Structural Engineering Calculations

SEA RANCH LODGE RESTAURANT

60 SEA WALK DRIVE
SEA RANCH, CALIFORNIA 95497

SE PROJECT NUMBER 1977

THESE ATTACHMENTS ARE PART OF THE APPROVED PLANS.
* DO NOT REMOVE THEM *
FEB 05 2020
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
BUILDING PLAN CHECK
PERMIT # BLDG-3421

PERMIT SUBMITTAL	**OCTOBER 30, 2019**
△3 PERMIT RESUBMITTAL	**JANUARY 13, 2020**
△4 FOUNDATION REVISION	**FEBRUARY 3, 2020**

415 | 7788726

1511 15TH STREET SAN FRANCISCO CALIFORNIA 94103
STRANDBERG ENGINEERING

PROJECT: The Sea Ranch Lodge Restaurant

DATE: 10.11.2019

JOB NO: 1977

ENGINEER: CVF

GRAVITY KEY - S2.0

Level 1

G17 3

STRANDBERG ENGINEERING

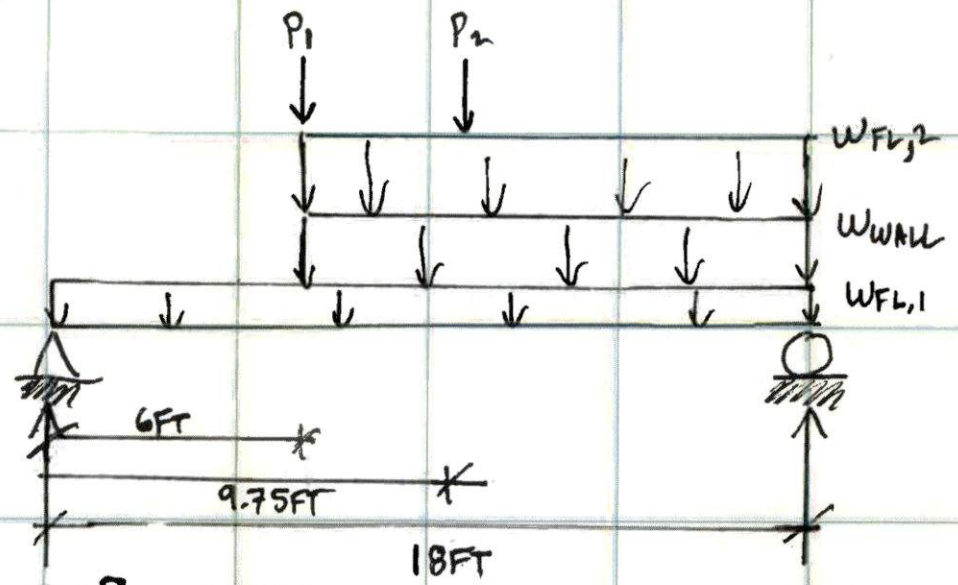
PROJECT: SEARANCH LODGE DATE: 02/2020

JOB NUMBER: 197.7 ENGINEER: CVF

GRID: 1/8"

GRAVITY DESIGN

1B-6: BEAM DESIGN FOR BEAM ON FIRST FLOOR @ G.L. 1.75, SPANNING FROM G.L. B thru C.4



R_1 : R_{DL} = 2.2K
R_{LL} = 3.06K

R_2 : R_{DL} = 4.2K
R_{LL} = 5.2K

LOADING

$W_{FL,1}$: FLOOR LOADING (Parallel JOISTS), LOWER FLOOR (REFER TO 1/S2.0)

DL = 14 PSF
LL = 40 PSF
t_W = 16"/12 = 1.33FT

W_{WALL} : WALL ABOVE BM (REFER TO 1/S2.0)

DL = 10 PSF
h_{WALL} = 12FT
} $W_{DL} = DL \times h_{WALL}$ = 120 PLF

$W_{FL,2}$: FLOOR LOADING (PERP. JOISTS) UPPER FLOOR (REFER TO 1/S2.1)

DL = 15 PSF
LL = 40PSF
t_W = 16FT/2 = 8FT

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G-2.8.1 A

PROJECT: SEA RANCH LODGE DATE: 02/2020

JOB NUMBER: 1977 ENGINEER: CUF

GRAVITY DESIGN

1B-6: CONTD...

LOADING, CONTD...

P_1: POINT LOAD FROM PERP. BEAM ON G.L. B.4 (Refer to 1/S2.0)

A_{TRIB} = 40 SQ.FT.

P_{DL} = 14 PSF × A_{TRIB} = 560 #

P_{LL} = 40 PSF × A_{TRIB} = 1,600 #

P_2: POINT LOAD FROM PERP. (E) BEAM ON G.L. B.6 (Refer to 1/S2.0)

A_{TRIB} = 75 SQ.FT.

P_{DL} = 14 PSF × A_{TRIB} = 1,050 #

P_{LL} = 40 PSF × A_{TRIB} = 3000 #

SEE ENERCALC ATTACHD.

USE 5 1/4" × 16 VELSA-LAM 2800

GRID: 1/8"

STRANDBERG ENGINEERING

G-28.2 4

Strandberg Engineering
1511 15th Street
San Francisco, CA 94103

Project Title: The Sea Ranch Lodge Restaurant
Engineer: CVF
Project ID: 1977
Project Descr: Gravity Design

Printed: 3 FEB 2020, 2:05PM

Wood Beam

File = P:\2019\1977 - The Sea Ranch Lodge Restaurant\CALCS\GRAVITY\The Sea Ranch Lodge Restaurant.ec6

Lic. # : KW-06009955 — STRANDBERG ENGINEERING

DESCRIPTION: 1B-6

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2015

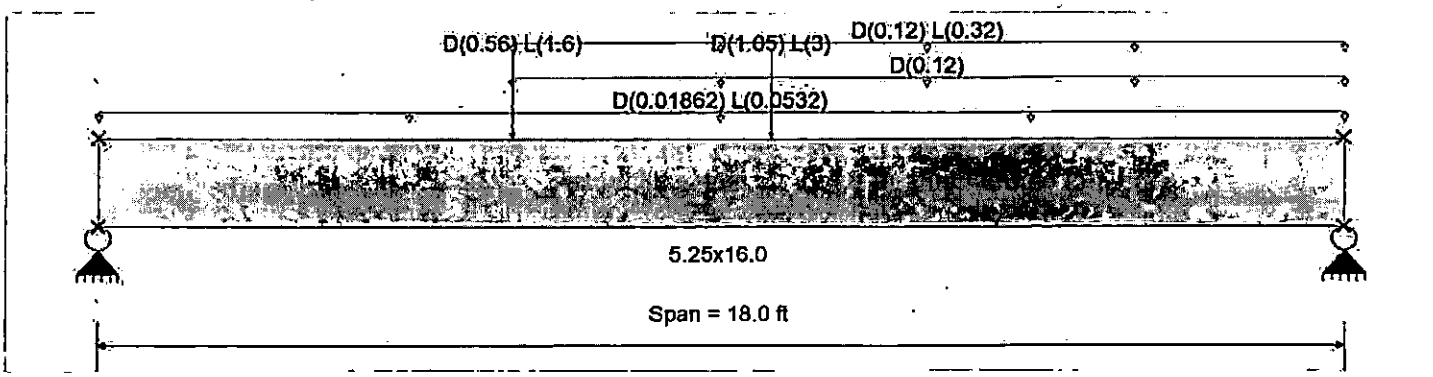
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Completely Unbraced

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0140, L = 0.040 ksf, Tributary Width = 1.330 ft, (W,fl,1)
Uniform Load : D = 0.120 k/ft, Extent = 6.0 -->> 18.0 ft, Tributary Width = 1.0 ft, (W,wall)
Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 6.0 -->> 18.0 ft, Tributary Width = 8.0 ft, (W,fl,2)
Point Load : D = 0.560, L = 1.60 k @ 6.0 ft, (P1)
Point Load : D = 1.050, L = 3.0 k @ 9.750 ft, (P2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.947 : 1**	Maximum Shear Stress Ratio	=	**0.463 : 1**
Section used for this span		**5.25x16.0**	Section used for this span		**5.25x16.0**
	=	2,452.28 psi		=	132.09 psi
	=	2,590.70 psi		=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	9.723 ft	Location of maximum on span	=	16.686 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.450 in	Ratio =	479 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.688 in	Ratio =	314 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 18.0 ft	1	0.356	0.187	0.90	0.969	1.00	1.00	1.00	1.00	0.96	15.62	837.02	2349.08	2.69	48.04	256.50
+D+L					0.969	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.0 ft	1	0.947	0.463	1.00	0.969	1.00	1.00	1.00	1.00	0.96	45.78	2,452.28	2590.70	7.40	132.09	285.00
+D+0.750L					0.969	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.0 ft	1	0.648	0.312	1.25	0.969	1.00	1.00	1.00	1.00	0.93	38.24	2,048.47	3162.22	6.22	111.08	356.25
+0.60D					0.969	1.00	1.00	1.00	1.00	0.93			0.00	0.00	0.00	0.00
Length = 18.0 ft	1	0.130	0.063	1.60	0.969	1.00	1.00	1.00	1.00	0.89	9.37	502.21	3848.41	1.61	28.83	456.00

G-28.3 4

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Wood Beam

Lic. # : KW-06009955

STRANDBERG ENGINEERING

DESCRIPTION: 1B-6

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.402	8.259
Overall MINimum	4.200	5.197
D Only	2.201	3.062
+D+L	6.402	8.259
+D+0.750L	5.352	6.960
+0.60D	1.321	1.837
L Only	4.200	5.197

G-284 A/4

LGUM/HGUM

Heavy-Duty Face-Mount Beam/Girder Hangers for Concrete and GFCMU (cont.)

Model No.	Ga.	Dimensions (in.)			Fasteners (in.)		Allowable Loads (DF, SP, LVL, PSL, LSL)				Code Ref.
		W	H	B	GFCMU and Concrete	Joist	Uplift (160)		Download (100/115/125)		
					Titen HD® Anchors	Strong-Drive® SDS Screws	GFCMU	Concrete	GFCMU	Concrete	
Double 2x Sizes											
LGUM26-2-SDS	12	3⁵⁄₁₆	5⁷⁄₁₆	4	(4) ⅜ x 4	(4) ¼ x 2½	1,430	1,430	5,595		
LGUM28-2-SDS	12	3⁵⁄₁₆	7³⁄₁₆	4	(6) ⅜ x 4	(6) ¼ x 2½	2,435	2,435	8,250		
LGUM210-2-SDS	12	3⁵⁄₁₆	9³⁄₁₆	4	(8) ⅜ x 4	(8) ¼ x 2½	3,575	3,575	9,575		
Triple 2x Sizes											
LGUM26-3-SDS	12	4¹⁵⁄₁₆	5½	4	(4) ⅜ x 4	(4) ¼ x 2½	1,430	1,430	5,610		
LGUM28-3-SDS	12	4¹⁵⁄₁₆	7¼	4	(6) ⅜ x 4	(6) ¼ x 2½	2,435	2,435	8,290		
LGUM210-3-SDS	12	4¹⁵⁄₁₆	9¼	4	(8) ⅜ x 4	(8) ¼ x 2½	3,575	3,575	9,715		
Quadruple 2x Sizes											
LGUM26-4-SDS	12	6⁹⁄₁₆	5⁷⁄₁₆	4	(4) ⅜ x 4	(4) ¼ x 2½	1,430	1,430	5,625		
LGUM28-4-SDS	12	6⁹⁄₁₆	7³⁄₁₆	4	(6) ⅜ x 4	(6) ¼ x 2½	2,435	2,435	8,335		
LGUM210-4-SDS	12	6⁹⁄₁₆	9³⁄₁₆	4	(8) ⅜ x 4	(8) ¼ x 2½	3,575	3,575	9,860		FL
4x Sizes											
LGUM46-SDS	12	3⅝	4⅞	4	(4) ⅜" x 4"	(4) ¼" x 2½"	1,430	1,430	5,600		
LGUM48-SDS	12	3⅝	6⅞	4	(6) ⅜" x 4"	(6) ¼" x 2½"	2,435	2,435	8,260		
LGUM410-SDS	12	3⅝	8⅞	4	(8) ⅜" x 4"	(8) ¼" x 2½"	3,575	3,575	9,620		
Engineered Wood and Structural Composite Lumber Sizes (Heavy Duty)											
HGUM5.25-SDS	7	5¼	11 to 30	5¼	(8) ⅝" x 5"	(24) ¼" x 2½"	4,105	5,075	14,025	14,770	
HGUM5.50-SDS	7	5½		5¼	(8) ⅝" x 5"	(24) ¼" x 2½"	4,105	5,075	14,000	14,915	
HGUM7.00-SDS	7	7		5¼	(8) ⅝" x 5"	(24) ¼" x 2½"	4,105	5,075	13,840	14,915	
HGUM7.25-SDS	7	7¼		5¼	(8) ⅝" x 5"	(24) ¼" x 2½"	4,105	5,075	13,810	14,915	
HGUM9.00-SDS	7	9		5¼	(8) ⅝" x 5"	(24) ¼" x 2½"	4,105	5,075	13,625	14,915	

1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern.
2. Tabulated uplift loads are based on 4" minimum distance to top of wall. For HGUM installations with 15" minimum distance to top of wall, uplift loads are 6,180 lb. for GFCMU and 6,585 for concrete.
3. Concrete shall have a minimum compressive strength of f'_c = 2,500 psi.
4. Grout-filled CMU (GFCMU) shall have a minimum compressive strength of f'_m = 1,500 psi.
5. LGUM must be installed on minimum 6"-thick wall and HGUM on minimum 8"-thick wall. (Nominal values for GFCMU.)
6. Titen HD® anchors may be installed into the head or bed joints.
7. Strong-Drive® SDS Heavy-Duty Connector screws may be installed through metal truss plates as approved by the Truss Designer, provided the requirements of ANSI/TPI 1-2014, Sections 7.5.3.4 and 8.9.2 are met (predrilling required through the plate using a 5⁄32" bit maximum).

See 1B-6 for Service RXN 2:
R,DL = 4200 #
R,LL = 5200 #

DEMAND : ASD RXN = R,DL+R,LL
= 9,400 #

CAPACITY : HGUM5.25-SDS = 14,770#/Cd
= 14,770#/1.25
= 11,816 #

DEMAND/CAPACITY = 9,400#/11,816#
0.79<1.0; **OK**

USE HGUM5.25-SDS WITH (8) 5/8"x5" TITEN HD ANCHORS ONTO (E) CONCRETE

G28.5 A