 3"	5' 5"	5' 11"	5' 8"	4' 11"
162S125-30	33	29.2	12	11' 8"	9' 3"	8' 1"	10' 2"	8' 1"	7' 1"	8' 11"	7' 4"	6' 5"
			16	10' 7"	8' 5"	7' 4"	8' 11"	7' 4"	6' 5"	7' 9"	6' 8"	5' 10"
			24	8' 11"	7' 4"	6' 5"	7' 3"	6' 5"	5' 7"	6' 4"	5' 10"	5' 1"
162S125-33	33	29.2	12	12' 0"	9' 6"	8' 4"	10' 6"	8' 4"	7' 3"	9' 6"	7' 7"	6' 7"
			16	10' 11"	8' 8"	7' 7"	9' 6"	7' 7"	6' 7"	8' 3"	6' 11"	6' 0"
			24	9' 6"	7' 7"	6' 7"	7' 10"	6' 7"	5' 9"	6' 9"	6' 0"	5' 3"
250S125-18	33	29.0	12	11' 8"	10' 6"	9' 2"	9' 7"	9' 2"	8' 1"	8' 3"	8' 3"	7' 4"
			16	10' 2"	9' 7"	8' 4"	8' 3"	8' 3"	7' 4"	7' 2"	7' 2"	6' 8"
			24	8' 3"	8' 3"	7' 4"	6' 9"	6' 9"	6' 5"	5' 10"e	5' 10"e	5' 10"e
250S125-27	33	28.9	12	15' 7"	12' 4"	10' 10"	12' 9"	10' 10"	9' 5"	11' 0"	9' 10"	8' 7"
			16	13' 6"	11' 3"	9' 10"	11' 0"	9' 10"	8' 7"	9' 7"	8' 11"	7' 10"
			24	11' 0"	9' 10"	8' 7"	9' 0"	8' 7"	7' 6"	7' 10"	7' 10"	6' 10"
250S125-30	33	28.9	12	16' 1"	12' 9"	11' 2"	13' 7"	11' 2"	9' 9"	11' 10"	10' 2"	8' 10"
			16	14' 5"	11' 7"	10' 2"	11' 10"	10' 2"	8' 10"	10' 3"	9' 2"	8' 1"
			24	11' 10"	10' 2"	8' 10"	9' 8"	8' 10"	7' 9"	8' 4"	8' 1"	7' 0"
250S125-33	33	28.9	12	16' 7"	13' 2"	11' 6"	14' 6"	11' 6"	10' 1"	12' 8"	10' 6"	9' 2"
			16	15' 1"	12' 0"	10' 6"	12' 8"	10' 6"	9' 2"	11' 0"	9' 6"	8' 4"
			24	12' 8"	10' 6"	9' 2"	10' 4"	9' 2"	8' 0"	8' 11"	8' 4"	7' 3"
250S125-43	33	28.9	12	18' 1"	14' 4"	12' 6"	15' 10"	12' 6"	10' 11"	14' 4"	11' 5"	9' 11"
			16	16' 5"	13' 0"	11' 5"	14' 4"	11' 5"	9' 11"	13' 0"	10' 4"	9' 0"
			24	14' 4"	11' 5"	9' 11"	12' 4"	9' 11"	8' 8"	10' 8"	9' 0"	7' 11"
350S125-18	33	28.8	12	13' 9"	13' 9"	12' 1"	11' 3"	11' 3"	10' 7"	9' 9"	9' 9"	9' 7"
			16	11' 11"	11' 11"	11' 0"	9' 9"	9' 9"	9' 7"	8' 5"e	8' 5"e	8' 5"e
			24	9' 9"	9' 9"	9' 7"	7' 11"e	7' 11"e	7' 11"e	6' 11"e	6' 11"e	6' 11"e
350S125-27	33	28.7	12	18' 6"	16' 1"	14' 0"	15' 1"	14' 0"	12' 3"	13' 1"	12' 9"	11' 1"
			16	16' 0"	14' 7"	12' 9"	13' 1"	12' 9"	11' 1"	11' 4"	11' 4"	10' 1"
			24	13' 1"	12' 9"	11' 1"	10' 8"	10' 8"	9' 9"	9' 3"	9' 3"	8' 10"
350S125-30	33	28.6	12	19' 11"	16' 7"	14' 6"	16' 3"	14' 6"	12' 8"	14' 1"	13' 2"	11' 6"
			16	17' 3"	15' 0"	13' 2"	14' 1"	13' 2"	11' 6"	12' 2"	11' 11"	10' 5"
			24	14' 1"	13' 2"	11' 6"	11' 6"	11' 6"	10' 0"	9' 11"	9' 11"	9' 1"
350S125-33	33	28.6	12	21' 5"	17' 1"	14' 11"	17' 6"	14' 11"	13' 1"	15' 2"	13' 7"	11' 10"
			16	18' 7"	15' 7"	13' 7"	15' 2"	13' 7"	11' 10"	13' 2"	12' 4"	10' 9"
			24	15' 2"	13' 7"	11' 10"	12' 5"	11' 10"	10' 4"	10' 9"	10' 9"	9' 5"
350S125-43	33	28.4	12	23' 6"	18' 8"	16' 3"	20' 6"	16' 3"	14' 3"	18' 5"	14' 10"	12' 11"
			16	21' 4"	16' 11"	14' 10"	18' 5"	14' 10"	12' 11"	16' 0"	13' 5"	11' 9"
			24	18' 5"	14' 10"	12' 11"	15' 1"	12' 11"	11' 4"	13' 0"	11' 9"	10' 3"
350S125-54	50	22.9	12	25' 1"	19' 11"	17' 5"	21' 11"	17' 5"	15' 2"	19' 11"	15' 10"	13' 10"
			16	22' 10"	18' 1"	15' 10"	19' 11"	15' 10"	13' 10"	18' 1"	14' 4"	12' 7"
			24	19' 11"	15' 10"	13' 10"	17' 5"	13' 10"	12' 1"	15' 10"	12' 7"	11' 0"
350S125-68	50	22.8	12	26' 10"	21' 4"	18' 7"	23' 5"	18' 7"	16' 3"	21' 4"	16' 11"	14' 9"
			16	24' 5"	19' 4"	16' 11"	21' 4"	16' 11"	14' 9"	19' 4"	15' 4"	13' 5"
			24	21' 4"	16' 11"	14' 9"	18' 7"	14' 9"	12' 11"	16' 11"	13' 5"	11' 9"
362S125-18	33	28.8	12	14' 0"	14' 0"	12' 6"	11' 6"	11' 6"	10' 11"	9' 11"e	9' 11"e	9' 11"e
			16	12' 2"	12' 2"	11' 4"	9' 11"e	9' 11"e	9' 11"e	8' 7"e	8' 7"e	8' 7"e
			24	9' 11"e	9' 11"e	9' 11"e	8' 1"e	8' 1"e	8' 1"e	7' 0"e	7' 0"e	7' 0"e
362S125-27	33	28.6	12	18' 10"	16' 6"	14' 5"	15' 5"	14' 5"	12' 7"	13' 4"	13' 1"	11' 5"
			16	16' 4"	15' 0"	13' 1"	13' 4"	13' 1"	11' 5"	11' 7"	11' 7"	10' 5"
			24	13' 4"	13' 1"	11' 5"	10' 11"	10' 11"	10' 0"	9' 5"	9' 5"	9' 1"
362S125-30	33	28.6	12	20' 3"	17' 0"	14' 10"	16' 7"	14' 10"	13' 0"	14' 4"	13' 6"	11' 10"
			16	17' 7"	15' 6"	13' 6"	14' 4"	13' 6"	11' 10"	12' 5"	12' 3"	10' 9"
			24	14' 4"	13' 6"	11' 10"	11' 8"	11' 8"	10' 4"	10' 2"	10' 2"	9' 4"
362S125-33	33	28.5	12	21' 11"	17' 7"	15' 4"	17' 10"	15' 4"	13' 5"	15' 6"	14' 0"	12' 2"
			16	18' 11"	16' 0"	14' 0"	15' 6"	14' 0"	12' 2"	13' 5"	12' 8"	11' 1"
			24	15' 6"	14' 0"	12' 2"	12' 8"	12' 2"	10' 8"	10' 11"	10' 11"	9' 8"
362S125-43	33	28.4	12	24' 2"	19' 2"	16' 9"	21' 1"	16' 9"	14' 8"	18' 10"	15' 3"	13' 4"
			16	21' 11"	17' 5"	15' 3"	18' 10"	15' 3"	13' 4"	16' 4"	13' 10"	12' 1"
			24	18' 10"	15' 3"	13' 4"	15' 4"	13' 4"	11' 7"	13' 4"	12' 1"	10' 7"

¹ Web height-to-thickness ratio exceeds 200. Web stiffeners are required at all support points and concentrated loads.

"e" web stiffeners required at ends.

Table Notes

1. Five pounds per square foot (psf), 7.5 psf, and 10 psf loads have **not** been reduced for strength or deflection checks; full lateral load is applied.

2. Limiting heights are based on steel properties only (non-composite) without the contribution of sheathing to strength and stiffness of the assembly. Properly fastened sheathing is still required for members to be considered fully braced.

3. Web crippling check based on 1" end bearing.

4. Studs are assumed to be adequately braced at maximum spacing of L_u to develop full allowable moment.

5. See page 5 for additional table notes.

Section	Fy (ksi)	L_u (in)	Spacing (in) oc	5 psf			7.5 psf			10 psf		
				L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
162S125-18	33	29.0	12	9' 0"	7' 8"	6' 8"	7' 4"	6' 8"	5' 10"	6' 4"	6' 1"	5' 4"
			16	7' 9"	6' 11"	6' 1"	6' 4"	6' 1"	5' 4"	5' 6"	5' 6"	4' 10"
			24	6' 4"	6' 1"	5' 4"	5' 2"	5' 2"	4' 8"	4' 6"	4' 6"	4' 3"
162S125-27	33	29.1	12	11' 3"	8' 11"	7' 10"	9' 8"	7' 10"	6' 10"	8' 4"	7' 1"	6' 3"
			16	10' 3"	8' 2"	7' 1"	8' 4"	7' 1"	6' 3"	7' 3"	6' 5"	5' 8"
			24	8' 4"	7' 1"	6' 3"	6' 10"	6' 3"	5' 5"	5' 11"	5' 8"	4' 11"
162S125-30	33	29.2	12	11' 8"	9' 3"	8' 1"	10' 2"	8' 1"	7' 1"	8' 11"	7' 4"	6' 5"
			16	10' 7"	8' 5"	7' 4"	8' 11"	7' 4"	6' 5"	7' 9"	6' 8"	5' 10"
			24	8' 11"	7' 4"	6' 5"	7' 3"	6' 5"	5' 7"	6' 4"	5' 10"	5' 1"
162S125-33	33	29.2	12	12' 0"	9' 6"	8' 4"	10' 6"	8' 4"	7' 3"	9' 6"	7' 7"	6' 7"
			16	10' 11"	8' 8"	7' 7"	9' 6"	7' 7"	6' 7"	8' 3"	6' 11"	6' 0"
			24	9' 6"	7' 7"	6' 7"	7' 10"	6' 7"	5' 9"	6' 9"	6' 0"	5' 3"
250S125-18	33	29.0	12	11' 8"	10' 6"	9' 2"	9' 7"	9' 2"	8' 1"	8' 3"	8' 3"	7' 4"
			16	10' 2"	9' 7"	8' 4"	8' 3"	8' 3"	7' 4"	7' 2"	7' 2"	6' 8"
			24	8' 3"	8' 3"	7' 4"	6' 9"	6' 9"	6' 5"	5' 10"e	5' 10"e	5' 10"e
250S125-27	33	28.9	12	15' 7"	12' 4"	10' 10"	12' 9"	10' 10"	9' 5"	11' 0"	9' 10"	8' 7"
			16	13' 6"	11' 3"	9' 10"	11' 0"	9' 10"	8' 7"	9' 7"	8' 11"	7' 10"
			24	11' 0"	9' 10"	8' 7"	9' 0"	8' 7"	7' 6"	7' 10"	7' 10"	6' 10"
250S125-30	33	28.9	12	16' 1"	12' 9"	11' 2"	13' 7"	11' 2"	9' 9"	11' 10"	10' 2"	8' 10"
			16	14' 5"	11' 7"	10' 2"	11' 10"	10' 2"	8' 10"	10' 3"	9' 2"	8' 1"
			24	11' 10"	10' 2"	8' 10"	9' 8"	8' 10"	7' 9"	8' 4"	8' 1"	7' 0"
250S125-33	33	28.9	12	16' 7"	13' 2"	11' 6"	14' 6"	11' 6"	10' 1"	12' 8"	10' 6"	9' 2"
			16	15' 1"	12' 0"	10' 6"	12' 8"	10' 6"	9' 2"	11' 0"	9' 6"	8' 4"
			24	12' 8"	10' 6"	9' 2"	10' 4"	9' 2"	8' 0"	8' 11"	8' 4"	7' 3"
250S125-43	33	28.9	12	18' 1"	14' 4"	12' 6"	15' 10"	12' 6"	10' 11"	14' 4"	11' 5"	9' 11"
			16	16' 5"	13' 0"	11' 5"	14' 4"	11' 5"	9' 11"	13' 0"	10' 4"	9' 0"
			24	14' 4"	11' 5"	9' 11"	12' 4"	9' 11"	8' 8"	10' 8"	9' 0"	7' 11"
350S125-18	33	28.8	12	13' 9"	13' 9"	12' 1"	11' 3"	11' 3"	10' 7"	9' 9"	9' 9"	9' 7"
			16	11' 11"	11' 11"	11' 0"	9' 9"	9' 9"	9' 7"	8' 5"e	8' 5"e	8' 5"e
			24	9' 9"	9' 9"	9' 7"	7' 11"e	7' 11"e	7' 11"e	6' 11"e	6' 11"e	6' 11"e
350S125-27	33	28.7	12	18' 6"	16' 1"	14' 0"	15' 1"	14' 0"	12' 3"	13' 1"	12' 9"	11' 1"
			16	16' 0"	14' 7"	12' 9"	13' 1"	12' 9"	11' 1"	11' 4"	11' 4"	10' 1"
			24	13' 1"	12' 9"	11' 1"	10' 8"	10' 8"	9' 9"	9' 3"	9' 3"	8' 10"
350S125-30	33	28.6	12	19' 11"	16' 7"	14' 6"	16' 3"	14' 6"	12' 8"	14' 1"	13' 2"	11' 6"
			16	17' 3"	15' 0"	13' 2"	14' 1"	13' 2"	11' 6"	12' 2"	11' 11"	10' 5"
			24	14' 1"	13' 2"	11' 6"	11' 6"	11' 6"	10' 0"	9' 11"	9' 11"	9' 1"
350S125-33	33	28.6	12	21' 5"	17' 1"	14' 11"	17' 6"	14' 11"	13' 1"	15' 2"	13' 7"	11' 10"
			16	18' 7"	15' 7"	13' 7"	15' 2"	13' 7"	11' 10"	13' 2"	12' 4"	10' 9"
			24	15' 2"	13' 7"	11' 10"	12' 5"	11' 10"	10' 4"	10' 9"	10' 9"	9' 5"
350S125-43	33	28.4	12	23' 6"	18' 8"	16' 3"	20' 6"	16' 3"	14' 3"	18' 5"	14' 10"	12' 11"
			16	21' 4"	16' 11"	14' 10"	18' 5"	14' 10"	12' 11"	16' 0"	13' 5"	11' 9"
			24	18' 5"	14' 10"	12' 11"	15' 1"	12' 11"	11' 4"	13' 0"	11' 9"	10' 3"
350S125-54	50	22.9	12	25' 1"	19' 11"	17' 5"	21' 11"	17' 5"	15' 2"	19' 11"	15' 10"	13' 10"
			16	22' 10"	18' 1"	15' 10"	19' 11"	15' 10"	13' 10"	18' 1"	14' 4"	12' 7"
			24	19' 11"	15' 10"	13' 10"	17' 5"	13' 10"	12' 1"	15' 10"	12' 7"	11' 0"
350S125-68	50	22.8	12	26' 10"	21' 4"	18' 7"	23' 5"	18' 7"	16' 3"	21' 4"	16' 11"	14' 9"
			16	24' 5"	19' 4"	16' 11"	21' 4"	16' 11"	14' 9"	19' 4"	15' 4"	13' 5"
			24	21' 4"	16' 11"	14' 9"	18' 7"	14' 9"	12' 11"	16' 11"	13' 5"	11' 9"
362S125-18	33	28.8	12	14' 0"	14' 0"	12' 6"	11' 6"	11' 6"	10' 11"	9' 11"e	9' 11"e	9' 11"e
			16	12' 2"	12' 2"	11' 4"	9' 11"e	9' 11"e	9' 11"e	8' 7"e	8' 7"e	8' 7"e
			24	9' 11"e	9' 11"e	9' 11"e	8' 1"e	8' 1"e	8' 1"e	7' 0"e	7' 0"e	7' 0"e
362S125-27	33	28.6	12	18' 10"	16' 6"	14' 5"	15' 5"	14' 5"	12' 7"	13' 4"	13' 1"	11' 5"
			16	16' 4"	15' 0"	13' 1"	13' 4"	13' 1"	11' 5"	11' 7"	11' 7"	10' 5"
			24	13' 4"	13' 1"	11' 5"	10' 11"	10' 11"	10' 0"	9' 5"	9' 5"	9' 1"
362S125-30	33	28.6	12	20' 3"	17' 0"	14' 10"	16' 7"	14' 10"	13' 0"	14' 4"	13' 6"	11' 10"
			16	17' 7"	15' 6"	13' 6"	14' 4"	13' 6"	11' 10"	12' 5"	12' 3"	10' 9"
			24	14' 4"	13' 6"	11' 10"	11' 8"	11' 8"	10' 4"	10' 2"	10' 2"	9' 4"
362S125-33	33	28.5	12	21' 11"	17' 7"	15' 4"	17' 10"	15' 4"	13' 5"	15' 6"	14' 0"	12' 2"
			16	18' 11"	16' 0"	14' 0"	15' 6"	14' 0"	12' 2"	13' 5"	12' 8"	11' 1"
			24	15' 6"	14' 0"	12' 2"	12' 8"	12' 2"	10' 8"	10' 11"	10' 11"	9' 8"
362S125-43	33	28.4	12	24' 2"	19' 2"	16' 9"	21' 1"	16' 9"	14' 8"	18' 10"	15' 3"	13' 4"
			16	21' 11"	17' 5"	15' 3"	18' 10"	15' 3"	13' 4"	16' 4"	13' 10"	12' 1"
			24	18' 10"	15' 3"	13' 4"	15' 4"	13' 4"	11' 7"	13' 4"	12' 1"	10' 7"

¹ Web height-to-thickness ratio exceeds 200. Web stiffeners are required at all support points and concentrated loads.

"e" web stiffeners required at ends.

Section	Fy (ksi)	Lu (in)	Spacing (in) oc	5 psf			7.5 psf			10 psf		
				L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
362S125-54	50	22.8	12	25' 10"	20' 6"	17' 11"	22' 7"	17' 11"	15' 8"	20' 6"	16' 3"	14' 2"
			16	23' 5"	18' 7"	16' 3"	20' 6"	16' 3"	14' 2"	18' 7"	14' 9"	12' 11"
			24	20' 6"	16' 3"	14' 2"	17' 11"	14' 2"	12' 5"	16' 3"	12' 11"	11' 3"
362S125-68	50	22.7	12	27' 7"	21' 11"	19' 2"	24' 1"	19' 2"	16' 9"	21' 11"	17' 5"	15' 2"
			16	25' 1"	19' 11"	17' 5"	21' 11"	17' 5"	15' 2"	19' 11"	15' 10"	13' 10"
			24	21' 11"	17' 5"	15' 2"	19' 2"	15' 2"	13' 3"	17' 5"	13' 10"	12' 1"
400S125-18 [1]	33	28.7	12	14' 9"e	14' 9"e	13' 6"e	12' 1"e	12' 1"e	11' 9"e	10' 5"e	10' 5"e	10' 5"e
			16	12' 10"e	12' 10"e	12' 3"e	10' 5"e	10' 5"e	10' 5"e	9' 1"e	9' 1"e	9' 1"e
			24	10' 5"e	10' 5"e	10' 5"e	8' 6"e	8' 6"e	8' 6"e	7' 5"e	7' 5"e	7' 5"e
400S125-27	33	28.5	12	19' 11"	17' 10"	15' 7"	16' 3"	15' 7"	13' 7"	14' 1"	14' 1"	12' 4"
			16	17' 3"	16' 2"	14' 2"	14' 1"	14' 1"	12' 4"	12' 2"	12' 2"	11' 3"
			24	14' 1"	14' 1"	12' 4"	11' 6"	11' 6"	10' 9"	9' 11"	9' 11"	9' 10"
400S125-30	33	28.5	12	21' 5"	18' 5"	16' 1"	17' 6"	16' 1"	14' 0"	15' 2"	14' 7"	12' 9"
			16	18' 6"	16' 8"	14' 7"	15' 2"	14' 7"	12' 9"	13' 1"	13' 1"	11' 7"
			24	15' 2"	14' 7"	12' 9"	12' 4"	12' 4"	11' 2"	10' 8"	10' 8"	10' 1"
400S125-33	33	28.4	12	23' 2"	19' 0"	16' 7"	18' 11"	16' 7"	14' 6"	16' 4"	15' 1"	13' 2"
			16	20' 0"	17' 3"	15' 1"	16' 4"	15' 1"	13' 2"	14' 2"	13' 9"	12' 0"
			24	16' 4"	15' 1"	13' 2"	13' 4"	13' 2"	11' 6"	11' 7"	11' 7"	10' 6"
400S125-43	33	28.2	12	26' 1"	20' 9"	18' 1"	22' 10"	18' 1"	15' 10"	19' 11"	16' 5"	14' 4"
			16	23' 9"	18' 10"	16' 5"	19' 11"	16' 5"	14' 4"	17' 3"	14' 11"	13' 1"
			24	19' 11"	16' 5"	14' 4"	16' 3"	14' 4"	12' 7"	14' 1"	13' 1"	11' 5"
400S125-54	50	22.7	12	27' 11"	22' 2"	19' 4"	24' 5"	19' 4"	16' 11"	22' 2"	17' 7"	15' 4"
			16	25' 4"	20' 2"	17' 7"	22' 2"	17' 7"	15' 4"	20' 2"	16' 0"	13' 11"
			24	22' 2"	17' 7"	15' 4"	19' 4"	15' 4"	13' 5"	17' 7"	13' 11"	12' 2"
400S125-68	50	22.5	12	29' 10"	23' 8"	20' 8"	26' 1"	20' 8"	18' 1"	23' 8"	18' 10"	16' 5"
			16	27' 2"	21' 6"	18' 10"	23' 8"	18' 10"	16' 5"	21' 6"	17' 1"	14' 11"
			24	23' 8"	18' 10"	16' 5"	20' 8"	16' 5"	14' 4"	18' 10"	14' 11"	13' 0"
550S125-27 [1]	33	27.9	12	23' 10"	22' 10"	20' 2"	19' 6"	19' 6"	17' 6"	16' 10"	16' 10"	15' 11"
			16	20' 8"	20' 8"	18' 3"	16' 10"	16' 10"	15' 11"	14' 7"	14' 7"	14' 5"
			24	16' 10"	16' 10"	15' 11"	13' 9"	13' 9"	13' 9"	11' 11" e	11' 11" e	11' 11" e
550S125-30	33	27.9	12	25' 8"	23' 9"	20' 10"	21' 0"	20' 8"	18' 2"	18' 2"	18' 2"	16' 6"
			16	22' 3"	21' 6"	18' 11"	18' 2"	18' 2"	16' 6"	15' 9"	15' 9"	14' 11"
			24	18' 2"	18' 2"	16' 6"	14' 10"	14' 10"	14' 4"	12' 10" e	12' 10" e	12' 10" e
550S125-33	33	27.8	12	27' 9"	24' 8"	21' 6"	22' 8"	21' 6"	18' 10"	19' 8"	19' 6"	17' 1"
			16	24' 1"	22' 4"	19' 7"	19' 8"	19' 6"	17' 1"	17' 0"	17' 0"	15' 6"
			24	19' 8"	19' 6"	17' 1"	16' 0"	16' 0"	14' 11"	13' 11"	13' 11"	13' 6"
550S125-43	33	27.6	12	33' 9"	26' 10"	23' 5"	27' 8"	23' 5"	20' 5"	24' 0"	21' 3"	18' 7"
			16	29' 4"	24' 4"	21' 3"	24' 0"	21' 3"	18' 7"	20' 9"	19' 4"	16' 11"
			24	24' 0"	21' 3"	18' 7"	19' 7"	18' 7"	16' 3"	16' 11"	16' 11"	14' 9"
550S125-54	50	22.1	12	36' 2"	28' 9"	25' 1"	31' 7"	25' 1"	21' 11"	28' 9"	22' 9"	19' 11"
			16	32' 10"	26' 1"	22' 9"	28' 9"	22' 9"	19' 11"	26' 1"	20' 8"	18' 1"
			24	28' 9"	22' 9"	19' 11"	25' 1"	19' 11"	17' 5"	22' 9"	18' 1"	15' 10"
550S125-68	50	21.8	12	38' 8"	30' 8"	26' 10"	33' 9"	26' 10"	23' 5"	30' 8"	24' 4"	21' 3"
			16	35' 2"	27' 11"	24' 4"	30' 8"	24' 4"	21' 3"	27' 11"	22' 2"	19' 4"
			24	30' 8"	24' 4"	21' 3"	26' 10"	21' 3"	18' 7"	24' 4"	19' 4"	16' 11"
600S125-27 [1]	33	27.7	12	24' 10"e	24' 4"e	21' 3"e	20' 4"e	20' 4"e	18' 7"e	17' 7"e	17' 7"e	16' 10"e
			16	21' 6"e	21' 6"e	19' 4"e	17' 7"e	17' 7"e	16' 10"e	15' 3"e	15' 3"e	15' 3"e
			24	17' 7"e	17' 7"e	16' 10"e	14' 4"e	14' 4"e	14' 4"e	12' 5"e	12' 5"e	12' 5"e
600S125-30	33	27.6	12	26' 10"	25' 2"	22' 0"	21' 11"	21' 11"	19' 3"	18' 11"	18' 11"	17' 6"
			16	23' 3"	22' 11"	20' 0"	18' 11"	18' 11"	17' 6"	16' 5"	16' 5"	15' 10"
			24	18' 11"	18' 11"	17' 6"	15' 6"	15' 6"	15' 3"	13' 5"e	13' 5"e	13' 5"e
600S125-33	33	27.6	12	29' 0"	26' 2"	22' 10"	23' 8"	22' 10"	19' 11"	20' 6"	20' 6"	18' 1"
			16	25' 2"	23' 9"	20' 9"	20' 6"	20' 6"	18' 1"	17' 9"	17' 9"	16' 6"
			24	20' 6"	20' 6"	18' 1"	16' 9"	16' 9"	15' 10"	14' 6"	14' 6"	14' 5"
600S125-43	33	27.3	12	35' 6"	28' 9"	25' 1"	29' 0"	25' 1"	21' 11"	25' 1"	22' 10"	19' 11"
			16	30' 9"	26' 1"	22' 10"	25' 1"	22' 10"	19' 11"	21' 9"	20' 9"	18' 1"
			24	25' 1"	22' 10"	19' 11"	20' 6"	19' 11"	17' 5"	17' 9"	17' 9"	15' 10"
600S125-54	50	21.9	12	38' 9"	30' 9"	26' 10"	33' 10"	26' 10"	23' 6"	30' 9"	24' 5"	21' 4"
			16	35' 3"	27' 11"	24' 5"	30' 9"	24' 5"	21' 4"	27' 11"	22' 2"	19' 5"
			24	30' 9"	24' 5"	21' 4"	26' 10"	21' 4"	18' 8"	24' 1"	19' 5"	16' 11"
600S125-68	50	21.6	12	41' 7"	33' 0"	28' 10"	36' 4"	28' 10"	25' 2"	33' 0"	26' 2"	22' 10"
			16	37' 9"	30' 0"	26' 2"	33' 0"	26' 2"	22' 10"	30' 0"	23' 9"	20' 9"
			24	33' 0"	26' 2"	22' 10"	28' 10"	22' 10"	20' 0"	26' 2"	20' 9"	18' 2"
800S125-43	33	26.3	12	40' 11"	36' 1"	31' 6"	33' 5"	31' 6"	27' 6"	28' 11"	28' 8"	25' 0"
			16	35' 5"	32' 9"	28' 8"	28' 11"	28' 8"	25' 0"	25' 1"	25' 1"	22' 9"
			24	28' 11"	28' 8"	25' 0"	23' 8"	23' 8"	21' 10"	20' 6"	20' 6"	19' 10"
800S125-54	50	21.1	12	48' 10"	38' 9"	33' 10"	42' 8"	33' 10"	29' 7"	38' 9"	30' 9"	26' 10"
			16	44' 4"	35' 2"	30' 9"	38' 9"	30' 9"	26' 10"	34' 1"	27' 11"	24' 5"
			24	38' 9"	30' 9"	26' 10"	32' 1"	26' 10"	23' 6"	27' 10"	24' 5"	21' 4"
800S125-68	50	20.8	12	52' 10"	41' 11"	36' 8"	46' 2"	36' 8"	32' 0"	41' 11"	33' 4"	29' 1"
			16	48' 0"	38' 1"	33' 4"	41' 11"	33' 4"	29' 1"	38' 1"	30' 3"	26' 5"
			24	41' 11"	33' 4"	29' 1"	36' 8"	29' 1"	25' 5"	33' 3"	26' 5"	23' 1"

[1] Web height-to-thickness ratio exceeds 200. Web stiffeners are required at all support points and concentrated loads.

"e" web stiffeners required at ends.

See Table Notes on page 21.