Co. 01. 159024 REV. 01.

49

CITY OF

PORTLAND, OREGON

OFFICE OF PLANNING AND DEVELOPMENT REVIEW
1900 SW 4th Ave, Suite 5000
Portland, OR 97201

MULTNOMAH COUNTY

COMMERCIAL BUILDING PERMIT

01-159024-REV-02-CO

Site Address: 11010 SW BARBUR BLVD
11000 Building

Issued: 10/7/02

PROJECT INFORMATION		Occ. Group	Const. Type
Business	New Construction	B	V-N

Project Description: REVISION 10/1/02 DELETE ACCESS TO STORAGE AREA, CHANGE TO UNOCCUPIED SPACE, MODIFY 1ST FLOOR SHEAR WALL - SEE COMPLETENESS CHECK

APPLICANT	STOA INTERNATIONAL EKA ARCHITECTS *NEIL LEE*	Phone (503) 644-4222
PROPERTY OWNER	BARRY J BUTCHER	Phone
CONTRACTOR	To Bid	Phone

Project Details	
Code Edition (Year)	1997
Lot Area (Sq. Ft.)	12130
Zoning - Property (1)	CO2

Project Details	
Ground Disturbance Area (Sq. Ft.)	9750
Water District	City of Portland

PAID
OCT 7 2002
CITY OF PORTLAND

BEFORE YOU DIG	ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is 1-800-332-2344).

CITY CONTACT PROCESS MANAGEMENT Phone: 503-823-7357
E-Mail: Fax: (503) 823-4172

INSPECTION REQUEST PHONE NUMBERS

Building/Trade Inspections - Call Before 6:00 AM: (503) 823-7000

TDD: (503) 823-6868

IVR Inspection Request Number: 2122476

AG Rolin Consulting
P.O. Box 358, Gresham, OR 97030
(503) 618-1426 Fax (503) 618-0228
AGROLIN@AOL.COM
STRUCTURAL DESIGN, ENGINEERING & CONSULTING

01-15024-REV 02.02

STRUCTURAL CALCULATIONS

PROJECT: **11000 Building/Breeze Hill Business Center REV. 2**

ADDRESS: Portland, Oregon

CLIENT: Barry Butcher and Associates

JOB NUMBER: B0121 – Rev. 2

ATTACHED PLEASE FIND CALCULATIONS SHEETS, 1 THROUGH 49, DATED SEPTEMBER/AUGUST, 2002, WHICH VERIFY THE STRUCTURAL ADEQUACY OF THE LATERAL RESISTING SYSTEM, CANOPIES AND EXTERIOR STEEL STAIRS FOR THE ABOVE REFERENCED PROJECT. THE DESIGN BASED ON THE REQUIREMENTS OF THE 1997 UNIFORM BUILDING CODE, AS AMENDED BY THE STATE OF OREGON.

City of Portland
APPROVED
OCT 07 2002
Permit Number

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
61557
OREGON
SEPT. 14, 1979
JASON M. WEBER
EXPIRES: 06-30-20

AG Rolin Consulting STRUCTURAL DESIGN & ENGINEERING	Project BREEZE HILL	By JMW	Sheet No. 01
	Location PORTLAND, OR	Date 08/01	
	Client CHRISTENSON	Revised	Job No. B0121
		Date	

LOADS

ROOF
DL = 20 PSF
SL = 25 PSF

FLOOR
DL = 20 PSF
LL = 50 PSF
PART = 20 PSF

WALLS
DL = 50 PLF ABOVE GRADE
DL = 150 PLF BELOW GRADE

WIND

$P = C_e C_q q_s I$

C_e = 0.62 (EXP B, TO 15') 0.67 (20') 0.72 (25') 0.76 (30') C_q = 1.3

q_s = 16.4 PSF

I = 1.0

P_{15} = 13.4 PSF P_{20} = 14.3 PSF P_{25} = 15.2 PSF P_{30} = 16.2 PSF

City of Portland APPROVED OCT 07 2002 Permit Number

F/B

ROOF = [(16.2 x 2) + 15.4 (5) + 14.3 (1.67)] 4B = 6.4K

2ND = [14.3 (3.33) + 13.2 (9.25)] 4B = 8.1K } 14.5K

S/S

ROOF = [(16.2 x 2) + 15.4 (5) + 14.3 (1.67)] 67.67 = 9.0K

2ND = [(14.3 (3.33) + 13.2 (9.25)] 67.67 = 11.5K } 20.5K } 23.1K

1ST = [13.2 (10.8)] 18 = 2.6K

SEISMIC

$V = \frac{2.5 C_a I}{R} W$ C_a = 0.36 I = 1.0 R = 5.5

$V = \frac{3.0 (.36)(1)}{5.5} W = .196 W$

$W_{ROOF} = 20(48 \times 50 + 557) + 50(211)(.94) = 154K$

$W_{2ND} = 20(48 \times 50 + 557) + 50(211)(.72) + 10(48 \times 50 + 557) = 215K$

$W_{1ST} = 20(557) + (150(65) + 50(6))(66) + 10(557) = 86K$

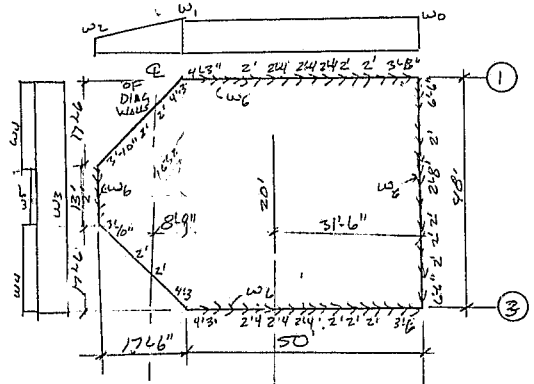
LEVEL	V	$E_{MIN} = \frac{V}{.714}$	$E_{MAX} = 1.5V$	
ROOF	30.2K	21.6K	32.4K	BY INSPECTION SEISMIC CONTROLS
2ND	42.2K	30.2K	45.2K	
1ST	16.9K	12.1	18.1K	

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project: BREEZE HILL	By: JMW	Sheet No: 02
Location: PORTLAND, OR	Date: 8/01	
Client: CHRISTENSEN	Revised: 6/02	Job No: B0121
	Date	

12 OF

$w = 260$ plf
$w_1 = 320$ plf
$w_2 = 220$ plf
$w_3 = 205$ plf
$w_4 = 95$ plf
$w_5 = 65$ plf
$w_6 = 65$ plf



CHECK C

F/B
$r = 7.7/21.6\,(19/20) = 0.18$
$c = 2-20/(3502^{1/2}(.18)) = .12 \sim 1.0$

S/S
$r = 4.25(367)/21.6\,(19/4.25) = .17$
$c = 2-20/(3502^{1/2}(.17)) = 0 \sim 1.0$

WALL	SHEAR	STRESS	MOT	LOADS	T/C	USE
1	10.8k	367 #/'	376(2)(6) = 4.5k	.9(1380)(2)²/2 = 27.5k	1000#	4
		PIER1 7669 (12) = 92.1k		.9(690)(50)²/2 = 776.1k		
		PIER2 3131 (12) = 37.6k		.9(634)(17.5)²/2 = 88k		
3	10.8k	367#/'	376(2)(6) =	.9(1380)(2)²/2 = 27.5k	1000#	4
		PIER1 7669 (12) =		.9(690)(50)²/2 = 776.1k		
		PIER2 3131 (12)		.9(636)(17.5)²/2 = 88k		
	LOAD INCREASED BY A FACTOR OF 1.414 FOR DIAGONAL WALL					
A	6.75k	395#/'	395(2)(6) = 4.7k	.9(1000)(2)²/2 = 1.8k	2369#	4 MST72
			3375(12) = 40.5k	.9(600)(25)²/2 = 140.6k		
B	7.7k	385#/'	7700(9) = 69.7k	.9(120)(20)²/2 = 21.6k	2385#	4 MST72
C	7.2k	304#/'	304(2)(6) = 3.6k	.9(900)(2)²/2 = 1.6k	1014#	4
		PIER1	4616(12) = 55.4k	.9(450)(31)²/2 = 195k		
		PIER2	2580(12) = 31k	.9(450)(12.5)²/2 = 31.6k		

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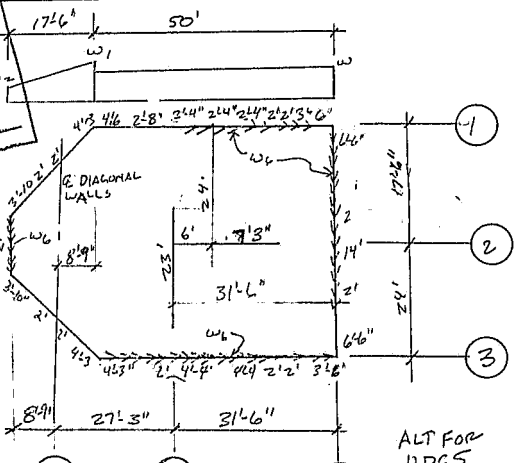
STRUCTURAL DESIGN & ENGINEERING

Project: BREEZE HILL	By: JMW	Sheet No: 03
Location: PORTLAND, OR	Date: 08/01	
Client: CHRISTENSEN	Revised: 09/02	Job No: B0121
	Date:	

2ND FLR

WF = 370 #/LF
w_1 = 455 #/LF
w_2 = 307 #/LF
w_3 = 343 #/LF
w_4 = 126 #/LF
w_5 = 84 #/LF
w_6 = 84 #/LF



CHECK e

F/B
r = (18.1/51.8)(10/23) = .15
e = 2 - 20/(23502)(1/6)(115²)) = 0 ~ 1.0

S/B
r = (15.1/52.8)(10/17) = .17
e = 2 - 20/(23502)(1/6)(.17) = 0 ~ 1.0

ALT FOR HDCS USE PHDS W/SSTB24

WALL	SHEAR ABOVE	SHEAR THIS LVL	TOTAL SHEAR	STRESS	M_{OT}	M_{RES}	T/C	USE
9/02								
1	10.8K PIER21 PIER25	11.75K	22.55K	949#/L	949.2(4) = 114 K-K 8540 (12) = 102 K-K 8374 (13) = 109 K-K	.9(3300)3²/2 = 5.9 K-K .9(1650)2¹/2 = 327 K-K .9(1650)25/2 = 46.1 K-K	2716#	7 HDCS/22 SSTB24
2	—	11.1K	11.1K	837#/L	837(7.25)(9.5) = 57.6 K-K 857(6)(9.5) = 47.7 K-K	.9(580)(7.25)²/2 = 137 K-K .9(340)(6)²/2 = 55.1 K-K	6060# 7033#	7 HDDA SSTB34 (2)2x
3	10.8K PIER19 PIER24	11.75K	22.55K	724#/L	724(2)(6) = 8.69 K-K 7901 (12) = 94.8 K-K 8450 (12) = 101 K-K	.9(3300)(3)²/2 = 5.94 K-K .9(1650)(11)²/2 = 26.8 K-K .9(1650)24²/2 = 428 K-K	1374#/L	6
A	6.75K PIER	9.5K	16.25K	951#/L	951(2)(6) = 11.4 K-K 8125 (12) = 97.5 K-K	.9(2140)(2)²/2 = 3.85 K-K .9(1070)(17.5)²/2 = 147 K-K	3780#	7 HDCS/22 W/SSTB24
B	7.7K	10.4K	18.1K	787#/L	18100 (12) = 217 K-K	.9(300)(23)²/2 = 71 K-K	6338#	6 PHD8 SSTB34
C	7.2K PIER	9.9K	17.1K	552#/L	552.2)(6) = 6.62 K-K 7200 (12) = 86.4 K-K	.9(2160)(2)²/2 = 5.9 K-K .9(1080)(5)²/2 = 121.5 K-K	1242#	6
IC		5.6K						

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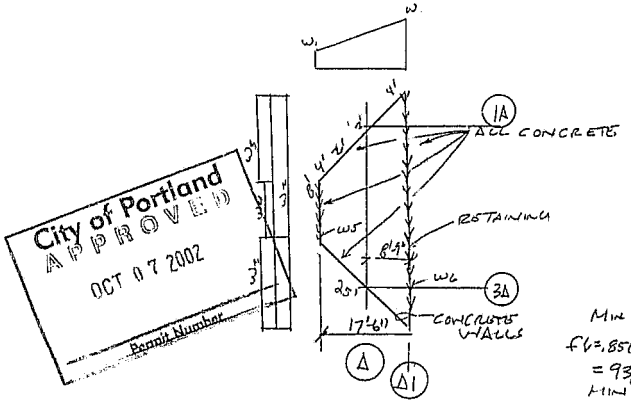
STRUCTURAL DESIGN & ENGINEERING

Project	BREEZE HILL	By	JMW
Location	PORTLAND, OR	Date	8/01
Client	CHRISTENSEN	Revised	7/02
		Date	

Sheet No 04
Job No 80121

1ST FLOOR

$w_1 = 635$ plf
$w_1 = 497$ plf
$w_2 = 49$ plf
$w_3 = 221$ plf
$w_4 = 147$ plf
$w_5 = 147$ plf
$w_6 = 105$ plf



MIN STRESS
$f_t = 3.85\sqrt{(3000)}$
$= 93$ psi
MIN. REINF

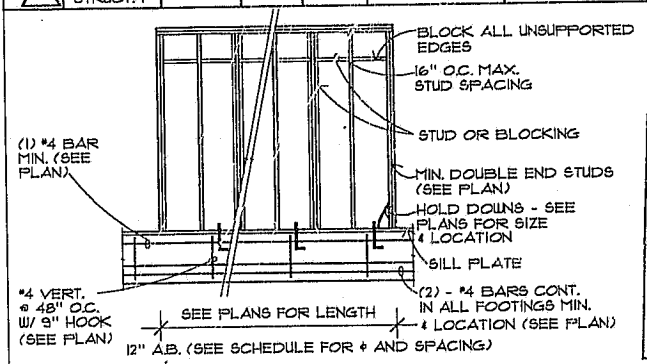
WALL	SHEAR ABOVE	SHEAR THIS LVL	TOTAL SHEAR	STRESS	MOT	MRES	T/C	USE
1A	5.9k	6.1k	12k x1.4	67 psi	16.8(10) = 168'-k	.9(2660)(17.5)²/2 = 358'-k	—	MIN REINF
3A	5.9k	6.1k	12k x1.4	67 psi	16.8(10) = 168'-k	.9(2600)(17.5)²/2 = 358'-k	—	
A	16.25k	6.9k	23.15k x1.4	193 psi	32.4(10) = 324'-k	.9(2600)(17.5)²/2 = 358'-k	—	
A1	—	7.9k	7.9k x1.4	2.0 psi	11.1k(10) = 111'-k	.9(1500)(50)²/2 = 1688'-k	—	

-FOR LINE A' BY INSTRUCTION THE SOLID 25' WALL WILL TAKE ALL THE LOAD AT THIS LEVEL BASED ON STIFFNESS SHOWN IN DESIGN OF THE 4'-2'-4' WALL TO TAKE THE LOAD CONTRIBUTED TO IT FROM WALL ABOVE

A'	8.125k	—	8.125k x1.4	11.4 psi	5.69k(6) = 34.14'-k	.9(2600)(9)²/2 = 18.7'-k	3.1	(2)#5 SAME

5
Rev 7/02

TYPE	SHEAT'G	SIDE (S)	STUD BL.K'G	SILL PLATE	EDGES NAIL'G	WALL ANCHOR
1	1/2" GYP.	ONE	2X	2X	5d COOLER NAILS @ 7" O.C.	1/2"ϕ @ 48" 16d @ 12"
2	1/2" GYP.	BOTH	2X	2X	5d COOLER NAILS @ 7" O.C.	1/2" ϕ@ 48" 16d @ 6"
3	15/32" APA RATED	ONE	2X	2X	10d @ 6" O.C.	1/2" ϕ@ 36" 16d @ 6"
4	15/32" APA RATED	ONE	2X	2X	10d @ 4" O.C.	1/2" ϕ@ 24" 16d @ 4"
5	15/32" APA RATED	BOTH	2X	2X	10d @ 6" O.C.	1/2" ϕ@ 16" 16d @ 3"
6	15/32" APA RATED	BOTH	2X	3X	10d @ 4" O.C.	5/8" ϕ@ 12" (2) 20d @ 4"
7	15/32" STRUCT. I	BOTH	3X	3X	10d @ 4" O.C.	5/8" ϕ@ 12" (2) 20d @ 3"



1. ALL EXTERIOR WALLS TO BE SHEATHED WITH 15/32" APA-RATED CD-X SHEATHING, MIN. SEE PLANS.

2. WALL ANCHOR - ANCHOR BOLTS TO BE USED AT WALLS OVER FOUNDATION WALL. 16d NAILS USED AT BOTTOM PLATES TO FLOOR FRAMING BELOW. 1/2"ϕx10" AB @4'-0"O.C., EXCEPT AS NOTED.

3. "△X" SYMBOL INDICATES THE SHEARWALL. THE NUMBER INSIDE OF THE SYMBOL INDICATES THE TYPE OF SHEAR MATRIAL AS SHOWN ON THE SHEARWALL SCHEDULE.

4. 10d AND 16d NAILS SHALL BE COMMON NAILS.

5. NAIL "COLLECTOR" BLOCKING TO PLYWOOD WITH SAME AS EDGE NAILING. SEE PLAN FOR LOCATION.

6. SHEARWALLS SHALL EXTEND FROM SILL PLATE TO ROOF OR SECOND FLOOR DIAPHRAGM. USE SHEAR MATERIAL, BLOCKS OR OTHER STRUCTURAL ELEMENTS TO PROVIDE A POSITIVE CONNECTION BETWEEN DIAPHRAGM AND WALLS. SEE DETAIL.

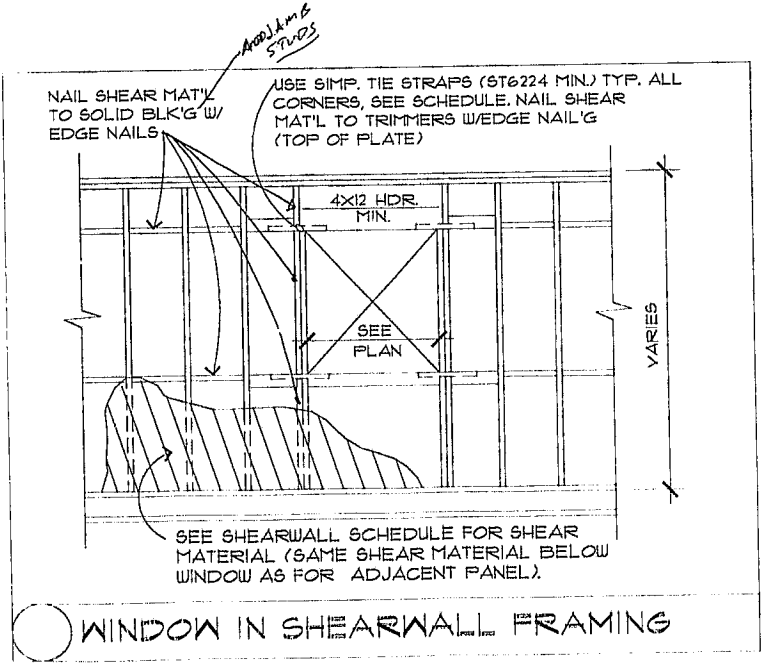
7. WHERE PLYWOOD IS APPLIED ON BOTH FACES OF WALL AND NAIL SPACING IS LESS THAN 6", PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS OR FRAMING SHALL BE 3x.

8. WHERE 2 ROWS OF NAILS ARE REQUIRED, THEY MUST BE STAGGERED.

SHEARWALL SCHEDULE

6
REV 07/12

City of Portland
APPROVED
OCT 07 2002
Permit Number



WINDOW IN SHEARWALL FRAMING

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STRUCTURAL DESIGN & ENGINEERING

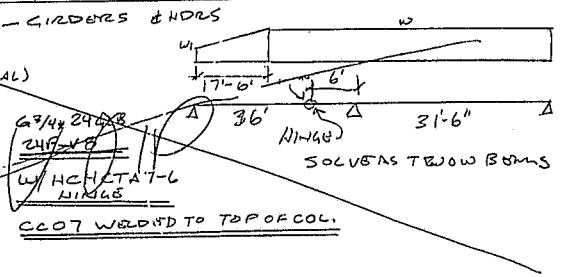
Project	BREEZE HILL	By	JDW
Location	PORTLAND, OR	Date	8/01
Client	CHRISTENSEN	Revised	
		Date	

Sheet No. 7
Job No 80121

LIMITED FRAMING — GIRDERS & HDRS

1) ROOF GIRDER (OPTIONAL)

W_{DL} = 480 plf
W_{SL} = 600 plf
W_{IDL} = 130 plf
W_{ISL} = 168 plf



CCO7 WELDED TO TOP OF COL.

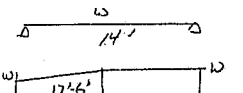
2) FLOOR GIRDER

W_{DL} = 440 plf
W_{LL} = 1200 plf
W_{PART} = 480 plf
W_{IDL} = 130 plf
W_{ILL} = 375 plf
W_{IPART} = 180 plf

5/8 x 28 GLB → RIGHT

SEE FOLLOWING PAGES FOR CALCS

USE W 14x90
A992 STEEL



BEAR & BOLT TO TOP OF COL.

STEEL COL.

INTERIOR

WITH ROOF LOAD P = 54K
WITHOUT ROOF LOAD P = 38K
} TS 4x4x1/4

BASE PLATE

INTERIOR

P = 54K

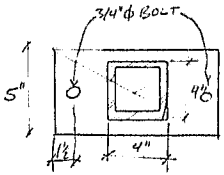
$F_p = .7 f'_c = .7\ 2500 = 1750$ psi

$A_1 = \frac{54}{1.75} = 31 in^2$

B = 5 $n = (5 - .8(4))/2 = 0.9"$

N = 11" $m = (11 - .95(4))/2 = 3.6"$

$f_p = \frac{54}{5x11} = 981$ psi $t = (3.6)\left(\frac{.981}{.125(36)}\right)^{1/2} = 1.18" \sim 1\frac{1}{4}"$



ALT INT

$f_p = \frac{29}{5x11} = 0.527$ psi $t = 3.6\left(\frac{.527}{.125(36)}\right)^{1/2} = 0.87 \sim 1"$ USE

PERIMETER WALL

$F_p = .35(2500) = 875$ psi $A_1 = (29/.875) = 33$ $f_p = \frac{29}{5x11} = .527$ $t = 3.6\left(\frac{.527}{.125(36)}\right)^{1/2} = 1"$ USE

Willamette Industries, Inc.
Engineered Wood Products

AG ROLIN CONSULTING

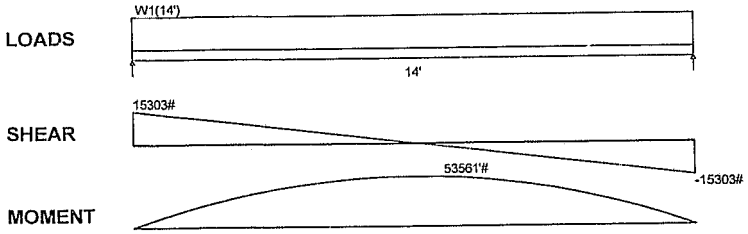
E-Z Calc (v6.2.0-R)

JOB NAME: Breeze Hill
LOCATION: Portland, OR
JOB NO: B0121

DESIGNER: JMW

08/27/2001
SHEET:

MARK BEAM Floor Beam 2) Floor Beam- Right Side
Input reflects horizontal center to center spans
W1= 2160 plf LL = 1200 plf DL = 960 plf Duration = 100%
Member Weight = 26.2 plf



Maximum Reactions	Support 1	Support 2
Critical Live Load: (DOL)	8400 (100)	8400 (100)
Dead Load:	6903	6903

	% Allow.	Maximum	Allow.	DOL - Control
Shear: (lbs)	67%	11477	17220	100% - All Loads
Positive Moment: (ft-lbs)	72%	53561	74185	100% - All Loads

Deflection	LL	Ratio	TL	Ratio	
Span:	0.146	/ / 1153	0.265	/ / 633	EI =7119 x 10^6

***** USE 5.125 x 21 INCH Willamette GLB(24F-V4 DF) *****

Min end bearing = 4.59 inches. Support bearing length requirements must be checked separately. Continuous lateral support required at top edge. Lateral support required at bearings for bottom edge.

Willamette Industries, Inc.
Engineered Wood Products

AC ROLIN CONSULTING

9

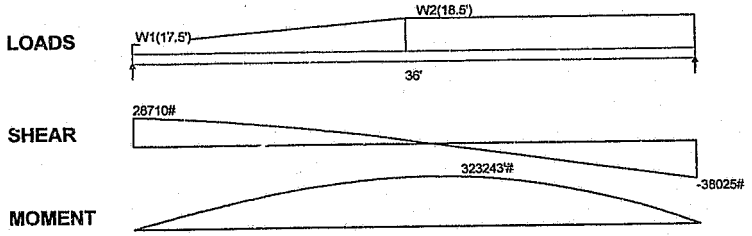
E-Z Calc (v6.2.0-R)

JOB NAME: Breeze Hill
LOCATION: Portland, OR
JOB NO: B0121

DESIGNER: JMW

08/27/2001
SHEET:

MARK BEAM Floor Beam 2) Floor Beam- Left Side
Input reflects horizontal center to center spans
W1= 585 to 2160 plf LL = 325 to 1200 plf DL = 260 to 960 plf Duration = 100%
W2= 2160 plf LL = 1200 plf . DL = 960 plf Duration = 100%
Member Weight = 76.6 plf



Maximum Reactions	Support 1	Support 2
Critical Live Load: (DOL)	15184 (100)	20359 (100)
Dead Load:	13526	17666

	% Allow.	Maximum	Allow.	DOL - Control
Shear: (lbs)	62%	-31315	50400	100% - All Loads
Positive Moment: (ft-lbs)	106%	323243	304186	100% - All Loads

Deflection	LL	Ratio	TL	Ratio	
Span:	0.651	l / 663	1.22	l / 354	EI =61236 x 10^6

***** OVER STRESSED! DO NOT USE 8.75 x 36 INCH Willamette GLB(24F-V8 DF) *****

PROGRAM LIMITS BASED ON NDS 8 3/4 x 40½ WOULD WORK

Min end bearing = 6.69 inches. Support bearing length requirements must be checked separately. Continuous lateral support required at top edge. Lateral support required at bearings for bottom edge.

STEEL OPTION:

$S = \frac{323243(12)}{16(50E3)} = 129\ in^3$

USE W14x90 w/ ¼x8 PLATE TOP & ⅞"Ø x 3½" STUDS @ 2'-0" O.C. STAGGERED COUNTERSINK NUT & WASHER

$I = 362\ in^4$

$S = 143\ in^3$

$I_s = \frac{I_w E_w}{E_s} = \frac{23921.666}{29E3} = 132 in^4$

FOR INFORMATION ONLY - DO NOT USE

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project BREEZE HILL	By JMW	Sheet No 10
Location PORTLAND, OR	Date 08/01	
Client CHRISTENSEN	Revised	Job No B0121
	Date	

CONCRETE WALLS BASEMENT LEVEL

TYPICAL

P_{DL} = 1950 #/ft × 1.2 = 2340 } 3780
P_{LL} = 900 #/ft × 1.6 = 1440

W60
× 1.2 = 2340 #/ft
× .4 = 360 #/ft
2700

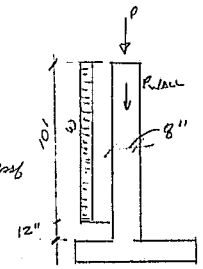
SEISMIC

$F_p = w = \frac{a_p C_a I}{R_p}\left(1+3\frac{h_x}{h_r}\right)W$

a=1.0 hx=0 I=1.0 W150 #/ft
Rp=3.0 hr=27

$\frac{a_p}{R_p}\left(1+3\frac{h_x}{h_r}\right) = 0.33$ USE 0.7 MIN

$F_p = w = .7(.36)(150) = 38$ #/ft



AT COL POINTLOAD (÷6')

w/150

P_{DL} = 13350 + 13500/6 = 3600 #/ft × 1.2 = 4320 × 1.2 = 4320
P_{LL} = 15500/6 = 2585 #/ft × 1.6 = 4130 × .4 = 1033
8450 #/ft 5353 #/ft

#5 @ 12" O.C. EW TYP. CONTINUED IN WALL

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project BRISBEE HILL	By JHW	Sheet No. 10
Location PORTLAND, OR	Date 08/01	
Client CHRISTENSEN	Revised	Job No. B0121
	Date	

CONCRETE WALLS BASEMENT LEVEL

TYPICAL

P_{DL} = 1950 #/ft × 1.2 = 2340 } 3780
P_{LL} = 900 #/ft × 1.6 = 1440

W60
× 1.2 = 2340 #/ft
× .4 = 360 #/ft
2700

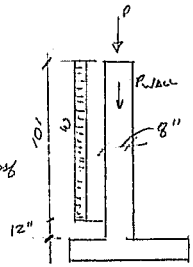
SEISMIC

$F_p = W = \frac{a_p C_a I}{R_p}\left(1+3\frac{h_x}{h_r}\right)W$

$a = 1.0$ $h_x = 0$ $I = 1.0$
$R_p = 3.0$ $h_r = 27$ W150 #/ft

$\frac{a_p}{R_p}\left(1+3\frac{h_x}{h_r}\right) = 0.33$
use 0.7 MIN

$F_p = W = .7(.36)(150) = 38$ #/ft



AT COL POINTLOAD (+6')

P_{DL} = 13350 + 13500/6 = 3600 #/ft × 1.2 = 4320
P_{LL} = 15500/6 = 2585 #/ft × 1.6 = 4130
8450 #/ft

w/150
× 1.2 = 4320
× .4 = 1033
5353 #/ft

#5 @ 12" O.C. EWT TYP.
CONTINUED IN WALL

//

WALL OUTPUT

VALUES RELATED TO AXIAL LOADS AND GENERAL WALL REQUIREMENTS

Max axial allowable load is = 92.01 kips/ft
Acutal axial load is 3.780 kips/ft SF = 24.34
Min Horiz. steel = 0.240 in^2 Actual = 0.310 in^2 OK
Min Vert. steel = 0.144 in^2 Actual = 0.310 in^2 OK
Min. H = 6.000 in Actual H = 8.000 in OK

WALL GEOMETRY

Wall thickness = 8.000 in
Wall unbraced height = 11.00 ft
Horizontal rebar spacing is 12.00 in
Horizontal rebar size is #5
Vertical rebar spacing is 12.00 in
Vertical rebar size is #5
Rebar yield strength is 6.00E+04 psi
Concrete compressive strength is 3000 psi
Rebar cover is 3.688 in

WALL POINT LOADS

LOAD ID	DIST. FROM BASE (FT)	LOAD (KIPS)

Uniform Load is 0 (kips/ft)
Axial load is 3.780 (kips)

WALL OUTPUT

12

VALUES RELATED TO AXIAL LOADS AND GENERAL WALL REQUIREMENTS

Max axial allowable load is = 92.01 kips/ft
Acutal axial load is 2.700 kips/ft SF = 34.08
Min Horiz. steel = 0.240 in^2 Actual = 0.310 in^2 OK
Min Vert. steel = 0.144 in^2 Actual = 0.310 in^2 OK
Min H 6.000 in Actual H = 8.000 in OK

VALUES RELATED TO WALL SHEAR AND MOMENT

Allowable moment = 2.684 ft-kips/ft
Actual moment = 0.575 ft-kips/ft OK
Allowable Shear = 4.732 kips/ft
Actual Max Shear = 0.261 kips/ft OK
Note, ACI section 11.16 may provide a larger allowable shear value!
Warning, rebar area is less than ACI 10.5.1 minimum!

$A_{s\,min} = \frac{3(3000)^{1/2}}{60000}(12(4)) = 0.131\,in^2$

or

$A_{s\,min} = \frac{200(12x4)}{60000} = 0.16\,in^2$

USE .05 EW / GL

WALL GEOMETRY

Wall thickness = 8.000 in
Wall unbraced height = 11.00 ft
Horizontal rebar spacing is 12.00 in
Horizontal rebar size is #5
Vertical rebar spacing is 12.00 in
Vertical rebar size is #5
Rebar yield strength is 6.00E+04 psi
Concrete compressive strength is 3000 psi
Rebar cover is 3.688 in

WALL POINT LOADS

LOAD ID DIST FROM BASE (FT) LOAD (KIPS)

Uniform Load is 0.0380 (kips/ft)
Axial load is 2.700 (kips)

WALL OUTPUT

VALUES RELATED TO AXIAL LOADS AND GENERAL WALL REQUIREMENTS

Max axial allowable load is = 92.01 kips/ft
Acutal axial load is 8.450 kips/ft SF = 10.89
Min Horiz. steel = 0.240 in^2 Actual = 0.310 in^2 OK
Min Vert. steel = 0.144 in^2 Actual = 0.310 in^2 OK
Min. H = 6.000 in Actual H = 8.000 in OK

WALL GEOMETRY

Wall thickness = 8.000 in
Wall unbraced height = 11.00 ft
Horizontal rebar spacing is 12.00 in
Horizontal rebar size is #5
Vertical rebar spacing is 12.00 in
Vertical rebar size is #5
Rebar yield strength is 6.00E+04 psi
Concrete compressive strength is 3000 psi
Rebar cover is 3.688 in

WALL POINT LOADS

LOAD ID DIST. FROM BASE (FT) LOAD (KIPS)

Uniform Load is 0 (kips/ft)
Axial load is 8.450 (kips)

WALL OUTPUT

VALUES RELATED TO AXIAL LOADS AND GENERAL WALL REQUIREMENTS

Max axial allowable load is = 92.01 kips/ft
Acutal axial load is 5.353 kips/ft SF = 17.19
Min Horiz. steel = 0.240 in^2 Actual = 0.310 in^2 OK
Min Vert. steel = 0.144 in^2 Actual = 0.310 in^2 OK
Min. H = 6.000 in Actual H = 8.000 in OK

VALUES RELATED TO WALL SHEAR AND MOMENT

Allowable moment = 2.684 ft-kips/ft
Actual moment = 0.575 ft-kips/ft OK
Allowable Shear = 4.732 kips/ft
Actual Max Shear = 0.261 kips/ft OK
Note, ACI section 11.16 may provide a larger allowable shear value!
Warning, rebar area is less than ACI 10.5.1 minimum!

#5 @ 12" o.c EW

WALL GEOMETRY

Wall thickness = 8.000 in
Wall unbraced height = 11.00 ft
Horizontal rebar spacing is 12.00 in
Horizontal rebar size is #5
Vertical rebar spacing is 12.00 in
Vertical rebar size is #5
Rebar yield strength is 6.00E+04 psi
Concrete compressive strength is 3000 psi
Rebar cover is 3.688 in

WALL POINT LOADS

LOAD ID DIST. FROM BASE (FT) LOAD (KIPS)

Uniform Load is 0.0380 (kips/ft)
Axial load is 5.353 (kips)

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project	BARBER/HALL	By JMW	Sheet No 15
Location	PDX	Date 08/02	
Client	BUTCHER	Revised 09/02	Job No 8012
		Date	

RETAINING WALL

(1) RESTRAINED WALL W/ KEY 10" THK — 11' TALL CONSTRUCTION REQUIRES THAT THIS WALL NOT BE A CANTILEVER WALL DURING CONSTRUCTION

(2) RESTRAINED WALL
9' MAX BACK FILL
11' RESTRAINED
8" THK

REVISED W/ NO SLAB

DESIGN VALUES
CANTILEVER ACTIVE = 35pcf
RESTRAINED ACTIVE = 45pcf
passive = 150pcf
bearing = 2000 psf (per soils report)

Title : BREEZE HILL
Job # : B0121 Dsgnr: JMW Date: AUG 12,2002
Description....
11' CANTILEVER WALL

Page: 17

This Wall in File: C:\RP6\B0121.RP5

RetainPro Version 6.0
Build Date : 10-SEP-2001, (c) 1989-2001

Cantilevered Retaining Wall Design

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	150.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in

Footing Dimensions & Strengths

Toe Width	=	3.00 ft
Heel Width	=	3.50
Total Footing Width	=	6.50
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	30.00 in
Key Distance from Toe	=	2.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 3.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning

Surcharge Over Toe = 75.0 psf
Used for Sliding & Overturning

Design Summary

Total Bearing Load	=	6,420 lbs	
...resultant ecc.	=	8.85 in	
Soil Pressure @ Toe	=	1,660 psf	OK
Soil Pressure @ Heel	=	315 psf	OK
Allowable	=	2,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,324 psf	
ACI Factored @ Heel	=	441 psf	
Footing Shear @ Toe	=	24.6 psi	OK
Footing Shear @ Heel	=	21.8 psi	OK
Allowable	=	85.0 psi	
Wall Stability Ratios			
Overturning	=	2.51	OK
Sliding	=	1.54	OK
Sliding Calcs (Vertical Component NOT Used)			
Lateral Sliding Force	=	2,568.9 lbs	
less 100% Passive Force	= -	1,398.1 lbs	
less 100% Friction Force	= -	2,568.2 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,324	441 psf
Mu' : Upward	=	9,156	2,485 ft-#
Mu' : Downward	=	1,654	6,956 ft-#
Mu: Design	=	7,502	4,472 ft-#
Actual 1-Way Shear	=	24.58	21.81 psi
Allow 1-Way Shear	=	85.00	85.00 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	

Stem Construction

		Top Stem	2nd
Design height	ft =	Stem OK 4.00	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete
Thickness	=	10.00	10.00
Rebar Size	=	# 5	# 5
Rebar Spacing	=	12.00	6.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.386	0.786
Total Force @ Section	lbs =	1,457.8	3,599.8
Moment....Actual	ft-# =	3,401.4	13,199.1
Moment.....Allowable	ft-# =	8,816.6	16,782.8
Shear.....Actual	psi =	18.3	45.3
Shear.....Allowable	psi =	93.1	93.1
Lap Splice if Above	in =	35.60	35.60
Lap Splice if Below	in =	35.60	10.50
Wall Weight	psf =	125.0	125.0
Rebar Depth 'd'	in =	6.63	6.63
Masonry Data			
f'm	psi =		
Fs	psi =		
Solid Grouting	=		
Special Inspection	=		
Modular Ratio 'n'	=		
Short Term Factor	=		
Equiv. Solid Thick.	=		
Masonry Block Type	=	Medium Weight	
Concrete Data			
f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

Other Acceptable Sizes & Spacings
Toe: #4@ 9.75 in, #5@ 15.00 in, #6@ 21.50 in, #7@ 29.00 in, #8@ 38.25 in, #9@ 48
Heel: #4@ 9.75 in, #5@ 15.00 in, #6@ 21.50 in, #7@ 29.00 in, #8@ 38.25 in, #9@ 48
Key: #4@ 12.50 in, #5@ 19.25 in, #6@ 27.25 in, #7@ 37.25 in,

RetainPro Version 6.0
Build Date : 10-SEP-2001, (c) 1989-2001

Cantilevered Retaining Wall Design

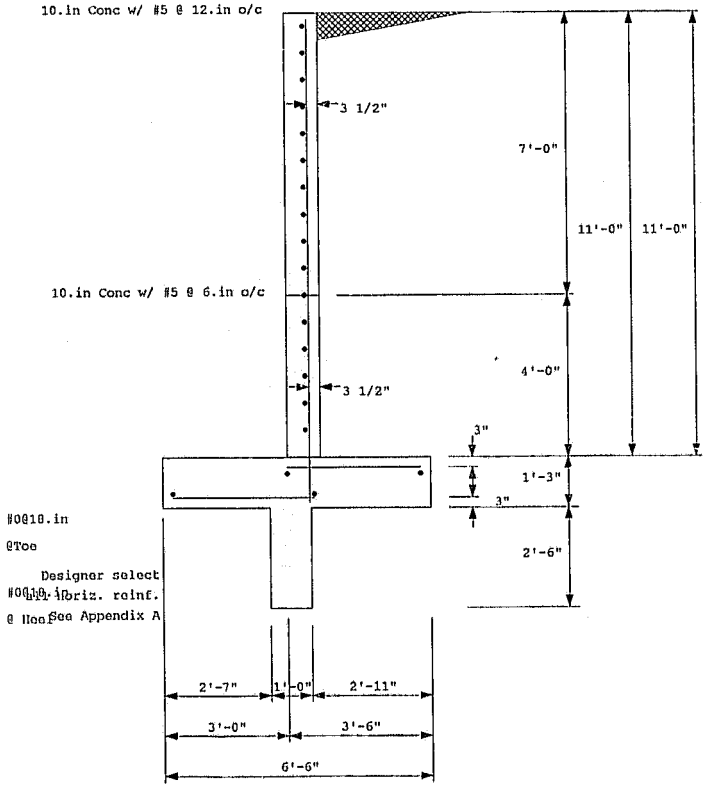
Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	2,626.1	4.08	10,723.2	Soil Over Heel	=	3,226.7	5.17	16,671.1
Toe Active Pressure	=	-27.3	0.42	-11.4	Sloped Soil Over Heel	=			
Surcharge Over Toe	=	-29.8	0.63	-18.6	Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=		0.00	
Load @ Stem Above Soil	=				Soil Over Toe	=			
					Surcharge Over Toe	=	225.0	1.50	337.5
					Stem Weight(s)	=	1,375.0	3.42	4,697.9
					Earth @ Stem Transitions	=			
					Footing Weight	=	1,218.8	3.25	3,960.9
					Key Weight	=	375.0	3.08	1,156.3
					Vert. Component	=			
Total	=	2,568.9	O.T.M. =	10,693.2		Total =	6,420.4 lbs	R.M.=	26,823.7

Resisting/Overturning Ratio = 2.51

Vertical Loads used for Soil Pressure = 6,420.4 lbs

Vertical component of active pressure NOT used for soil pressure


10.in Conc w/ #5 @ 12.in o/c
3 1/2"
7'-0"
11'-0"
11'-0"
10.in Conc w/ #5 @ 6.in o/c
4'-0"
3 1/2"
3"
1'-3"
3"
2'-6"
#0@10.in
@Toe
Designer select
#0@10.in
@ Heel
Add'l horiz. reinf.
See Appendix A
2'-7"
1'-0"
2'-11"
3'-0"
3'-6"
6'-6"

Envelope Joint Displacements, (continued)

Joint Label		X Translate (In)	Lc	Y Translate (In)	Lc	Z Translate (In)	Lc	X Rotate (radians)	Lc	Y Rotate (radians)	Lc	Z Rotate (radians)	Lc
N18	max	0.002	3	0	3	0	3	0	3	0	3	0.000	1
	min	-0.019	6	-0.091	6	-0.003	6	-0.001	6	0	6	0.000	1
N19	max	0.000	3	0.000	3	0.000	3	0	3	0	6	0	2
	min	0.000	2	0.000	2	0.000	2	0	2	0	3	0	3
N20	max	0.000	3	0.000	3	0.000	2	0	2	0	3	0	2
	min	0.000	2	0.000	2	0.000	3	0	3	0	6	0	3
N21	max	0.000	3	0	3	0.000	3	0	2	0	6	0	3
	min	0.000	6	-0.003	2	0.000	2	0	3	0	3	0	2
N22	max	0.000	3	0	3	0.000	2	0	3	0	3	0	3
	min	0.000	6	-0.003	2	0.000	3	0	2	0	6	0	2
N23	max	0.000	6	0	3	0.000	2	0	3	0	6	0	3
	min	0.000	3	-0.003	6	0.000	3	0	2	0	3	0	3
N24	max	0.000	6	0	3	0.000	3	0	2	0	3	0	3
	min	0.000	3	-0.003	6	0.000	2	0	3	0	6	0	6

Envelope Reactions

Joint Label		X Force (Lb)	Lc	Y Force (Lb)	Lc	Z Force (Lb)	Lc	X Moment (K-ft)	Lc	Y Moment (K-ft)	Lc	Z Moment (K-ft)	Lc
N19	max	15.186	2	2676.099	2	5.662	2	0.000	1	0.000	1	0.000	1
	min	-0.409	3	207.582	3	-1.328	3	0.000	1	0.000	1	0.000	1
N20	max	15.186	2	2676.099	2	1.328	3	0.000	1	0.000	1	0.000	1
	min	-0.409	3	207.582	3	-5.662	2	0.000	1	0.000	1	0.000	1
N23	max	-124.308	3	0.000	1	11.675	3	0.000	1	0.000	1	0.000	1
	min	-2990.214	6	0.000	1	-49.784	2	0.000	1	0.000	1	0.000	1
N24	max	-124.308	3	0.000	1	49.784	2	0.000	1	0.000	1	0.000	1
	min	-2990.214	6	0.000	1	-11.675	3	0.000	1	0.000	1	0.000	1
N22	max	2975.586	6	0.000	1	10.353	3	0.000	1	0.000	1	0.000	1
	min	124.716	3	0.000	1	-44.157	2	0.000	1	0.000	1	0.000	1
N21	max	2975.586	6	0.000	1	44.157	2	0.000	1	0.000	1	0.000	1
	min	124.716	3	0.000	1	-10.353	3	0.000	1	0.000	1	0.000	1
Reaction Totals :	max	0.000	3	5352.197	2	0.000	2						
	min	0.000	2	415.164	3	0.000	3						

Envelope Member Section Forces

Member Label	Section		Axial (Lb)	Lc	Shear y-y (Lb)	Lc	Shear z-z (Lb)	Lc	Torque (K-ft)	Lc	Moment y-y (K-ft)	Lc	Moment z-z (K-ft)	Lc
M1	1	max	-3.942	3	-41.248	3	-0.091	3	0.002	6	0.005	6	0.019	3
		min	-89.577	6	-814.618	6	-2.167	6	0	3	0	3	-0.309	6
	2	max	-3.942	3	-26.609	3	-0.091	3	0.002	6	0.004	6	0.121	6
		min	-89.577	6	-906.654	6	-2.167	6	0	3	0	3	0.036	3
	3	max	-3.942	3	-11.971	3	-0.091	3	0.002	6	0.003	6	0.598	6
		min	-89.577	6	-998.691	6	-2.167	6	0	3	0	3	0.046	3
M2	1	max	-8.249	3	974.035	2	0	1	0	1	0.003	6	0.502	2
		min	-187.544	6	-151.265	3	0	1	0	1	0	3	0.015	3
	2	max	-8.249	3	0	1	0	1	0	1	0.003	6	0.406	3
		min	-187.544	6	0	1	0	1	0	1	0	3	-2.014	2
	3	max	-8.249	3	151.265	3	0	1	0	1	0.003	6	0.502	2
		min	-187.544	6	-974.035	2	0	1	0	1	0	3	0.015	3

Envelope Member Section Forces, (continued)

Member Label	Section		Axial (Lb)	Lc	Shear y-y (Lb)	Lc	Shear z-z (Lb)	Lc	Torque (K-ft)	Lc	Moment y-y (K-ft)	Lc	Moment z-z (K-ft)	Lc
M3	1	max	-3.942	3	998.691	6	2.167	6	0	3	0.003	6	0.598	6
		min	-89.577	6	11.971	3	0.091	3	-0.002	6	0	3	0.046	3
	2	max	-3.942	3	906.654	6	2.167	6	0	3	0.004	6	0.121	6
		min	-89.577	6	26.609	3	0.09[illegible]	3	-0.002	6	0	3	0.036	3
	3	max	-3.942	3	814.618	6	2.167	6	0	3	0.005	6	0.019	3
		min	-89.577	6	41.248	3	0.091	3	-0.002	6	0	3	-0.309	6
M4	1	max	361.153	6	138.595	6	-0.224	3	0.001	6	0.005	6	-0.001	3
		min	15.842	3	70.383	3	-5.149	6	0	3	0	3	-0.18	6
	2	max	361.153	6	68.655	6	-0.224	3	0.001	6	-0.001	3	-0.12	3
		min	15.842	3	0.443	3	-5.149	6	0	3	-0.012	6	-0.53	6
	3	max	361.153	6	-1.285	6	-0.224	3	0.001	6	-0.001	3	-0.004	3
		min	15.842	3	-69.496	3	-5.149	6	0	3	-0.029	6	-0.644	6
M5	1	max	92.806	6	-17.197	3	-5.03	3	0.346	3	-0.002	3	-0.005	3
		min	4.039	3	-3292.367	6	-115.545	6	-3.997	6	-0.045	6	-0.824	6
	2	max	92.806	6	-19.788	3	-5.03	3	0.346	3	-0.003	3	-0.003	3
		min	4.039	3	-3294.957	6	-115.545	6	-3.997	6	-0.059	6	-0.412	6
	3	max	92.806	6	-22.378	3	-5.03	3	0.346	3	-0.003	3	0	3
		min	4.039	3	-3297.548	6	-115.545	6	-3.997	6	-0.074	6	0	6
M6	1	max	115.545	6	-22.378	3	92.806	6	0	6	-0.003	3	0.346	3
		min	5.03	3	-3297.548	6	4.039	3	0	3	-0.074	6	-3.997	6
	2	max	115.545	6	-32.74	3	92.806	6	0	6	-0.001	3	0.359	3
		min	5.03	3	-3307.909	6	4.039	3	0	3	-0.028	6	-2.346	6
	3	max	115.545	6	-43.101	3	92.806	6	0	6	0.019	6	0.378	3
		min	5.03	3	-3318.27	6	4.039	3	0	3	0.001	3	-0.689	6
M7	1	max	110.154	6	107.068	3	0	1	0	1	0.02	6	0.378	3
		min	4.753	3	107.068	6	0	1	0	1	0.001	3	-0.69	6
	2	max	110.154	6	0	1	0	1	0	1	0.02	6	0.102	3
		min	4.753	3	0	1	0	1	0	1	0.001	3	-0.966	6
	3	max	110.154	6	-107.068	3	0	1	0	1	0.02	6	0.378	3
		min	4.753	3	-107.068	6	0	1	0	1	0.001	3	-0.69	6
M8	1	max	115.545	6	3318.27	6	-4.039	3	0	3	0.019	6	0.378	3
		min	5.03	3	43.101	3	-92.806	6	0	6	0.001	3	-0.689	6
	2	max	115.545	6	3307.909	6	-4.039	3	0	3	-0.001	3	0.359	3
		min	5.03	3	32.74	3	-92.806	6	0	6	-0.028	6	-2.346	6
	3	max	115.545	6	3297.548	6	-4.039	3	0	3	-0.003	3	0.346	3
		min	5.03	3	22.378	3	-92.806	6	0	6	-0.074	6	-3.997	6
M9	1	max	92.806	6	3297.548	6	115.545	6	3.997	6	-0.003	3	0	3
		min	4.039	3	22.378	3	5.03	3	-0.346	3	-0.074	6	0	6
	2	max	92.806	6	3294.957	6	115.545	6	3.997	6	-0.003	3	-0.003	3
		min	4.039	3	19.788	3	5.03	3	-0.346	3	-0.059	6	-0.412	6
	3	max	92.806	6	3292.367	6	115.545	6	3.997	6	-0.002	3	-0.005	3
		min	4.039	3	17.197	3	5.03	3	-0.346	3	-0.045	6	-0.824	6
M10	1	max	361.153	6	69.496	3	5.149	6	0	3	-0.001	3	-0.004	3
		min	15.842	3	1.285	6	0.224	3	-0.001	6	-0.029	6	-0.644	6
	2	max	361.153	6	-0.443	3	5.149	6	0	3	-0.001	3	-0.12	3
		min	15.842	3	-68.655	6	0.224	3	-0.001	6	-0.012	6	-0.53	6
	3	max	361.153	6	-70.383	3	5.149	6	0	3	0.005	6	-0.001	3
		min	15.842	3	-138.595	6	0.224	3	-0.001	6	0	3	-0.18	6
M11	1	max	-5.283	3	694.355	6	-0.728	3	0	3	0.016	6	2.676	6
		min	-120.726	6	-25.835	3	-16.479	6	-0.002	6	0.001	3	-0.328	3

Envelope Member Section Forces, (continued)

Member Label	Section		Axial (Lb)	Lc	Shear y-y (Lb)	Lc	Shear z-z (Lb)	Lc	Torque (K-ft)	Lc	Moment y-y (K-ft)	Lc	Moment z-z (K-ft)	Lc
	2	max	-5.283	3	622.566	6	-0.728	3	0	3	0.008	6	2.347	6
		min	-120.728	6	-4.186	3	-16.479	6	-0.002	6	0	3	-0.32	3
	3	max	-5.283	3	550.776	6	-0.728	3	0	3	0	3	2.054	6
		min	-120.728	6	17.462	3	-16.479	6	-0.002	6	-0.001	6	-0.324	3
M12	1	max	-6.719	3	741.822	6	0	1	0	1	0	3	0.735	6
		min	-153.692	6	-223.699	3	0	1	0	1	0	6	-0.307	3
	2	max	-6.719	3	0	1	0	1	0	1	0	3	0.271	3
		min	-153.692	6	0	1	0	1	0	1	0	6	-1.181	6
	3	max	-6.719	3	223.699	3	0	1	0	1	0	3	0.735	6
		min	-153.692	6	-741.822	6	0	1	0	1	0	6	-0.307	3
M13	1	max	-5.283	3	-17.462	3	16.479	6	0.002	6	0	3	2.054	6
		min	-120.728	6	-550.776	6	0.728	3	0	3	-0.001	6	-0.324	3
	2	max	-5.283	3	4.186	3	16.479	6	0.002	6	0.008	6	2.347	6
		min	-120.728	6	-622.566	6	0.728	3	0	3	0	3	-0.32	3
	3	max	-5.283	3	25.835	3	16.479	6	0.002	6	0.016	6	2.676	6
		min	-120.728	6	-694.355	6	0.728	3	0	3	0.001	3	-0.328	3
M14	1	max	-124.449	3	5.074	2	0	1	0	6	0	1	0	1
		min	-2788.45	6	5.074	1	0	1	0	3	0	1	0	1
	2	max	-122.32	3	0	1	0	1	0	6	0	1	-0.009	1
		min	-2786.32	6	0	1	0	1	0	3	0	1	-0.009	2
	3	max	-120.19	3	-5.074	2	0	1	0	6	0	1	0	1
		min	-2784.19	6	-5.074	1	0	1	0	3	0	1	0	1
M15	1	max	-124.449	3	5.074	6	0	1	0	3	0	1	0	1
		min	-2788.45	6	5.074	2	0	1	0	6	0	1	0	1
	2	max	-122.32	3	0	1	0	1	0	3	0	1	-0.009	2
		min	-2786.32	6	0	1	0	1	0	6	0	1	-0.009	6
	3	max	-120.19	3	-5.074	6	0	1	0	3	0	1	0	1
		min	-2784.19	6	-5.074	2	0	1	0	6	0	1	0	1
M16	1	max	2676.099	2	0.409	3	1.328	3	0	1	0	1	0	1
		min	207.582	3	-15.186	2	-5.662	2	0	1	0	1	0	1
	2	max	2621.716	2	0.409	3	1.328	3	0	1	0.006	3	0.072	2
		min	153.2	3	-15.186	2	-5.662	2	0	1	-0.027	2	-0.002	3
	3	max	2567.334	2	0.409	3	1.328	3	0	1	0.013	3	0.144	2
		min	98.818	3	-15.186	2	-5.662	2	0	1	-0.054	2	-0.004	3
M17	1	max	1126.85	6	-11.521	3	11.675	3	0	3	0.158	2	-0.004	3
		min	95.778	3	-421.051	6	-49.784	2	0	6	-0.037	3	-0.708	2
	2	max	1108.723	6	-11.521	3	11.675	3	0	3	0.079	2	0.015	3
		min	77.651	3	-421.051	6	-49.784	2	0	6	-0.018	3	-0.044	2
	3	max	1090.595	6	-11.521	3	11.675	3	0	3	0	3	0.634	6
		min	59.524	3	-421.051	6	-49.784	2	0	6	0	6	0.033	3
M18	1	max	2676.099	2	0.409	3	5.662	2	0	1	0	1	0	1
		min	207.582	3	-15.186	2	-1.328	3	0	1	0	1	0	1
	2	max	2621.716	2	0.409	3	5.662	2	0	1	0.027	2	0.072	2
		min	153.2	3	-15.186	2	-1.328	3	0	1	-0.006	3	-0.002	3
	3	max	2567.334	2	0.409	3	5.662	2	0	1	0.054	2	0.144	2
		min	98.818	3	-15.186	2	-1.328	3	0	1	-0.013	3	-0.004	3
M19	1	max	1126.85	6	-11.521	3	49.784	2	0	6	0.037	3	-0.004	3
		min	95.778	3	-421.051	6	-11.675	3	0	3	-0.158	2	-0.708	2
	2	max	1108.723	6	-11.521	3	49.784	2	0	6	0.018	3	0.015	3
		min	77.651	3	-421.051	6	-11.675	3	0	3	-0.079	2	-0.044	2

Envelope Member Section Forces, (continued)

Member Label	Section		Axial (Lb)	Lc	Shear y-y (Lb)	Lc	Shear z-z (Lb)	Lc	Torque (K-ft)	Lc	Moment y-y (K-ft)	Lc	Moment z-z (K-ft)	Lc
	3	max	1090.595	6	-11.521	3	49.784	2	0	6	0	6	0.634	6
		min	59.524	3	-421.051	6	-11.675	3	0	3	0	3	0.033	3
M20	1	max	2569.164	6	1464.623	2	0.006	3	0.211	2	0	6	0.852	2
		min	112.787	3	3.039	3	-0.035	6	-0.05	3	0	3	0	3
	2	max	2569.164	6	1461.284	2	0.006	3	0.211	2	0	6	0.426	2
		min	112.787	3	-0.3	3	-0.035	6	-0.05	3	0	3	-0.001	3
	3	max	2569.164	6	1457.944	2	0.006	3	0.211	2	0	1	0	1
		min	112.787	3	-3.639	3	-0.035	6	-0.05	3	0	1	0	1
M21	1	max	-112.787	3	1090.595	6	0	1	0	6	0	3	0.634	6
		min	-2569.164	6	59.524	3	0	1	0	3	0	6	0.033	3
	2	max	-112.787	3	1087.256	6	0	1	0	6	0	3	0.317	6
		min	-2569.164	6	56.184	3	0	1	0	3	0	6	0.016	3
	3	max	-112.787	3	1083.917	6	0	1	0	6	0	3	0	1
		min	-2569.164	6	52.845	3	0	1	0	3	0	6	0	1
M22	1	max	-112.787	3	1090.595	6	0	1	0	3	0	6	0.634	6
		min	-2569.164	6	59.524	3	0	1	0	6	0	3	0.033	3
	2	max	-112.787	3	1087.256	6	0	1	0	3	0	6	0.317	6
		min	-2569.164	6	56.184	3	0	1	0	6	0	3	0.016	3
	3	max	-112.787	3	1083.917	6	0	1	0	3	0	6	0	1
		min	-2569.164	6	52.845	3	0	1	0	6	0	3	0	1
M23	1	max	2569.164	6	1464.623	2	0.035	6	0.05	3	0	3	0.852	2
		min	112.787	3	3.039	3	-0.006	3	-0.211	2	0	6	0	3
	2	max	2569.164	6	1461.284	2	0.035	6	0.05	3	0	3	0.426	2
		min	112.787	3	-0.3	3	-0.006	3	-0.211	2	0	6	-0.001	3
	3	max	2569.164	6	1457.944	2	0.035	6	0.05	3	0	1	0	1
		min	112.787	3	-3.639	3	-0.006	3	-0.211	2	0	1	0	1

Envelope Member Deflections

Member Label	Section		x-Translate (in)	Lc	y-Translate (in)	Lc	z-Translate (in)	Lc	x-Rotate (radians)	Lc	(n) L/y Ratio	Lc	(n) L/z Ratio	Lc
M1	1	max	0	3	-0.001	3	0	6	0	3	NC		NC	
		min	0	6	-0.004	2	0	3	-0.001	6	NC		NC	
	2	max	0	3	0	3	0	6	0	3	NC		NC	
		min	0	6	-0.005	2	0	3	-0.001	6	NC		NC	
	3	max	0	3	0	3	0	6	0	3	NC		NC	
		min	0	6	-0.006	2	0	3	-0.001	6	4996.717	2	NC	
M2	1	max	0	3	0	3	0	6	0	3	NC		NC	
		min	0	6	-0.006	2	0	3	-0.001	6	NC		NC	
	2	max	0	1	0.002	3	0	3	0	3	NC		NC	
		min	0	1	-0.016	2	0	6	-0.001	6	NC		NC	
	3	max	0	6	0	3	0	6	0	3	NC		NC	
		min	0	3	-0.006	2	0	3	-0.001	6	NC		NC	
M3	1	max	0	6	0	3	0	6	0	3	NC		NC	
		min	0	3	-0.006	2	0	3	-0.001	6	4996.717	2	NC	
	2	max	0	6	0	3	0	6	0	3	NC		NC	
		min	0	3	-0.005	2	0	3	-0.001	6	NC		NC	
	3	max	0	6	-0.001	3	0	6	0	3	NC		NC	
		min	0	3	-0.004	2	0	3	-0.001	6	NC		NC	
M4	1	max	0	3	-0.001	3	0	6	0	3	NC		NC	
		min	0	6	-0.004	2	0	3	0	2	NC		NC	

Envelope Member Deflections, (continued)

Member Label	Section		x-Translate (in)	Lc	y-Translate (in)	Lc	z-Translate (in)	Lc	x-Rotate (radians)	Lc	(n) L/y Ratio	Lc	(n) L/z Ratio	Lc
	2	max	0	3	-0.001	3	0.001	6	0	3	NC		NC	
		min	-0.001	6	-0.048	6	0	3	0	6	NC		NC	
	3	max	0	3	-0.001	3	0	6	0	3	NC		NC	
		min	-0.001	6	-0.089	6	0	3	0	6	NC		NC	
M5	1	max	0	3	-0.001	3	0	6	0	3	NC		NC	
		min	-0.001	6	-0.089	6	0	3	0	6	NC		NC	
	2	max	0	3	-0.001	3	0	6	0	3	NC		NC	
		min	-0.001	6	-0.09	6	0	3	0	6	NC		NC	
	3	max	0	3	-0.001	3	0	3	0	3	NC		NC	
		min	-0.001	6	-0.092	6	0	6	0	6	NC		NC	
M6	1	max	0	6	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.092	6	-0.001	6	0	3	NC		NC	
	2	max	0	6	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.092	6	-0.001	6	0	3	NC		NC	
	3	max	0	6	0	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.093	6	-0.002	6	0	3	NC		8003.947	6
M7	1	max	0	6	0	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.093	6	-0.002	6	0	3	NC		NC	
	2	max	0	1	0.001	3	0	3	0.001	6	NC		NC	
		min	0	1	-0.098	6	-0.006	6	0	3	NC		NC	
	3	max	0	3	0	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.093	6	-0.002	6	0	3	NC		NC	
M8	1	max	0	3	0	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.093	6	-0.002	6	0	3	NC		8003.947	6
	2	max	0	3	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.092	6	-0.001	6	0	3	NC		NC	
	3	max	0	3	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.092	6	-0.001	6	0	3	NC		NC	
M9	1	max	0.001	6	-0.001	3	0	3	0	3	NC		NC	
		min	0	3	-0.092	6	0	6	0	6	NC		NC	
	2	max	0.001	6	-0.001	3	0	6	0	3	NC		NC	
		min	0	3	-0.09	6	0	3	0	6	NC		NC	
	3	max	0.001	6	-0.001	3	0	6	0	3	NC		NC	
		min	0	3	-0.089	6	0	3	0	6	NC		NC	
M10	1	max	0.001	6	-0.001	3	0	6	0	3	NC		NC	
		min	0	3	-0.089	6	0	3	0	6	NC		NC	
	2	max	0.001	6	-0.001	3	0.001	6	0	3	NC		NC	
		min	0	3	-0.048	6	0	3	0	6	NC		NC	
	3	max	0	6	-0.001	3	0	6	0	3	NC		NC	
		min	0	3	-0.004	2	0	3	0	2	NC		NC	
M11	1	max	0	3	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.089	6	-0.001	6	0	3	NC		NC	
	2	max	0	3	0	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.094	6	-0.001	6	0	3	2523.111	6	NC	
	3	max	0	3	0.001	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.103	6	-0.001	6	0	3	845.91	6	NC	
M12	1	max	0	3	0.001	3	0	3	0.001	6	NC		NC	
		min	0	6	-0.103	6	-0.001	6	0	3	NC		NC	
	2	max	0	1	0.02	3	0	3	0.001	6	6679.286	3	NC	
		min	0	1	-0.195	6	-0.001	6	0	3	1355.363	6	NC	

Envelope Member Deflections, (continued)

Member Label	Section		x-Translate (In)	Lc	y-Translate (in)	Lc	z-Translate (In)	Lc	x-Rotate (radians)	Lc	(n) L/y Ratio	Lc	(n) L/z Ratio	Lc
	3	max	0	6	0.001	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.103	6	-0.001	6	0	3	NC		NC	
M13	1	max	0	6	0.001	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.103	6	-0.001	6	0	3	845.91	6	NC	
	2	max	0	6	0	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.094	6	-0.001	6	0	3	2523.111	6	NC	
	3	max	0	6	-0.001	3	0	3	0.001	6	NC		NC	
		min	0	3	-0.089	6	-0.001	6	0	3	NC		NC	
M14	1	max	0.002	6	0	3	0	6	0	2	NC		NC	
		min	0	3	-0.005	6	0	3	0	3	NC		NC	
	2	max	0.012	6	-0.198	3	0	3	0	3	441.749	3	NC	
		min	0.001	3	-0.254	6	-0.002	6	0	6	441.749	6	NC	
	3	max	0.022	6	0.002	3	0.001	3	0	3	NC		NC	
		min	0.001	3	-0.104	6	-0.004	6	0	6	NC		NC	
M15	1	max	0.002	6	0	3	0	3	0	3	NC		NC	
		min	0	3	-0.005	6	0	6	0	2	NC		NC	
	2	max	0.012	6	-0.198	3	0.002	6	0	6	441.749	3	NC	
		min	0.001	3	-0.254	6	0	3	0	3	441.749	6	NC	
	3	max	0.022	6	0.002	3	0.004	6	0	6	NC		NC	
		min	0.001	3	-0.104	6	-0.001	3	0	3	NC		NC	
M16	1	max	0	1	0	1	0	1	0	3	NC		NC	
		min	0	1	0	1	0	1	0	6	NC		NC	
	2	max	0	3	0.006	2	0.002	2	0	3	NC		NC	
		min	-0.002	2	0	3	-0.001	3	0	6	NC		NC	
	3	max	0	3	0	1	0	1	0	3	NC		NC	
		min	-0.003	2	0	1	0	1	0	6	NC		NC	
M17	1	max	0	3	0	1	0	1	0	3	NC		NC	
		min	-0.003	2	0	1	0	1	0	6	NC		NC	
	2	max	0	3	0	3	0	3	0	3	NC		NC	
		min	-0.003	6	0	2	-0.001	2	0	6	NC		NC	
	3	max	0	3	0	1	0	1	0	3	NC		NC	
		min	-0.003	6	0	1	0	1	0	6	NC		NC	
M18	1	max	0	1	0	1	0	1	0	6	NC		NC	
		min	0	1	0	1	0	1	0	3	NC		NC	
	2	max	0	3	0.006	2	0.001	3	0	6	NC		NC	
		min	-0.002	2	0	3	-0.002	2	0	3	NC		NC	
	3	max	0	3	0	1	0	1	0	6	NC		NC	
		min	-0.003	2	0	1	0	1	0	3	NC		NC	
M19	1	max	0	3	0	1	0	1	0	6	NC		NC	
		min	-0.003	2	0	1	0	1	0	3	NC		NC	
	2	max	0	3	0	3	0.001	2	0	6	NC		NC	
		min	-0.003	6	0	2	0	3	0	3	NC		NC	
	3	max	0	3	0	1	0	1	0	6	NC		NC	
		min	-0.003	6	0	1	0	1	0	3	NC		NC	
M20	1	max	0	1	0	3	0	1	0	3	NC		NC	
		min	0	1	-0.003	2	0	1	0	2	NC		NC	
	2	max	0	3	0	3	0	6	0	3	NC		NC	
		min	0	6	-0.005	2	0	3	0	2	4518.212	2	NC	
	3	max	0	3	0	3	0	6	0	3	NC		NC	
		min	0	6	-0.006	2	0	3	0	2	2073.643	2	NC	

Envelope Member Deflections, (continued)

Member Label	Section		x-Translate (In)	Lc	y-Translate (In)	Lc	z-Translate (In)	Lc	x-Rotate (radians)	Lc	(n) L/y Ratio	Lc	(n) L/z Ratio	Lc
M21	1	max	0	1	0	3	0	1	0	2	NC		NC	
		min	0	1	-0.003	6	0	1	0	3	NC		NC	
	2	max	0	6	0	3	0	6	0	2	NC		NC	
		min	0	3	-0.005	6	0	3	0	3	6098.504	6	NC	
	3	max	0	6	0	3	0	6	0	2	NC		NC	
		min	0	3	-0.006	6	0	3	0	3	2798.014	6	NC	
M22	1	max	0	1	0	3	0	1	0	3	NC		NC	
		min	0	1	-0.003	6	0	1	0	2	NC		NC	
	2	max	0	6	0	3	0	3	0	3	NC		NC	
		min	0	3	-0.005	6	0	6	0	2	6098.504	6	NC	
	3	max	0	6	0	3	0	3	0	3	NC		NC	
		min	0	3	-0.006	6	0	6	0	2	2798.014	6	NC	
M23	1	max	0	1	0	3	0	1	0	2	NC		NC	
		min	0	1	-0.003	2	0	1	0	3	NC		NC	
	2	max	0	3	0	3	0	3	0	2	NC		NC	
		min	0	6	-0.005	2	0	6	0	3	4518.212	2	NC	
	3	max	0	3	0	3	0	3	0	2	NC		NC	
		min	0	6	-0.006	2	0	6	0	3	2073.643	2	NC	

Envelope Member AISC ASD 9th Code Checks

Label	Code Chk	Loc (In)	Shear Chk Lc		Loc (In)	Dir	Lc	Fa (Ksi)	Ft (Ksi)	Fb y-y (Ksi)	Fb z-z (Ksi)	ASD Eqn.
M1	0.017	12	2	0.025	12	y	2	21.167	21.6	27	21.6	H1-3
M2	0.095	62	2	0.024	0	y	2	12.854	21.6	27	11.887	H1-3
M3	0.017	0	2	0.025	0	y	2	21.167	21.6	27	21.6	H1-3
M4	0.025	81	2	0.003	0	y	2	16.843	21.6	27	18.197	H1-2
M5	0.271	0	2	0.276	1.5	z	2	21.502	21.6	27	21.6	H2-1
M6	0.119	0	2	0.08	12	y	2	21.167	21.6	27	21.6	H2-1
M7	0.05	62	2	0.003	124	y	2	12.854	21.6	27	11.887	H1-2
M8	0.119	12	2	0.08	0	y	2	21.167	21.6	27	21.6	H2-1
M9	0.271	3	2	0.276	1.5	z	2	21.502	21.6	27	21.6	H2-1
M10	0.025	0	2	0.003	81	y	2	16.843	21.6	27	18.197	H1-2
M11	0.508	0	2	0.06	0	y	2	20.845	21.6	27	21.6	H1-3
M12	0.424	62	2	0.063	0	y	2	5.589	21.6	27	10.839	H1-3
M13	0.508	12	2	0.06	12	y	2	20.845	21.6	27	21.6	H1-3
M14	0.385	43.923	2	0.001	0	0	2	0.154	21.6	27	27	H2-1
M15	0.385	43.923	2	0.001	87.84687.8462			0.154	21.6	27	27	H2-1
M16	0.048	114	2	0.001	0	y	2	21.289	27.6	30.36	30.36	H1-1
M17	0.1	0	2	0.015	0	y	2	26.448	27.6	30.36	30.36	H1-2
M18	0.048	114	2	0.001	0	y	2	21.289	27.6	30.36	30.36	H1-1
M19	0.1	0	2	0.015	0	y	2	26.448	27.6	30.36	30.36	H1-2
M20	0.114	0	2	0.072	0	y	2	27.382	27.6	30.36	30.36	H1-3
M21	0.09	0	2	0.037	0	y	2	27.425	27.6	30.36	30.36	H2-1
M22	0.09	0	2	0.037	0	y	2	27.425	27.6	30.36	30.36	H2-1
M23	0.114	0	2	0.072	0	y	2	27.382	27.6	30.36	30.36	H1-3

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project 11000 Bldg	By JMW	Sheet No. 46
Location Portland, OR	Date 09/02	
Client Boyer	Revised	Job No. B0121
	Date	

SNOW DRIFT

$P_g = 25 psf$

$P_f = C_e I P_g (.83) = .7(1.0)(25)(.83) = 14.5 psf$ ← 25 psf MIN BY CODE

$h_d = .43(50)^{1/3}(25+10)^{1/4} - 1.5 = 2.35 ft$

$D = .13(25) + 14 = 17.25 psf$

@ PARAPET $h_d' = .5(h_d) = .5(2.35) = 1.18$

$h_b = \frac{14.5}{17.25} = .84$

$P_m = 17.25(.84 + 1.18) = 34.8 psf$

DRIFT $= 34.8 - 25 = 9.8 psf$

$h_d = \frac{9.8}{17.25} = .56$ $\quad w_d = (4)(.56)\,2.27' = 27"$

FLOOR JOIST

$w_{DL} = 40 psf$ (20 psf + 20 PARTITION)

$w_{LL} = 50 psf$

14" TJI/PRO-350 @ 16" O.C.

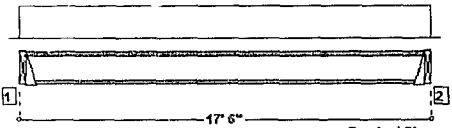
17'-6"

TimberJoist
A Weyerhaeuser Business
TJ-Beam(TM) 6.04 Serial Number: 72002000039
User: JP, 8/28/2002 3:26:17 PM
Page 1 Engine Version: 4.4.6

FLOOR JOIST

14" TJI®/Pro(TM)-350 @ 16" o/c

THIS PRODUCT MEETS OR EXCEEDS THE SET DESIGN CONTROLS FOR THE APPLICATION AND LOADS LISTED



Product Diagram is Conceptual.

LOADS:

Analysis is for a Joist Member

Primary Load Group - Residential - Living Areas (psf): 40.0 Live at 100 % duration, 15.0 Dead

Vertical Loads

Type	Class	Live	Dead	Location	Application	Comment
Uniform(psf)	Floor(1.00)	50.0	40.0	0 To 17' 6"	Replaces	

SUPPORTS:

		Input Width	Bearing Length	Vertical Reactions (lbs) Live/Dead/Uplift/Total	Ply	Depth	Nailing Depth	Detail	Other
1	Timberstrand LSL Beam	3.50"	Hanger	583 / 467 / 0 / 1050	1	11.88"	N/A	H1: Top Mount Hanger	None
2	Timberstrand LSL Beam	3.50"	Hanger	583 / 467 / 0 / 1050	1	11.88"	N/A	H1: Top Mount Hanger	None

-See TJ SPECIFIER'S / BUILDERS GUIDE for detail(s): H1: Top Mount Hanger

HANGERS: Simpson Strong-Tie® Connectors

Support		Model	Slope	Skew	Reverse Flanges	Top Flange Offset	Top Flange Slope	Support Wood Species
1	Top Mount Hanger	ITT3514	0/12	0	N/A	No	0	N/A
2	Top Mount Hanger	ITT3514	0/12	0	N/A	No	0	N/A

Nailing for Support 1: Face: 2-N10 , Top: 4-N10 , Member: 2-N10
Nailing for Support 2: Face: 2-N10 , Top: 4-N10 , Member: 2-N10

DESIGN CONTROLS:

	Maximum	Design	Control	Control	Location
Shear (lbs)	1015	-1015	1710	Passed (59%)	Rt. end Span 1 under Floor loading
Vertical Reaction (lbs)	1015	1015	1615	Passed (63%)	Bearing 2 under Floor loading
Moment (Ft-Lbs)	4293	4293	6380	Passed (67%)	MID Span 1 under Floor loading
Live Load Defl (in)		0.213	0.423	Passed (L/953)	MID Span 1 under Floor loading
Total Load Defl (in)		0.384	0.846	Passed (L/529)	MID Span 1 under Floor loading
TJ-Pro		50	40	Passed	Span 1

Deflection Criteria: STANDARD(LL L/480 TL L/240)

Allowable moment was increased for repetitive member usage

Deflection analysis is based on composite action with single layer of 23/32", 3/4" Panels (24" Span Rating) GLUED & NAILED wood decking.

Bracing(Lu): All compression edges (top and bottom) must be braced at 2' 8" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability

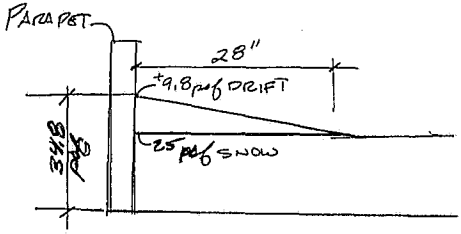
PROJECT INFORMATION:

11000 BLDG
BUTCHER
AGR # 80121

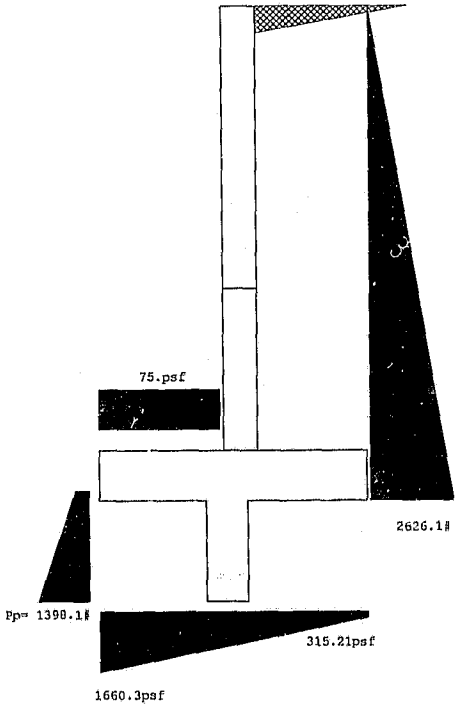
OPERATOR INFORMATION:

Mackenzie-Weber
Phone : 503.816.2558
Fax : 503.699.2647

AG Rolin Consulting STRUCTURAL DESIGN & ENGINEERING	Project 11000 Bldg	By J.MW	Sheet No. 48
	Location	Date 08/02	
	Client	Revised	Job No. B0121
		Date	



SNOW DRIFT @ PARAPET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Title : BREEZE HILL
Job # : B0121 Dsgnr: JMW Date: AUG 12,2002
Description....
11' RESTRAINED

This Wall in File: C:\RP6\B0121.RP5

RetainPro Version 6.0
Build Date : 10-SEP-2001, (c) 1989-2001

Restrained Retaining Wall Design

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	11.00 ft
Top Support Height	=	11.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	40.0 psf/ft
Toe Active Pressure	=	40.0 psf/ft
Passive Pressure	=	150.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

Toe Width	=	2.75 ft
Heel Width	=	3.50
Total Footing Width	=	6.25
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	7.00 in
Key Distance from Toe	=	2.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 3.00in @ Btm.= 3.00 in

Design Summary

Total Bearing Load	=	6,451 lbs
...resultant ecc.	=	2.91 in
Soil Pressure @ Toe	=	792 psf OK
Soil Pressure @ Heel	=	1,272 psf OK
Allowable	=	2,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,109 psf
ACI Factored @ Heel	=	1,781 psf
Footing Shear @ Toe	=	10.2 psi OK
Footing Shear @ Heel	=	6.2 psi OK
Allowable	=	85.0 psi
Reaction at Top	=	484.0 lbs
Reaction at Bottom	=	2,497.3 lbs
Sliding Stability Ratio	=	1.68 OK

Sliding Calcs

Lateral Sliding Force	=	2,497.3 lbs
less 100% Passive Force	=	- 1,617.2 lbs
less 100% Friction Force	=	- 2,580.4 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,109	1,781 psf
Mu' : Upward	=	4,566	6,014 ft-#
Mu' : Downward	=	1,575	6,956 ft-#
Mu: Design	=	2,991	-942 ft-#
Actual 1-Way Shear	=	10.24	6.16 psi
Allow 1-Way Shear	=	85.00	85.00 psi

Concrete Stem Construction

Thickness = 10.00 in Fy = 60,000 psi
Wall Weight = 125.0 pcf f'c = 3,000 psi
Stem is FIXED to top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design height	=	11.00 ft	6.10 ft	0.00 ft
Rebar Size	=	# 5	# 4	# 5
Rebar Spacing	=	12.00 in	12.00 in	12.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	6.50 in	7.50 in	6.50 in
Design Data				
ft/FB + fa/Fa	=	0.000	0.410	0.697
Mu....Actual	=	0.0 ft-#	2,698.0 ft-#	6,023.4 ft-#
Mn * Phi.....Allowable	=	8,642.3 ft-#	6,573.0 ft-#	8,642.3 ft-#
Shear Force @ this height	=	0.0 lbs		3,257.3 lbs
Shear.....Actual	=	0.00 psi		41.76 psi
Shear.....Allowable	=	93.11 psi		93.11 psi
Rebar Lap Required	=	53.40 in	42.72 in	
Rebar embedment into footing	=			10.50 in

Other Acceptable Sizes & Spacings:
Toe: None Spec'd -or- Not req'd, Mu < S * Fr
Heel: None Spec'd -or- Not req'd, Mu < S * Fr
Key: #4@ 12.50 in, #5@ 19 -or- #4@ 12.50 in, #5@ 19.25 in, #6@ 27.

Summary of Forces on Footing : Slab is NOT providing sliding, stem is FIXED at footing

Forces acting on footing for sliding & soil pressure....

Sliding Forces

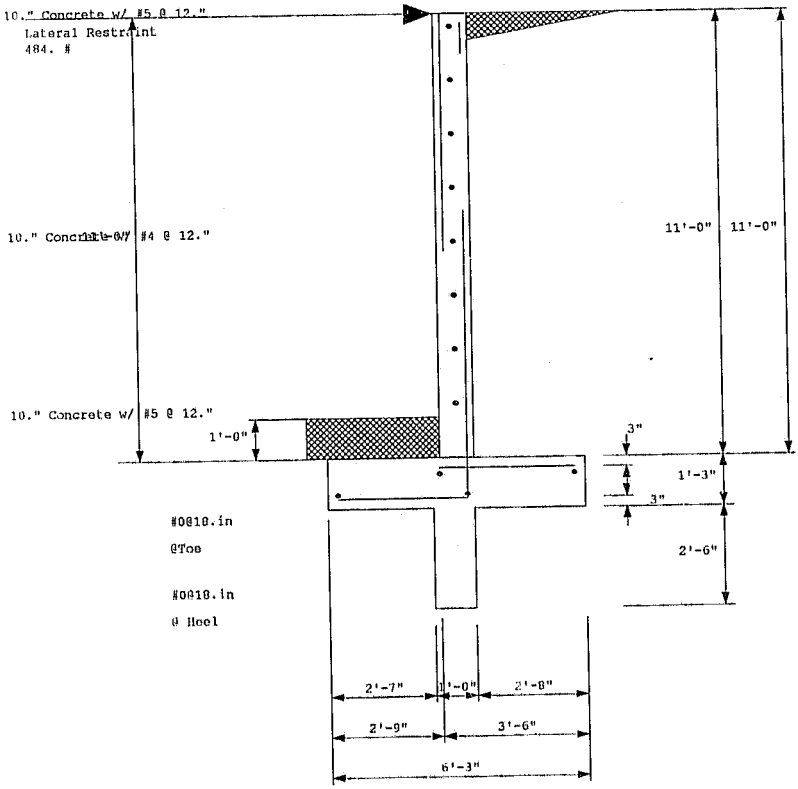
Stem Shear @ Top of Footing	=	-1,916.0 lbs
Heel Active Pressure	=	-581.3
Sliding Force	=	2,497.3 lbs

Net Moment User For Soil Pressure Calculations: -1,563.2 ft-#

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem = -3,543.2ft-#

Surcharge Over Heel	=	lbs	ft	ft-#
Adjacent Footing Load	=	lbs	ft	ft-#
Axial Dead Load on Stem	=	lbs	ft	ft-#
Soil Over Toe	=	302.5 lbs	1.38 ft	415.9ft-#
Surcharge Over Toe	=	lbs	ft	ft-#
Stem Weight	=	1,375.0 lbs	3.17 ft	4,354.2ft-#
Soil Over Heel	=	3,226.7 lbs	4.92 ft	15,864.4ft-#
Footing Weight	=	1,546.9 lbs	2.99 ft	4,631.4ft-#
Total Vertical Force	=	6,451.0 lbs	Base Moment =	21,722.7ft-#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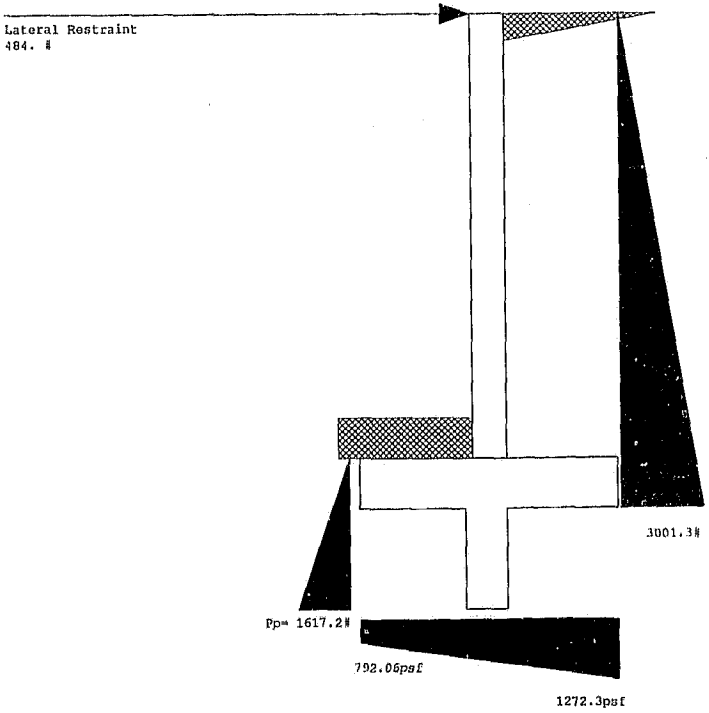
Lateral Restraint
484. #
10." Concrete w/ #4 @ 12."
10." Concrete w/ #5 @ 12."
1'-0"
#0@10.in
@Toe
#0@10.in
@ Heel
11'-0"
11'-0"
3"
1'-3"
3"
2'-6"
2'-7"
1'-0"
2'-8"
2'-9"
3'-6"
6'-3"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Page 23

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Title : BREEZE HILL
Job # : B0121 Dsgnr: JMW Date: AUG 12,2002
Description....
9FT BACKFILL MAX. 11FT RETRAINED HT.

This Wall in File: C:\RP6\B0121.RP5

RetainPro Version 6.0
Build Date : 10-SEP-2001, (c) 1989-2001

Restrained Retaining Wall Design

Criteria

Retained Height	=	9.00 ft
Wall height above soil	=	2.00 ft
Total Wall Height	=	11.00 ft
Top Support Height	=	11.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	12.00 in
Soil Density	=	110.00 pcf
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	40.0 psf/ft
Toe Active Pressure	=	40.0 psf/ft
Passive Pressure	=	150.0 psf/ft
Water height over heel	=	0.0 ft
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in

Footing Strengths & Dimensions

Toe Width	=	1.67 ft
Heel Width	=	2.33
Total Footing Width	=	4.00
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	2.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 3.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	75.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Uniform Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
.. Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft

Design Summary

Total Bearing Load	=	4,033 lbs	
...resultant ecc.	=	2.33 in	
Soil Pressure @ Toe	=	1,302 psf	OK
Soil Pressure @ Heel	=	715 psf	OK
Allowable Soil Pressure Less Than Allowable	=	2,000 psf	
ACI Factored @ Toe	=	1,823 psf	
ACI Factored @ Heel	=	1,001 psf	
Footing Shear @ Toe	=	6.3 psi	OK
Footing Shear @ Heel	=	5.8 psi	OK
Allowable	=	85.0 psi	
Reaction at Top	=	226.6 lbs	
Reaction at Bottom	=	1,827.4 lbs	
Sliding Stability Ratio	=	1.65	OK
Sliding Calcs			
Lateral Sliding Force	=	1,827.4 lbs	
less 100% Passive Force	= -	1,398.1 lbs	
less 100% Friction Force	= -	1,613.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Concrete Stem Construction

Thickness = 8.00 in Fy = 60,000 psi
Wall Weight = 100.0 pcf f'c = 3,000 psi
Stem is FIXED to top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design height	=	11.00 ft	5.65 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	12.00 in	12.00 in	12.00
Rebar Placed at	=	Center	Center	Center
Rebar Depth 'd'	=	4.00 in	4.00 in	4.00 in
Design Data				
fb/FB + fa/Fa	=	0.000	0.317	0.774
Mu....Actual	=	0.0 ft-#	1,634.8 ft-#	3,990.1 ft-#
Mn * Phi....Allowable	=	5,154.8 ft-#	5,154.8 ft-#	5,154.8 ft-#
Shear Force @ this height	=	0.0 lbs		2,288.4 lbs
Shear.....Actual	=	0.00 psi		47.68 psi
Shear.....Allowable	=	93.11 psi		93.11 psi
Rebar Lap Required	=	53.40 in	53.40 in	
Rebar embedment into footing	=			10.50 in

Other Acceptable Sizes & Spacings:

Toe: None Spec'd -or- Not req'd, Mu < S * Fr
Heel: None Spec'd -or- Not req'd, Mu < S * Fr
Key: #4@ 12.50 in, #5@ 19 -or- #4@ 12.50 in, #5@ 19.25 in, #6@ 27.

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,823	1,001 psf
Mu' : Upward	=	2,371	1,548 ft-#
Mu' : Downward	=	724	2,288 ft-#
Mu: Design	=	1,648	740 ft-#
Actual 1-Way Shear	=	6.30	5.75 psi
Allow 1-Way Shear	=	85.00	85.00 psi

Title : BREEZE HILL
Job # : B0121 Dsgnr: JMW Date: AUG 12,2002
Description....
9FT BACKFILL MAX. 11FT RETRAINED HT.

This Wall In File: C:\RP6\B0121.RP5

RetainPro Version 6.0
Build Date : 10-SEP-2001, (c) 1989-2001

Restrained Retaining Wall Design

Summary of Forces on Footing : Slab is NOT providing sliding, stem is FIXED at footing

Forces acting on footing for sliding & soil pressure....

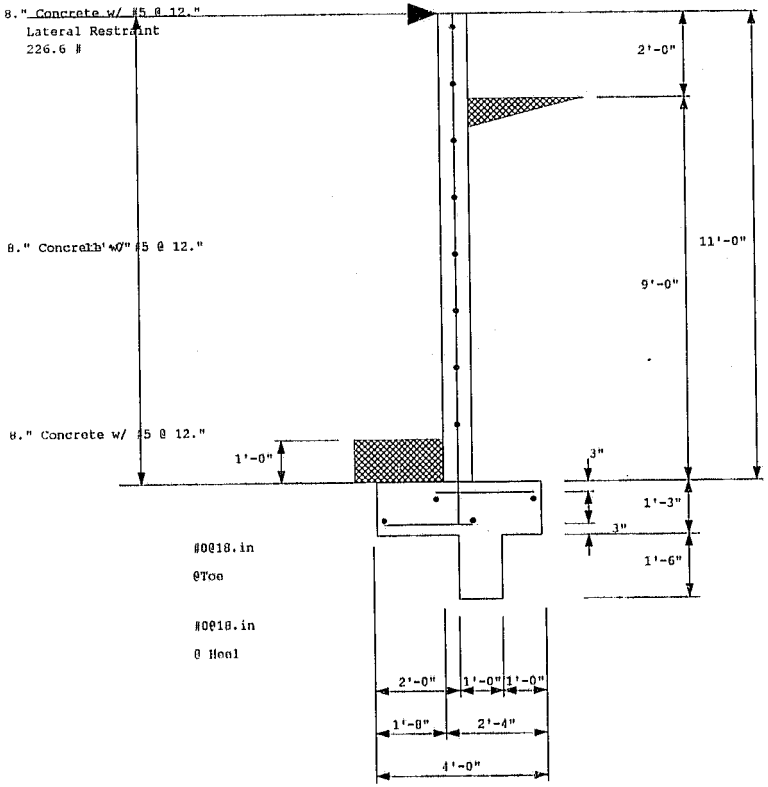
Sliding Forces

Stem Shear @ Top of Footing	=	-1,346.1 lbs
Heel Active Pressure	=	-481.3
Sliding Force	=	**1,827.4 lbs**

Net Moment User For Soil Pressure Calculations
782.0 ft-#

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem			=	-2,347.1 ft-#
Surcharge Over Heel	=	lbs	ft	ft-#
Adjacent Footing Load	=	lbs	ft	ft-#
Axial Dead Load on Stem	=	lbs	ft	ft-#
Soil Over Toe	=	183.3 lbs	0.83 ft	152.7 ft-#
Surcharge Over Toe	=	125.0 lbs	0.83 ft	104.1 ft-#
Stem Weight	=	1,100.0 lbs	2.00 ft	2,199.5 ft-#
Soil Over Heel	=	1,649.5 lbs	3.17 ft	5,222.2 ft-#
Footing Weight	=	974.8 lbs	2.00 ft	1,949.8 ft-#
Total Vertical Force	=	4,032.6 lbs	Base Moment =	7,281.1 ft-#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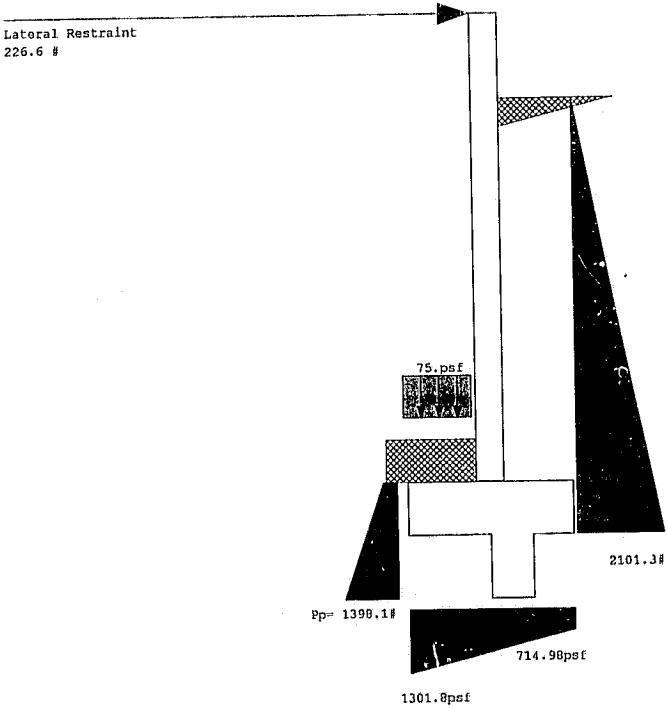
Lateral Restraint
226.6 #
8." Concrete w/ #5 @ 12."
8." Concrete w/ #5 @ 12."
2'-0"
11'-0"
9'-0"
1'-0"
3"
1'-3"
3"
1'-6"
#0@18.in
@Toe
#0@18.in
@ Heel
2'-0"
1'-0"
1'-0"
1'-0"
2'-4"
4'-0"


Lateral Restraint
226.6 #
75.psf
2101.3#
Pp= 1398.1#
714.98psf
1301.8psf

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project	BREEZE HILL	By	JMW
Location	PORTLAND, OR	Date	08/01
Client	CHRISTENSEN	Revised	
		Date	

Sheet No. 28
Job No. B0121

FOUNDATION — THESE ARE MIN SIZES AND MAYBE INCREASED ON PLANS

$\beta = 1500 - 50 - 50 = 1400$ psf
(CLAD) (LL)

TYP

BEARING CONT =

$W_{DL} = 2310$ plf
$W_{LL} = 900$ plf
> 3210 plf

$B = \frac{3210}{1400} = 2.29 \sim 2'6"$ WIDE x 12" THK w/(3)#4 BOTT CONT #4 VERT w/6" HOOK IN FTG @ 48" O.C.

NON-BEARING-CONT

$W_{DL} = 1410$ plf
$W_{LL} = 75$ plf
> 1485 plf

∴ USE 18" x 12" FTG w/(2)#4 CONT #4 VERT w/6" HOOK IN FTG @ 48" O.C.

AT CONCRETE WALLS

DIAGONAL

$W_{DL} = 3900$ plf
$W_{LL} = 900$ plf
> 4800#

$B = \frac{4800}{1400} = 3.43 \sim 4'0"$ x 12" THK w/(4)#5 CONT w/(4)@ 24" O.C. TRANSVERSE

ENDWALL

$W_{DL} = 5254$ plf
$W_{LL} = 2531$ plf
> 7785 plf

$B = \frac{7785}{1400} = 5.56 \sim 6'3"$ 6'3" x 15" THK

$\beta = \frac{7785}{6.25} = 1245$

$M_u = 1.6(1245)(3)^2 = 9.1$ k-k

$M_u = A_s f_y \left(d - \frac{A_s f_y}{1.7 f'_c b}\right)$

SOLVE FOR A_s:
$A_s = (1.1)\ 0.018 = 0.12$
USE #5 @ 12" O.C. EW

$d = 15 - 3 - .5 = 11.5$

$K = \frac{bd^2}{12000} = \frac{12(11.5)^2}{12000} = .013$

$K = \frac{.9}{.13} = .68$ USE $\rho \times 1.1$ Act

INTERIOR WALL

$W_{DL} = 480$ plf $W_{LL} = 600$ plf

∴ 18" WIDE x 12" THK w/

COL FTG

RIGHT / RIGHT MIDDLE

ASSUME ROOF & FLOOR BEAM

$P_{DL} = 6903$#
$P_{LL} = 8400$#
> 15.3k

$B = L = \left(\frac{1530}{1.4}\right)^{\frac{1}{2}} = 3.31 \sim 4'$ SQ

$\beta = \frac{15300}{42} = 956$ psf BY INSPECTION SIMILAR TO ABOVE

12" THK w/(4)#5 EW BOTT

MIDDLE COL

$P_{DL} = 17.7$k
$P_{LL} = 20.4$k
> 38.1k

$B = L = \left(\frac{38.1}{1.4}\right)^{\frac{1}{2}} = 5.2'$ USE 6' x 15" THK FTG w/(4)#5 EW BOTT

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Project: Breeze Hill	By: JMW	Sheet No. 29
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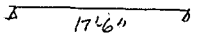
	Date	

STAIR (EXT)

STRINGER (4' O.C.)

DL = 50 psf
LL = 100 psf

$R_L = 150(17.5/2) = 1312^{\#}$
$R_{LL} = 875^{\#}$
$R_{DL} = 437^{\#}$



$M = \frac{150(17.5)^2}{8} = 5.7^{k}$ $S = 5.7(12)/.4(36) = 4.8^{in^3}$

USE C12x20.7
(BASED ON ARCH REQ'MT)

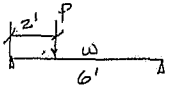
$\Delta_{LL} = L/480 = (17.5(12)/480) = .44^{in}$
$\Delta_{TL} = L/360 = (17.5(12)/360 = .58^{in}$

$I_{LL} = \frac{5}{384}\frac{(100)(17.5)^4(1728)}{29E6(.44)} = 16.5^{in^4}$

$I_{TL} = \frac{5}{384}\frac{(150)(17.5)^4(1728)}{29E6(.58)} = 18.9^{in^4}$

BEAM @ HEAD OF STAIRS

$P_{DL} = 437^{\#}$ $w_{DL} = 30^{plf}$
$P_{LL} = 875^{\#}$ $w_{LL} = 800^{plf}$



$M = \frac{1312(2)(4)}{6} + \frac{3306(6)}{8} = 3.5^{k}$ $S = 3.3(12)/.4(36) = 2.7^{in^3}$

$\Delta_{LL} = 72/480 = .15$
$\Delta_{TL} = 72/360 = .2$

$I = \frac{875(2)(4)(8)(12(8))^{1/2}(1728)}{27(29E6)(6)(.15)} = 1.35^{in^4}$

$I = \frac{1312(2)(4)(8)(12(8))^{1/2}(1728)}{27(29E6)(6)(.2)} = 1.51^{in^4}$

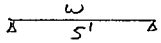
C6x8.2

AG Rolin Consulting STRUCTURAL DESIGN & ENGINEERING	Project BREEZE HILL	By JMW	Sheet No. 30
	Location PDX	Date 07/02	
	Client CHRISTENSEN / BUTCHER	Revised	Job No. B0121
		Date	

1) ROOF HDR

W_{DL} = 360 plf
W_{LL} = 600 plf

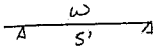
4x8 DF#2



2) FLOOR HDR

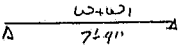
W_{DL} = 480 plf
W_{LL} = 600 plf

6x8 DF#1



W_{IDL} = 360 plf
W_{ISL} = 600 plf

6x14 DF#1



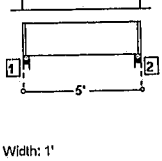
TJ-Beam(TM) 8.04 Serial Number: 7002000039
User: 2 8/27/2002 3:33:16 PM
Page 1 Engine Version: 1.4.16

1) TYP. ROOF HDR

3 1/2" x 7 1/4" 1.6E Solid Sawn Douglas Fir #2

THIS PRODUCT MEETS OR EXCEEDS THE SET DESIGN CONTROLS FOR THE APPLICATION AND LOADS LISTED

Member Slope: 0/12 Roof Slope0/12



All dimensions are horizontal.

Product Diagram is Conceptual.

LOADS:

Analysis is for a Header (Flush Beam) Member. Tributary Load Width: 1'
Primary Load Group - Snow (psf): 25.0 Live at 115 % duration, 15.0 Dead
Vertical Loads:

Type	Class	Live	Dead	Location	Application	Comment
Uniform(plf)	Floor(1.00)	600.0	360.0	0 To 5'	Replaces	

SUPPORTS:

		Input Width	Bearing Length	Vertical Reactions (lbs) Live/Dead/Uplift/Total	Detail	Other
1	Stud wall	3.50"	3.50"	1500 / 915 / 0 / 2415	By Others - Rim: Rim Board	1 Ply 3 1/2" 1.3E TimberStrand® LSL
2	Stud wall	3.50"	3.50"	1500 / 915 / 0 / 2415	By Others - Rim: Rim Board	1 Ply 3 1/2" 1.3E TimberStrand® LSL

-See TJ SPECIFIER'S / BUILDERS GUIDE for detail(s): By Others - Rim: Rim Board

DESIGN CONTROLS:

	Maximum	Design	Control	Control	Location
Shear (lbs)	2254	-1550	1607	Passed (96%)	Rt. end Span 1 under Floor loading
Moment (Ft-Lbs)	2630	2630	2905	Passed (91%)	MID Span 1 under Floor loading
Live Load Defl (in)		0.036	0.156	Passed (L/999+)	MID Span 1 under Floor loading
Total Load Defl (in)		0.058	0.233	Passed (L/966)	MID Span 1 under Floor loading

-Deflection Criteria: STANDARD(LL:L/360,TL:L/240).
-Bracing(Lu): All compression edges (top and bottom) must be braced at 2' 6" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.
-The allowable shear stress (Fv) has not been increased due to the potential of splits, checks and shakes. See NDS for applicability of increase.
-Analysis based on vertical loads only and assumes structural supports as noted in the input. Axial loads are not considered in this analysis.
-Design assumes adequate continuous lateral support of the compression edge.

ADDITIONAL NOTES:

-IMPORTANT! The analysis presented is output from software developed by Trus Joist (TJ). TJ warrants the sizing of its products by this software will be accomplished in accordance with TJ product design criteria and code accepted design values. The specific product application, input design loads, and stated dimensions have been provided by the software user. This output has not been reviewed by a TJ Associate.
-Not all products are readily available. Check with your supplier or TJ technical representative for product availability.
-Solid sawn lumber analysis is in accordance with 1991 NDS methodology and is solely presented for comparison purposes. Program limitations and assumptions about this analysis are available through the software's On-line Help. Trus Joist does not warrant the analysis nor the performance of solid sawn lumber materials.
-Allowable Stress Design methodology was used for Building Code UBC analyzing the solid sawn lumber material listed above.

PROJECT INFORMATION:

BREEZE HILL
BUTCHER
AGR#: B0121

OPERATOR INFORMATION:

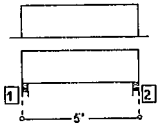
Mackenzie~Weber
Phone : 503.816.2558
Fax : 503.699.2647

Trus Joist
A Weyerhaeuser business
T-Beam(TM) 6.04 Serial Number: 70020000038
Ser 2: 8/27/2002 3:32:22 PM
Rac 1: Engine Version: 1.4.1b

2) TYP. FLOOR HDR

5 1/2" x 7 1/2" 1.6E Solid Sawn Douglas Fir #1

THIS PRODUCT MEETS OR EXCEEDS THE SET DESIGN CONTROLS FOR THE APPLICATION AND LOADS LISTED



Product Diagram is Conceptual.

LOADS:

Analysis is for a Header (Flush Beam) Member. Tributary Load Width: 1'
Primary Load Group - Residential - Living Areas (psf). 40.0 Live at 100 % duration, 15.0 Dead
Vertical Loads

Type	Class	Live	Dead	Location	Application	Comment
Uniform(plf)	Floor(1.00)	600.0	480.0	0 To 5'	Replaces	

SUPPORTS:

		Input Width	Bearing Length	Vertical Reactions (lbs) Live/Dead/Uplift/Total	Detail	Other
1	Stud wall	3.50"	3.50"	1500 / 1225 / 0 / 2725	By Others	None
2	Stud wall	3.50"	3.50"	1500 / 1225 / 0 / 2725	By Others	None

See TJ SPECIFIER'S / BUILDERS GUIDE for detail(s): By Others

DESIGN CONTROLS:

	Maximum	Design	Control	Control	Location
Shear (lbs)	2543	1726	2338	Passed (74%)	Rt. end Span 1 under Floor loading
Moment (Ft-Lbs)	2967	2967	5801	Passed (51%)	MID Span 1 under Floor loading
Live Load Defl (in)		0.021	0.117	Passed (L/999+)	MID Span 1 under Floor loading
Total Load Defl (in)		0.038	0.233	Passed (L/999+)	MID Span 1 under Floor loading

Deflection Criteria: STANDARD/(LL L/480,TL L/240)
-Bracing(Lu): All compression edges (top and bottom) must be braced at 2' 8" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability
-The allowable shear stress (Fv) has not been increased due to the potential of splits, checks and shakes. See NDS for applicability of increase.

ADDITIONAL NOTES:

-IMPORTANT! The analysis presented is output from software developed by Trus Joist (TJ). TJ warrants the sizing of its products by this software will be accomplished in accordance with TJ product design criteria and code accepted design values. The specific product application, input design loads, and stated dimensions have been provided by the software user. This output has not been reviewed by a TJ Associate.
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Allowable Stress Design methodology was used for Building Code UBC analyzing the solid sawn lumber material listed above.

PROJECT INFORMATION:

BREEZE HILL
BUTCHER
AGR# 80121

OPERATOR INFORMATION:

Mackenzie-Weber
Phone : 503.816.2556
Fax : 503.699.2647

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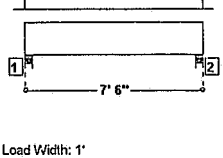
2) ENTRY HDR

5 1/2" x 13 1/2" 1.6E Solid Sawn Douglas Fir #1

THIS PRODUCT MEETS OR EXCEEDS THE SET DESIGN CONTROLS FOR THE APPLICATION AND LOADS LISTED



Product Diagram is Conceptual.

LOADS:

Analysis is for a Header (Flush Beam) Member. Tributary Load Width: 1'
Primary Load Group - Residential - Living Areas (psf): 40.0 Live at 100 % duration, 15.0 Dead
Vertical Loads:

Type	Class	Live	Dead	Location	Application	Comment
Uniform(plf)	Floor(1.00)	600.0	480.0	0 To 7' 6"	Replaces	
Uniform(plf)	Snow(1.15)	600.0	360.0	0 To 7' 6"	Replaces	

SUPPORTS:

		Input Width	Bearing Length	Vertical Reactions (lbs) Live/Dead/Uplift/Total	Detail	Other
1	Stud wall	3.50"	3.50"	4500 / 3216 / 0 / 7716	By Others	None
2	Stud wall	3.50"	3.50"	4500 / 3216 / 0 / 7716	By Others	None

-See TJ SPECIFIER'S / BUILDERS GUIDE for detail(s): By Others

DESIGN CONTROLS:

	Maximum	Design	Control	Control	Location
Shear (lbs)	7373	-4801	4839	Passed (99%)	Rt. end Span 1 under Snow loading
Moment (Ft-Lbs)	13210	13210	21614	Passed (61%)	MID Span 1 under Snow loading
Live Load Defl (in)		0.039	0.179	Passed (L/999+)	MID Span 1 under Snow loading
Total Load Defl (in)		0.068	0.358	Passed (L/999+)	MID Span 1 under Snow loading

-Deflection Criteria: STANDARD(LL:L/480,TL:L/240).
-Bracing(Lu): All compression edges (top and bottom) must be braced at 2' 8" o/c unless detailed otherwise. Proper attachment and positioning of lateral bracing is required to achieve member stability.
-The allowable shear stress (Fv) has not been increased due to the potential of splits, checks and shakes. See NDS for applicability of increase.

ADDITIONAL NOTES:

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-Allowable Stress Design methodology was used for Building Code UBC analyzing the solid sawn lumber material listed above.

PROJECT INFORMATION:

BREEZE HILL
BUTCHER
AGN#: B0121

OPERATOR INFORMATION:

Mackenzie-Weber
Phone : 503.816.2558
Fax : 503.699.2647

AG Rolin Consulting
STRUCTURAL DESIGN & ENGINEERING

Project BREEZE HILL CANOPY	By JMW	Sheet No. 34
Location BEAVERTON, OR	Date 11/01	
Client CHRISTENSON	Revised	Job No. B0121
	Date	

CANOPY DESIGN

DL = 15 psf

SN = 25 psf + DRIFT

DRIFT

$h_d = 0.43 (W_b)^{1/3} (P_g+10)^{1/4} - 1.5$

$= 0.43(50)^{1/3}(25+10)^{1/4} - 1.5$

$= 2.35$

$D = 0.13 P_g + 14 = 0.13(25) + 14$

$D = 17.25$ psf

$P_H = D(h_d + h_b)$

$= 17.25(2.35 + 1.01) = 58$ psf

$P_g = 25$ psf

$P_f = Ce \cdot I \cdot P_g$

$P_f = 0.7(1)(25) = 17.5$ psf

$W_b = 50$ (min)

$h_b = \frac{17.5}{17.25} = 1.01$

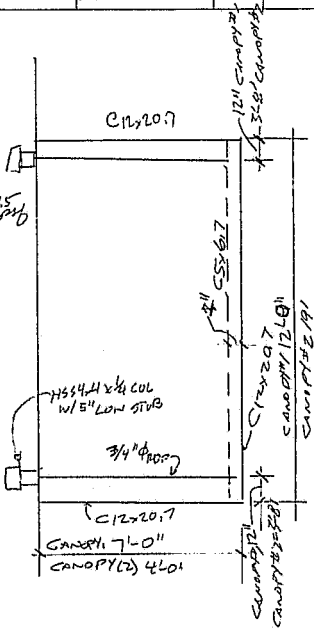
PEAK DRIFT

58 - 25 = 33 psf

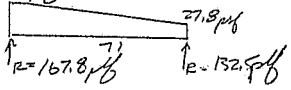
$h_d = \frac{33}{17.25} = 1.91$

$4h_d = 4(1.91) = 7.65$

TRUNCATED $\frac{33}{7.65}(7.65) = 21.8$ psf



SNOW LOAD



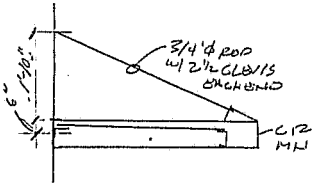
WIND - LOAD

$p = Cc\,Cq\,q_s\,I$ $\quad Cc = 0.62$ $\quad Cq = 1.4$

$q_s = 16.4$ $\quad I = 1.0$

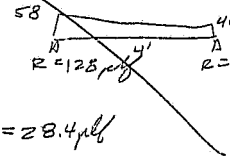
$p = 14.2$ psf

$R = 14.2 \times 3.5 = 50$ plf



CANOPY #2

TRUNCATED SNOW $\frac{33}{7.65}(3.65) = 15.7$ psf



VOID

SAME CONSTRUCTION AS CANOPY #1

VOID

WIND

$R = 14.2(2) = 28.4$ plf

Global

Steel Code	AISC 9th Edition ASD
Allowable Stress Increase Factor (ASIF)	1.333
Include Shear Deformation	Yes
Include Warping	Yes
No. of Sections for Member Calcs	3
Redesign Sections	Yes
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y

Materials (General)

Material Label	Young's Modulus (Ksi)	Shear Modulus (Ksi)	Poisson's Ratio	Thermal Coef. (per 10^5 F)	Weight Density (K/ft^3)	Yield Stress (Ksi)
STL	29000	11154	.3	.65	.49	36
TUBE	29000	11154	.3	.65	.49	46

Sections

Section Label	Database Shape	Material Label	Area (In)^2	SA(yy)	SA(zz)	I y-y (In^4)	I z-z (In^4)	J (Torsion) (In^4)	T/C Only
FRAME	C12X20.7	STL	6.09	1.2	1.2	3.88	129	.37	
INTERIOR	C5X6.7	STL	1.97	1.2	1.2	.479	7.49	.06	
ROD	ROD0.75	STL	.442	1.2	1.2	.016	.016	.031	
COLUMN	HSS4X4X4	TUBE	3.365	1.2	1.2	7.788	7.788	12.758	

Joint Coordinates

Joint Label	X Coordinate (In)	Y Coordinate (In)	Z Coordinate (In)	Joint Temperature (F)
N1	0	0	0	0
N2	0	0	12	0
N3	0	0	136	0
N4	0	0	148	0
N5	81	0	0	0
N6	81	0	12	0
N7	81	0	136	0
N8	81	0	148	0
N9	84	0	0	0
N10	84	0	12	0
N11	84	0	136	0
N12	84	0	148	0
N13	0	38	12	0
N14	0	38	136	0
N15	81	4	12	0
N16	84	4	12	0
N17	81	4	136	0
N18	84	4	136	0
N19	-7	-114	12	0
N20	-7	-114	136	0
N21	-7	0	12	0
N22	-7	0	136	0
N23	-7	38	12	0

Joint Coordinates (continued)

Joint Label	X Coordinate (In)	Y Coordinate (In)	Z Coordinate (In)	Joint Temperature (F)
N24	-7	38	136	0

Boundary Conditions

Joint Label	X Translation (K/in)	Y Translation (K/in)	Z Translation (K/in)	MX Rotation (K-ft/rad)	MY Rotation (K-ft/rad)	MZ Rotation (K-ft/rad)
N19	Reaction	Reaction	Reaction			
N20	Reaction	Reaction	Reaction			
N23	Reaction		Reaction			
N24	Reaction		Reaction			
N22	Reaction		Reaction			
N21	Reaction		Reaction			

Member Data

Member Label	I Joint	J Joint	K Joint	X-Axis Rotate (degrees)	Section Set	End Releases I-End xyz xyz	End Releases J-End xyz xyz	End Offsets I-End (In)	End Offsets J-End (In)	Inactive Code	Member Length (In)
M1	N1	N2			FRAME						12
M2	N2	N3			FRAME						124
M3	N3	N4			FRAME						12
M4	N4	N8			FRAME						81
M5	N8	N12			FRAME						3
M6	N12	N11			FRAME						12
M7	N11	N10			FRAME						124
M8	N10	N9			FRAME						12
M9	N9	N5			FRAME						3
M10	N5	N1			FRAME						81
M11	N8	N7			INTERIOR						12
M12	N7	N6			INTERIOR						124
M13	N6	N5			INTERIOR						12
M14	N14	N17			ROD	BenPIN	BenPIN				87.846
M15	N13	N15			ROD	BenPIN	BenPIN				87.846
M16	N20	N22			COLUMN						114
M17	N22	N24			COLUMN						38
M18	N19	N21			COLUMN						114
M19	N21	N23			COLUMN						38
M20	N22	N3			COLUMN		BenPIN				7
M21	N24	N14			COLUMN						7
M22	N23	N13			COLUMN						7
M23	N21	N2			COLUMN		BenPIN				7

Steel Design / NDS Parameters

Member Label	Section Set	Length (In)	Lb y-y le2 (In)	Lb z-z le1 (In)	L_comp le_bend (In)	K y-y	K z-z	Cm y-y CH	Cm z-z	Cb B	Sway y	Sway z
M1	FRAME	12				.65	.65					
M2	FRAME	124				.65	.65					
M3	FRAME	12				.65	.65					
M4	FRAME	81				.65	.65					
M5	FRAME	3				.65	.65					

Steel Design / NDS Parameters (continued)

Member Label	Section Set	Length (In)	Lb y-y le2 (in)	Lb z-z le1 (In)	L_comp le_bend (In)	K y-y	K z-z	Cm y-y CH	Cm z-z	Cb B	Sway y	Sway z
M6	FRAME	12				.65	.65					
M7	FRAME	124				.65	.65					
M8	FRAME	12				.65	.65					
M9	FRAME	3				.65	.65					
M10	FRAME	81				.65	.65					
M11	INTERIOR	12				.65	.65					
M12	INTERIOR	124				.65	.65					
M13	INTERIOR	12				.65	.65					
M14	ROD	87.846				2.1	2.1					
M15	ROD	87.846				2.1	2.1					
M16	COLUMN	114				.8	.8					
M17	COLUMN	38				.65	.65					
M18	COLUMN	114				.8	.8					
M19	COLUMN	38				.65	.65					
M20	COLUMN	7				.8	.8					
M21	COLUMN	7				.65	.65					
M22	COLUMN	7				.65	.65					
M23	COLUMN	7				.8	.8					

Basic Load Case Data

BLC No.	Basic Load Case Description	Category Code	Category Description	Gravity X	Gravity Y	Gravity Z	Load Type Totals Nodal	Load Type Totals Point	Load Type Totals Dist.	Load Type Totals Surf.
1	DL	DL	Dead Load		-1					
2	SL	SL	Snow Load						6	
3	WIND-UP	WL	Wind Load						6	

Distributed Load Patterns

Pattern Label	Direction	Start Magnitude (Lb/ft, F)	End Magnitude (Lb/ft, F)	Start Location (In or %)	End Location (In or %)
UNIFORMY	Y	-1	-1	0	0

Member Distributed Loads, Category : SL, BLC 2 : SL

Member Label	I Joint	J Joint	Load Pattern Label	Pattern Multiplier
M3	N3	N4	UNIFORMY	167.8
M2	N2	N3	UNIFORMY	167.8
M1	N1	N2	UNIFORMY	167.8
M11	N8	N7	UNIFORMY	132.5
M12	N7	N6	UNIFORMY	132.5
M13	N6	N5	UNIFORMY	132.5

Member Distributed Loads, Category : WL, BLC 3 : WIND-UP

Member Label	I Joint	J Joint	Load Pattern Label	Pattern Multiplier
M3	N3	N4	UNIFORMY	-50
M2	N2	N3	UNIFORMY	-50
M1	N1	N2	UNIFORMY	-50
M11	N8	N7	UNIFORMY	-50
M12	N7	N6	UNIFORMY	-50
M13	N6	N5	UNIFORMY	-50

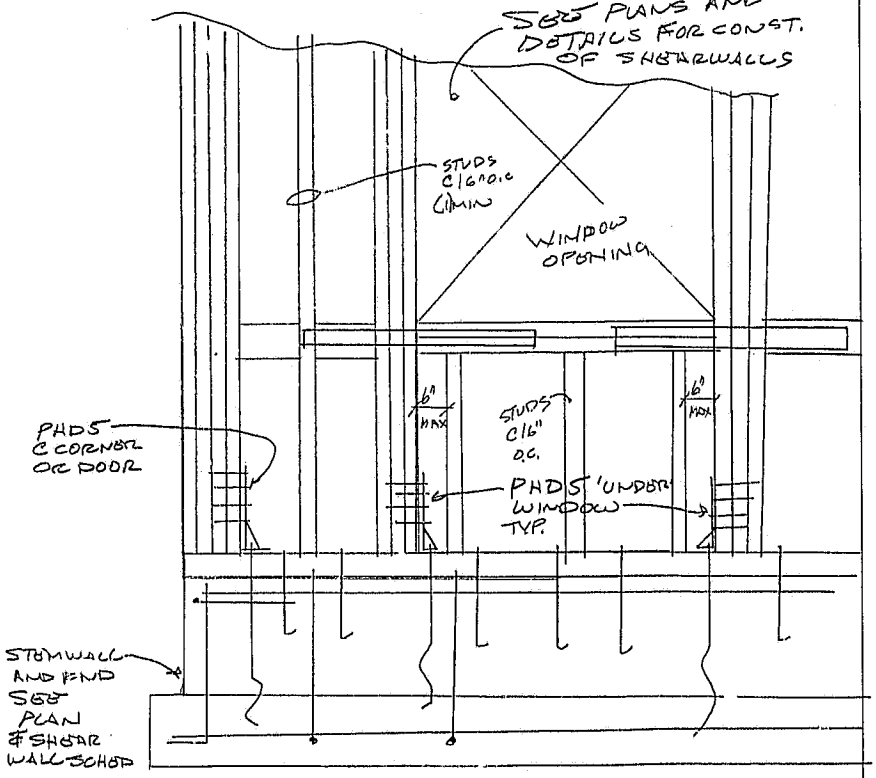
Load Combinations

Num	Description	Env	WS	PD	SRSS	CD	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	UBC 12-7	y				1	DL	1						
2	UBC 12-8 (b)	y				1	DL	1	LL	1	SL	1		
3	UBC 12-9 (a)	y	y			1	DL	1	WL	1				
4	UBC 12-9 (b)	y	y			1	DL	1	WL	-1				
5	UBC 12-11 (e)	y	y			1	DL	1	LL	.75	SL	.75	WL	.75
6	UBC 12-11 (f)	y	y			1	DL	1	LL	.75	SL	.75	WL	-.75

Envelope Joint Displacements

Joint Label		X Translate (in)	Lc	Y Translate (in)	Lc	Z Translate (in)	Lc	X Rotate (radians)	Lc	Y Rotate (radians)	Lc	Z Rotate (radians)	Lc
N1	max	0	3	-0.001	3	0	3	0	2	0	6	0	3
	min	0	6	-0.004	2	0	6	0	3	0	3	-0.001	6
N2	max	0	3	0	3	0	3	0	2	0	6	0	3
	min	0	6	-0.006	2	0	6	0	3	0	3	-0.001	6
N3	max	0	3	0	3	0	6	0	3	0	3	0	3
	min	0	6	-0.006	2	0	3	0	2	0	6	-0.001	6
N4	max	0	3	-0.001	3	0	6	0	3	0	3	0	3
	min	0	6	-0.004	2	0	3	0	2	0	6	-0.001	6
N5	max	0	3	-0.001	3	0	3	0	6	0	3	0	3
	min	-0.001	6	-0.089	6	0	6	0	3	0	6	-0.001	6
N6	max	0	3	0.001	3	0	3	0.002	6	0	6	0	3
	min	-0.001	6	-0.103	6	0	6	0	3	0	3	-0.001	6
N7	max	0	3	0.001	3	0	6	0	3	0	3	0	3
	min	-0.001	6	-0.103	6	0	3	-0.002	6	0	6	-0.001	6
N8	max	0	3	-0.001	3	0	6	0	3	0	6	0	3
	min	-0.001	6	-0.089	6	0	3	0	6	0	3	-0.001	6
N9	max	0	3	-0.001	3	0	6	0	6	0	3	0	3
	min	-0.001	6	-0.092	6	0	3	0	3	0	6	-0.001	6
N10	max	0	3	0	3	0	6	0	6	0	3	0	3
	min	-0.002	6	-0.093	6	0	3	0	3	0	6	-0.001	6
N11	max	0	3	0	3	0	3	0	3	0	6	0	3
	min	-0.002	6	-0.093	6	0	6	0	6	0	3	-0.001	6
N12	max	0	3	-0.001	3	0	3	0	3	0	6	0	3
	min	-0.001	6	-0.092	6	0	6	0	6	0	3	-0.001	6
N13	max	0	6	0	3	0	3	0	3	0	6	0	3
	min	0	3	-0.006	6	0	6	0	2	0	3	0	6
N14	max	0	6	0	3	0	6	0	2	0	3	0	3
	min	0	3	-0.006	6	0	3	0	3	0	6	0	6
N15	max	0.002	3	0.001	3	0.004	6	0	6	0	6	0.000	1
	min	-0.02	6	-0.104	6	-0.001	3	0	3	0	3	0.000	1
N16	max	0.002	3	0	3	0.003	6	0.001	6	0	6	0.000	1
	min	-0.019	6	-0.091	6	0	3	0	3	0	3	0.000	1
N17	max	0.002	3	0.001	3	0.001	3	0	3	0	3	0.000	1
	min	-0.02	6	-0.104	6	-0.004	6	0	6	0	6	0.000	1

AG Rolin Consulting STRUCTURAL DESIGN & ENGINEERING	Project BREEZE HILL	By JMW	Sheet No. 49
	Location PDX	Date 9/02	
	Client BUTCH	Revised	Job No. B0121
		Date	



OPTION

PHDS ARRANGEMENT

W/SSTB24