

PRCTI20231634



STRUCTURAL CALCULATIONS

For

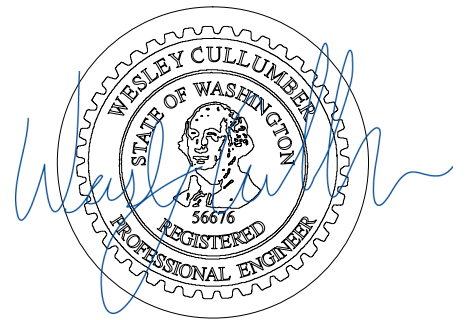
2nd Avenue McDonalds Remodel



& ASSOCIATES

Client: PM Design Group
Project Address: 304 2nd Avenue NE,
Puyallup, WA 98372
Homeowner: McDonalds
Project Number: (CR031224)
Purpose: Structural Engineering
for remodel
construction
Date: 3/20/2024
Engineer: Emma Brown, EIT
EOR: Wesley Cullumber, P.E.

The design calculations contained herein have been prepared by or under the direction of the following Registered Civil Engineer:



**City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE**

BSnowden
05/13/2024
3:44:28 PM



Calculations required to be provided by the Permittee on site for all Inspections

Wesley Cullumber, PE
WCDAssociates.com
wcullumber@WCDAssociates.com
916-251-9798



STRUCTURAL CALCULATIONS

Project Name: 2nd Avenue McDonalds Remodel
Location: 304 2nd Avenue NE, Puyallup, WA 98372
Project No.: (CR031224)

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STRUCTURAL CALCULATIONS

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Project No.: (CR031224)

1. DESIGN CRITERIA

PROJECT APPROACH

Typical design approach for gravity and lateral analysis. Seismic and Wind loading applied for lateral analysis. Gravity loading applied as specified in the calculations. Design utilized using ASD load combinations.

DESIGN VALUES

1. CRITERIA

Risk Category = II

2. ROOF LOADS

Roof Material = Single Ply Roofing
Roof Dead Load (DL) = 15 psf
Roof Live Load (RLL) = 20 psf
Deflection Live Load (LL) = L/360
Deflection Total Load (TL) = L/240

3. FLOOR LOADS

(NOT IN SCOPE)

4. SEISMIC LOADS

MCER ground motion (period=0.2s) Ss = 1.271g
MCER ground motion (period=1.0s) S1 = 0.437g
Design Spectral Acc. for Short Periods SDS = 1.017g
Design Spectral Acc. for 1-sec. Periods SD1 = 0.543g
Soil Site Class = D (default)
Seismic Design Category = D

5. WIND LOADS

Ultimate Wind Speed (3-Second Gust) = 98 mph
Wind Exposure = C
Topographic Factor Kzt = 1.0

6. GEOTECHNICAL

Allowable Bearing Capacity 1,500 psf (assumed)



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CODE REFERENCES

ASCE 7-16 Minimum Design Loads for Buildings and Other Structures

ACI 318-19 Building Code Requirements for Structural Concrete and Commentary

IBC 2021 International Building Code 2018

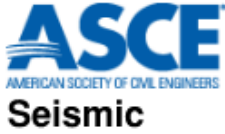
NDS 2018 National Design Specification 2018



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2. SEISMIC ANALYSIS



Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.271	S_{D1} :	N/A
S_1 :	0.437	T_L :	6
F_a :	1.2	PGA :	0.5
F_v :	N/A	PGA _M :	0.6
S_{MS} :	1.525	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.017	C_v :	1.354

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Wed Mar 20 2024

Date Source: [USGS Seismic Design Maps](#)

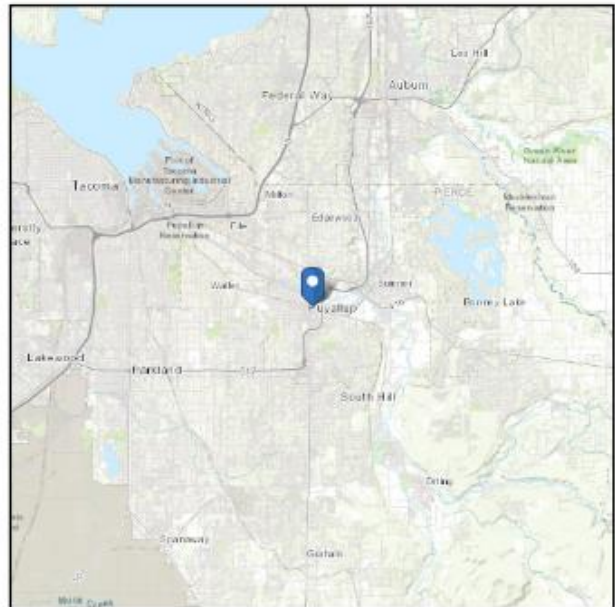
3. WIND ANALYSIS



Address:
304 2nd Ave NE
Puyallup, Washington
98372

ASCE Hazards Report

Standard: ASCE/SEI 7-16 **Latitude:** 47.192388
Risk Category: II **Longitude:** -122.290779
Soil Class: D - Default (see Section 11.4.3) **Elevation:** 49.15951588412808 ft (NAVD 88)



Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Mar 20 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

4. STRUCTURAL CALCULATIONS

ROOF ADDITION ANALYSIS

Wood Beam	Project File: 2ndAve.ec6
LIC#: KW-06014798, Build:20.23.10.02	WCD & ASSOCIATES
	(c) ENERCALC INC 1983-2023

DESCRIPTION: TYPICAL ROOF JOIST

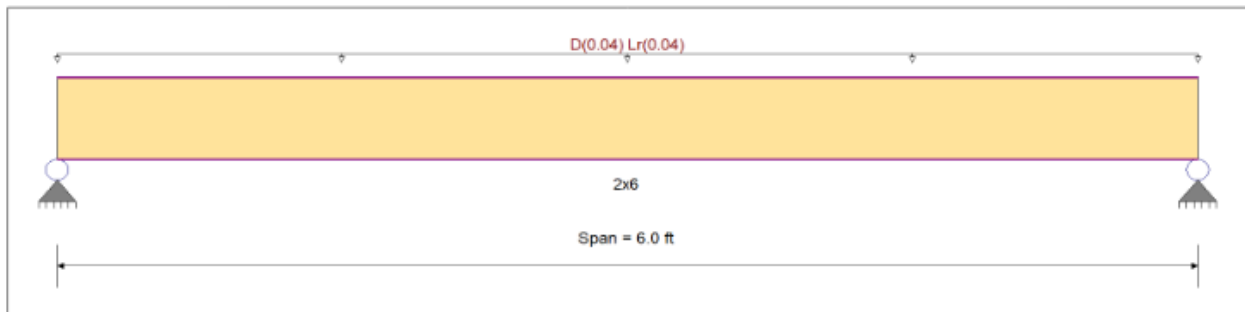
CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	900 psi	E : Modulus of Elasticity	
Load Combination : IBC 2021	Fb -	900 psi	Ebend- xx	1600ksi
	Fc - Prll	1350 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.2	Fv	180 psi		
	Ft	575 psi	Density	31.21pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase	



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.347 : 1	Maximum Shear Stress Ratio	=	0.169 : 1
Section used for this span		2x6	Section used for this span		2x6
fb: Actual	=	584.01 psi	fv: Actual	=	38.10 psi
F'b	=	1,681.88 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	3.000ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.035 in	Ratio =	2042 >=360	Span: 1 : Lr Only	
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a	
Max Downward Total Deflection	0.072 in	Ratio =	998 >=180	Span: 1 : +D+Lr	
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	Ct	CLx	Cf	Cfu	Cj	Cr	M	fb	F'b	V	fv	F'v		
D Only	Length = 6.0 ft	1	0.246	0.120	0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.15	0.19	298.4	1,211.0	0.0	0.00	0.0	0.0	162.0
+D+Lr	Length = 6.0 ft	1	0.347	0.169	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.15	0.37	584.0	1,681.9	0.21	38.1	225.0	0.0	0.0
+D+0.750Lr	Length = 6.0 ft	1	0.305	0.149	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.15	0.32	512.6	1,681.9	0.18	33.4	225.0	0.0	0.0
+0.60D	Length = 6.0 ft	1	0.083	0.041	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.15	0.11	179.0	2,152.8	0.06	11.7	288.0	0.0	0.0

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Wood Beam

Project File: 2ndAve.ec6

LIC#: KW-06014798, Build:20.23.10.02

WCD & ASSOCIATES

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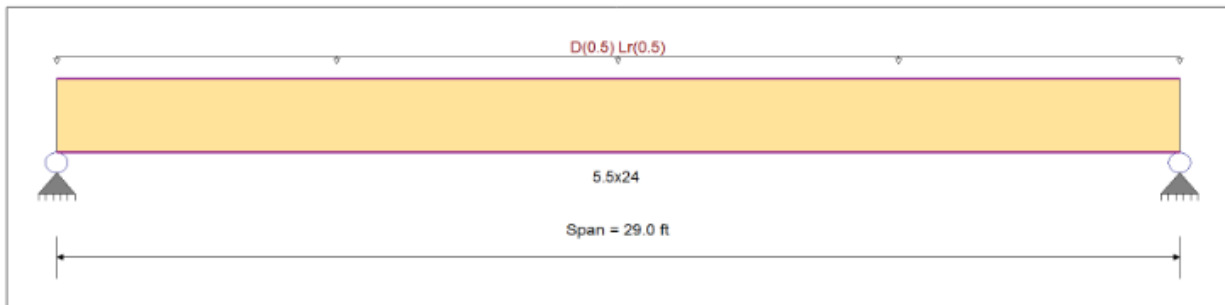
DESCRIPTION: Roof Beam

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
 Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity	
Load Combination : IBC 2021	Fb -	1,850.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy	850.0 ksi
	Ft	1,100.0 psi	Density	31.210 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
 Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 25.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.913 < 1	Maximum Shear Stress Ratio =	0.444 < 1
Section used for this span	5.5x24	Section used for this span	5.5x24
fb: Actual =	2,457.56psi	fv: Actual =	147.22 psi
F'b =	2,691.12psi	F'v =	331.25 psi
Load Combination	+D+Lr	Load Combination	+D+Lr
Location of maximum on span =	14.500ft	Location of maximum on span =	0.000ft
Span # where maximum occurs =	Span # 1	Span # where maximum occurs =	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.702 in Ratio =	495 >= 360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in Ratio =	0 < 360	n/a
Max Downward Total Deflection	1.444 in Ratio =	241 >= 240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in Ratio =	0 < 240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 29.0 ft	1	0.652	0.317	0.90	1.00	1.00	1.00	0.897	1.00	1.00	1.00	55.57	1,263.0	1,937.6	0.0	0.00	0.0	0.0
+D+Lr	Length = 29.0 ft	1	0.913	0.444	1.25	1.00	1.00	1.00	0.897	1.00	1.00	1.00	108.13	2,457.6	2,691.1	12.96	147.2	331.3	
+D+0.750Lr	Length = 29.0 ft	1	0.802	0.390	1.25	1.00	1.00	1.00	0.897	1.00	1.00	1.00	94.99	2,158.9	2,691.1	11.38	129.3	331.3	
+0.60D	Length = 29.0 ft	1	0.220	0.107	1.60	1.00	1.00	1.00	0.897	1.00	1.00	1.00	33.34	757.8	3,444.6	3.99	45.4	424.0	



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Project	2nd Avenue McD's Remodel
Project Number	CR031224
Engineer	KJK
Date	3/20/2024
Subject	Wood Stud/Post Capacity

NDS 2018 (ASD Method)

Eff. Column Height L_1 0.00 ft (Weak Axis)
 Eff. Column Height L_2 10.00 ft (Strong Axis)

	Dimensional Lumber (DF/L #2)	Timber (DF/L #1)
F_c =	1,350 psi	1,000 psi
E =	1,600,000 psi	1,600,000 psi
E_{min} =	580,000 psi	580,000 psi
C_d =	1.00	1.00
C_m =	1.00	1.00
C_t =	1.00	1.00
C_i =	1.00	1.00
E' =	1,600,000 psi	1,600,000 psi
E'_{min} =	580,000 psi	580,000 psi

	2x4 Stud (#2)	2x6 Stud (#2)	2x8 Stud (#2)	4x6 Stud in 2x4 Wall (#2)	4x6 stud in 2x6 wall (#2)	4x4 isolated (#2)	6x6 isolated (#1)
Col Dimension d_1 [in]	1.5	1.5	1.5	5.5	3.5	3.5	5.5
Col Dimension d_2 [in]	3.5	5.5	7.25	3.5	5.5	3.5	5.5
Size Factor C_f	1.15	1.1	1.05	1.1	1.1	1.15	1
Slenderness Ratio 1	0	0	0	0	0	0	0
Slenderness Ratio 2	34.29	21.82	16.55	34.29	21.82	34.29	21.82
Design Slenderness	34.29	21.82	16.55	34.29	21.82	34.29	21.82
F_c^* [psi]	1553	1485	1418	1485	1485	1553	1000
$F_c E$ [psi]	406	1002	1740	406	1002	406	1002
c	0.8	0.8	0.8	0.8	0.8	0.8	0.8
C_p	0.25	0.54	0.76	0.26	0.54	0.25	0.69
$F_c^* C_p$ [psi]	381	808	1073	380	808	381	692
Axial Capacity [lbs]	1,999	6,669	11,666	7,306	15,561	4,665	20,918

>13.0 kip (FROM ENERCALC) *OK*



STRUCTURAL CALCULATIONS

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PARAPET ANALYSIS

Parapet Wind Calculations (ASCE 7-16 Chapter 30 pt. 2)

Basic Wind Speed: 98 mph

From Enercalc:

Zone 3: -44.06

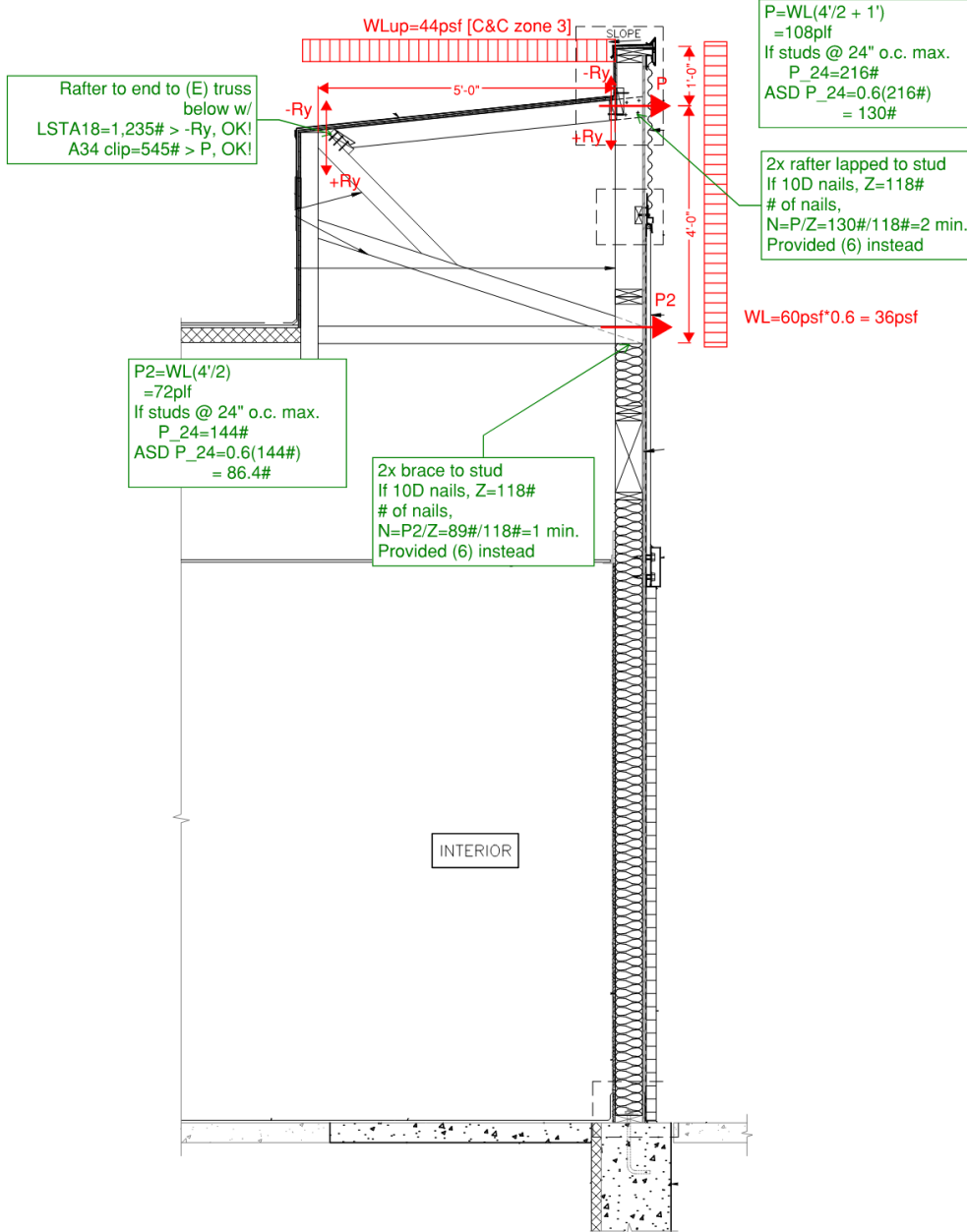
Zone 5: 15.38

Sum = 60 psf

Total Wind Speed = 60 psf unfactored
= 36 psf factored (0.6*60)

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-Ry=Trib(WL)=(5/2)(44psf)=110plf
 ASD $\Phi=0.6$
 $-\Phi Ry=0.6(110plf)=66 plf$
 If rafters at 24" o.c. $-2\Phi Ry=132\#$
 Use H3 hurricane ties
 LC1=DL+RL=10psf+20psf=30psf
 LC2=DL+0.6WL=10psf+0.6(44psf)=37psf
 -- LC2 governs --
 $+Ry=Trib(LC2)=(5/2)(LC2)=93plf$



19 WALL SECTION - DRIVE THRU
 A4.0 3/4" = 1'-0"



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If all wind reaction applied to existing sill plate on existing wall:

$$R = WL * 5' = 180\text{plf}$$

$$\text{ASD } 0.6R = 108\text{plf}$$

Roof frame anchored on opposite walls, thus
 $0.6R/2 = 54\text{plf}$

If nails are @16" o.c.:

$$0.6R/2 (16"/12") = 36$$

$$Z = 93\text{plf (Shear Capacity per nail)}$$

$$\text{ASD } 1.6Z = 148\text{plf}$$

Required # of 10 D nails

$$N = 36/148 = 1\text{MIN.}$$

Provide 4

Project Name: 2nd Avenue McDonalds Remodel
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Table 12N COMMON, BOX, or SINKER STEEL WIRE NAILS: Reference Lateral Design Values, Z, for Single Shear (two member) Connections^{1,2,3}



for sawn lumber or SCL with both members of identical specific gravity (tabulated lateral design values are calculated based on an assumed length of nail penetration, p, into the main member equal to 10D)

Side Member Thickness t _s in.	Nail Diameter D in.	Common Wire Nail Box Nail Sinker Nail	Species									
			G=0.67 Red Oak	G=0.55 Mixed Maple Southern Pine	G=0.5 Douglas Fir-Larch	G=0.49 Douglas Fir-Larch (N)	G=0.45 Douglas Fir(S) Hem-Fir(N)	G=0.43 Hem-Fir	G=0.42 Spruce-Pine-Fir	G=0.37 Redwood	G=0.36 Eastern Softwoods Spruce-Pine-Fir(S) Western Cedars Western Woods	G=0.35 Northern Species
		Pennyweight	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
3/4	0.099	6d 7d	73	61	55	54	51	48	47	39	38	36
	0.113	6d 8d 8d	94	79	72	71	65	58	57	47	46	44
	0.120	10d	107	89	80	77	71	64	62	52	50	48
	0.128	10d	121	101	87	84	78	70	68	57	56	54
	0.131	8d	127	104	90	87	80	73	70	60	58	56
	0.135	16d 12d	135	108	94	91	84	76	74	63	61	58
	0.148	10d 20d 16d	154	121	105	102	94	85	83	70	69	66
	0.162	16d 40d	183	138	121	117	108	99	96	82	80	77
	0.177	20d	200	153	134	130	121	111	107	92	90	87
	0.192	20d 30d	206	157	138	134	125	114	111	96	93	90
	0.207	30d 40d	216	166	147	143	133	122	119	103	101	97
	0.225	40d	229	178	158	154	144	132	129	112	110	106
	0.244	50d 60d	234	182	162	158	147	136	132	115	113	109
	1	0.099	6d 7d	73	61	55	54	51	48	47	42	41
0.113		6d 8d 8d	94	79	72	71	67	63	61	55	54	51
0.120		10d	107	89	81	80	76	71	69	60	59	56
0.128		10d	121	101	93	91	86	80	79	68	64	61
0.131		8d	127	106	97	95	90	84	82	68	66	63
0.135		16d 12d	135	113	103	101	96	89	86	71	69	66
0.148		10d 20d 16d	154	128	118	115	109	99	96	80	77	74
0.162		16d 40d	184	154	141	137	125	113	109	91	89	85
0.177		20d	213	178	155	150	138	125	121	102	99	95
0.192		20d 30d	222	183	159	154	142	128	124	105	102	98
0.207		30d 40d	243	192	167	162	149	135	131	111	109	104
0.225		40d	268	202	177	171	159	144	140	120	117	112
0.244		50d 60d	274	207	181	175	162	148	143	123	120	115
1-1/4		0.099	6d 7d	73	61	55	54	51	48	47	42	41
	0.113	6d 8d 8d	94	79	72	71	67	63	61	55	54	52
	0.120	10d	107	89	81	80	76	71	69	62	60	59
	0.128	10d	121	101	93	91	86	80	79	70	69	67
	0.131	8d	127	106	97	95	90	84	82	73	72	70
	0.135	16d 12d	135	113	103	101	96	89	86	78	76	74
	0.148	10d 20d 16d	154	128	118	115	109	102	100	89	87	84
	0.162	16d 40d	184	154	141	138	131	122	120	103	100	95
	0.177	20d	213	178	163	159	151	141	136	113	110	105
	0.192	20d 30d	222	185	170	166	157	145	140	116	113	108
	0.207	30d 40d	243	203	186	182	169	152	147	123	119	114
	0.225	40d	268	224	200	193	177	160	155	130	127	121
	0.244	50d 60d	276	230	204	197	181	163	158	133	129	124
	1-1/2	0.099	7d	73	61	55	54	51	48	47	42	41
0.113		8d 8d	94	79	72	71	67	63	61	55	54	52
0.120		10d	107	89	81	80	76	71	69	62	60	59
0.128		10d	121	101	93	91	86	80	79	70	69	67
0.131		8d	127	106	97	95	90	84	82	73	72	70
0.135		16d 12d	135	113	103	101	96	89	86	78	76	74
0.148		10d 20d 16d	154	128	118	115	109	102	100	89	87	84
0.162		16d 40d	184	154	141	138	131	122	120	106	104	101
0.177		20d	213	178	163	159	151	141	136	123	121	117
0.192		20d 30d	222	185	170	166	157	147	144	128	126	120
0.207		30d 40d	243	203	186	182	172	161	158	135	131	125
0.225		40d	268	224	205	201	190	178	172	143	138	132
0.244		50d 60d	276	230	211	206	196	181	175	148	141	135
1-3/4		0.113	8d	94	79	72	71	67	63	61	55	54
	0.120	10d	107	89	81	80	76	71	69	62	60	59
	0.128	10d	121	101	93	91	86	80	79	70	69	67
	0.135	16d 12d	135	113	103	101	96	89	86	78	76	74
	0.148	10d 20d 16d	154	128	118	115	109	102	100	89	87	84
	0.162	16d 40d	184	154	141	138	131	122	120	106	104	101
	0.177	20d	213	178	163	159	151	141	138	123	121	117
	0.192	20d 30d	222	185	170	166	157	147	144	128	126	122
	0.207	30d 40d	243	203	186	182	172	161	158	140	137	133
	0.225	40d	268	224	205	201	190	178	174	155	151	144

1. Tabulated lateral design values, Z, shall be multiplied by all applicable adjustment factors (see Table 11.3.1).

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 Location: 304 2nd Avenue NE, Puyallup, WA 98372
 Project No.: (CR031224)

Wood Beam

Project File: Enercalc Puyallup.ec6

LIC#: KW-06014798, Build:20.23.12.07

WCD & ASSOCIATES

(c) ENERCALC INC 1983-2023

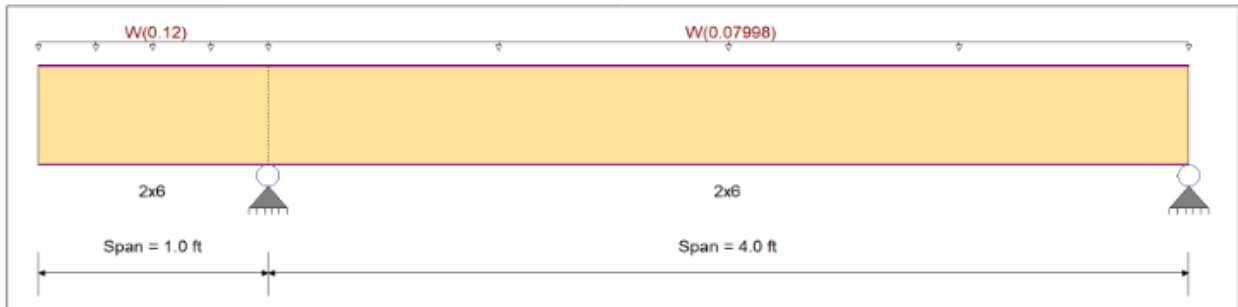
DESCRIPTION: 2x6 Parapet Calc

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
 Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	900.0 psi	E : Modulus of Elasticity
Load Combination : IBC 2021	Fb -	900.0 psi	Ebend- xx
	Fc - Prll	1,350.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	Ft	575.0 psi	31.210pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
 Load for Span Number 1
 Uniform Load : W = 0.060 ksf, Tributary Width = 2.0 ft, (Parapet Wind Load)
 Load for Span Number 2
 Uniform Load : W = 0.060 ksf, Tributary Width = 1.333 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.067 : 1	Maximum Shear Stress Ratio	=	0.053 : 1
Section used for this span	=	2x6	Section used for this span	=	2x6
fb: Actual	=	125.07 psi	fv: Actual	=	15.19 psi
F'b	=	1,872.00 psi	F'v	=	288.00 psi
Load Combination	=	+0.60W	Load Combination	=	+0.60W
Location of maximum on span	=	2.190ft	Location of maximum on span	=	1.000 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.011 in	Ratio = 4433 >=360	Span: 2 : W Only		
Max Upward Transient Deflection	-0.006 in	Ratio = 3908 >=360	Span: 1 : W Only		
Max Downward Total Deflection	0.006 in	Ratio = 7389 >=180	Span: 2 : +0.60W		
Max Upward Total Deflection	-0.004 in	Ratio = 6514 >=180	Span: 1 : +0.60W		

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values					
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
	Length = 1.0 ft	1			0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	1,053.0	0.00	0.0	162.0
	Length = 4.0 ft	2			0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.00			1,053.0	0.00	0.0	162.0	
+0.60W						1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
	Length = 1.0 ft	1	0.031	0.053	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.04	57.1	1,872.0	0.08	15.2	288.0	
	Length = 4.0 ft	2	0.067	0.053	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.08	125.1	1,872.0	0.08	15.2	288.0	
+0.450W						1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
	Length = 1.0 ft	1	0.023	0.040	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.03	42.8	1,872.0	0.06	11.4	288.0	



STRUCTURAL CALCULATIONS

Project Name: 2nd Avenue McDonalds Remodel
 Location: 304 2nd Avenue NE, Puyallup, WA 98372
 Project No.: (CR031224)

Wood Beam

Project File: Enercalc Puyallup.ec6

LIC#: KW-06014798, Build:20.23.12.07

WCD & ASSOCIATES

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DESCRIPTION: 2x6 Parapet Calc

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
	Length = 4.0 ft	2	0.050	0.040	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.06	93.8	1,872.0	0.06	11.4	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.0000	0.000	W Only	-0.0061	0.000
	2	0.0108	2.078		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #1			Values in KIPS
	Support 1	Support 2	Support 3	
Max Upward from all Load Conditions		0.295	0.145	
Max Upward from Load Combinations		0.177	0.087	
Max Upward from Load Cases		0.295	0.145	
+0.60W		0.177	0.087	
+0.450W		0.133	0.065	
W Only		0.295	0.145	

Project Name: 2nd Avenue McDonalds Remodel
 Location: 304 2nd Avenue NE, Puyallup, WA 98372
 Project No.: (CR031224)

Wood Beam

Project File: Enercalc Puyallup.ec6

LIC# : KW-06014798, Build:20.23.12.07

WCD & ASSOCIATES

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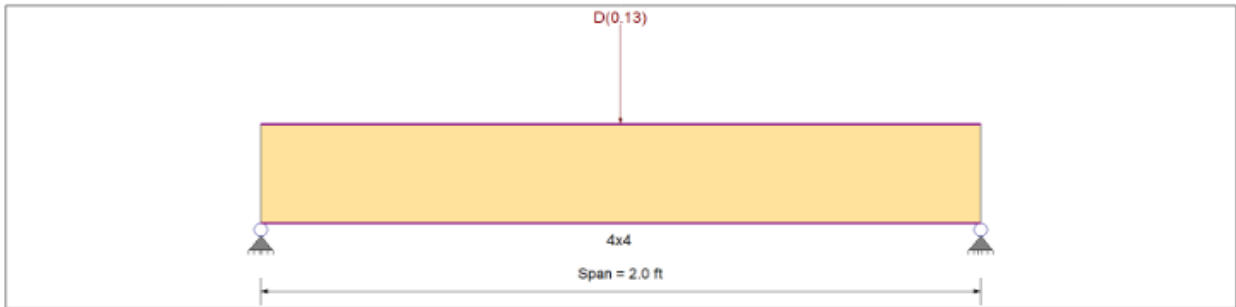
DESCRIPTION: Parapet Blocking

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
 Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	900 psi	E : Modulus of Elasticity	
Load Combination : IBC 2021	Fb -	900 psi	Ebend- xx	1600ksi
	Fc - Prll	1350 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.2	Fv	180 psi		
	Ft	575 psi	Density	31.21pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
 Point Load : D = 0.130 k @ 1.0 ft, (Max Point Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.092	1	Maximum Shear Stress Ratio =	0.051	: 1
Section used for this span	4x4		Section used for this span	4x4	
fb: Actual =	111.38	psi	fv: Actual =	8.19	psi
F'b =	1,215.00	psi	F'v =	162.00	psi
Load Combination =	D Only		Load Combination =	D Only	
Location of maximum on span =	1.000ft		Location of maximum on span =	1.715 ft	
Span # where maximum occurs =	Span # 1		Span # where maximum occurs =	Span # 1	
Maximum Deflection					
Max Downward Transient Deflection	0 in	Ratio =	0 < 360	n/a	
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a	
Max Downward Total Deflection	0.002 in	Ratio =	12438 >= 180	Span: 1 : D Only	
Max Upward Total Deflection	0 in	Ratio =	0 < 180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only	Length = 2.0 ft	1	0.092	0.051	0.90	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.07	111.4	1,215.0	0.07	8.2	162.0
+0.60D	Length = 2.0 ft	1	0.031	0.017	1.60	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.04	66.8	2,160.0	0.04	4.9	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.0019	1.007		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.068	0.068