



# LATERAL ANALYSIS

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## BUILDING INFORMATION

Project Title	<b>3-STORY EXAMPLE</b>	Designer	<b>Joe Engin</b>	Importance Factor	<b>1</b>
Project #	<b>PROJECT 1</b>	Number of Stories	<b>3</b>	Highest Story Ht	<b>42</b>
Date:	<b>1/22/2008</b>	Occupancy Category	<b>II</b>	Lumber Species	<b>Dry</b>

## WIND INFORMATION

Analytic Method: Rigid building of all heights. Design wind pressures determined by  $P=qGCP-qi(GCPI)$

Exposure Category	<b>C</b>	Wind Speed	<b>V = 110</b>
Enclosure Classification	<b>Enclosed</b>	Topo Factor	<b>Kzt = 1.12</b>

## SEISMIC INFORMATION

Seismic Force Resisting System:

Light-Framed Walls Sheathed with Wood Structural Panels Rated for Shear Resistance or Steel Sheets  
 Equivalent Lateral Force Procedure: Calculation of Seismic Response Coefficient -  $C_s = SDS / (R/I)$

Site Soil Classification	<b>D</b>
0.2 sec Spectral Response Acceleration	<b>Sds = 148%</b>
1.0 sec Spectral Response Acceleration	<b>Sd1 = 148%</b>
Response Modification Factor	<b>R = 6.5</b>
Deflection Amp.	<b>Cd = 4</b>
Long Period Transition Period	<b>T(L) = 3</b>
Damped 0.2 sec SRA	<b>Sds = 99%</b>
Damped 1.0 sec SRA	<b>Sd1 = 58%</b>
Overstrength Factor	<b>Omega = 2.5</b>
Seismic Design Category	<b>SDC = D</b>

## SUMMARY OF FORCES

### Story Forces

Story	Seismic	Wind N-S	Wind E-W
UPPER	29.84 kip	6.03 kip	6.40 kip
MIDDLE	48.89 kip	6.35 kip	7.23 kip
LOWER	79.59 kip	9.93 kip	6.45 kip

### Seismic

Response Coefficient	<b>Cs = 0.15 kip</b>
Total Seismic Weight	<b>W = 158.32 kip</b>
Redundancy Coefficient	<b>Rho = 1.30 kip</b>
Sisemic Base Shear	<b>(Cs*W) = 24.03 kip</b>
Design Base Shear	<b>0.7pCsW = 21.87 kip</b>

### Wind

Maximum main wind force resisting system design pressures in any direction

Story	Wall	Roof
UPPER	+25.12/-7.16	+12.71 / -9.64
MIDDLE	+25.08/-6.67	+11.83 / -11.29
LOWER	+21.5/-6.12	+11.85 / -8.19

## REPORT NOTES

All supporting details and calculations can be found in the following sections of the report



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Story: UPPER

## Shear Wall / Connector Key

Direction: **N-S**

Grid	#	Distance From GLA	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holdown Strap/Anchor	Bolt/ATR
4	1	20	6	10	A	SB	3x6 STAN	SW Below	-	MSTI60	N/A
4	2	36	4	10	B	SB	3x6 STAN	SW Below	-	MSTI48	N/A
4	3N	46	4	10	B	SB	3x6 STAN	Post	-	MSTI48	N/A
	3S						3x6 STAN	SW Below	-	MSTI48	N/A
6	1	25	12	10	D	SB	2-2x6 NO.2	SW Below	-	MSTI60	N/A
8	1	16	9	10	B	SB	2-2x6 NO.2	SW Below	-	MSTI60	N/A

## Shear Wall / Connector Key

Direction: **E-W**

Grid	#	Distance From GL1	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holdown Strap/Anchor	Bolt/ATR
D	1E	28	8	10	C	SB	4x6 NO.2	Post	-	MSTI60	N/A
	1W						4x6 NO.2	SW Below	-	MSTI60	N/A
B	1E	50	4	10	D	SB	2-2x6 NO.2	Post	-	MSTI72	N/A
	1W								-		
B	2E	64	4	10	C	SB	2-2x6 NO.2	SW Below	-	MSTI72	N/A
	2W								-		
F	1	62	6	10	D	SB	2-2x6 NO.2	Post no SW	-	PHD6	ATR-7/8"

## Diaphragm Key

Running N-S

Running E-W

Name	Area (sqft)	East Grid	West Grid	Width (ft)	overning Force	North Grid	South Grid	Width (ft)	Governing Force
U1	660	6	4	22	Seismic	D	G	30	Wind
U2	540	8	6	18	Seismic	B	F	30	Wind

## Components and Cladding

Name	Type	Zone	Diaphragm	Effective Wind Area (sqft)	Positive Design Press. (p+)	Negative Design Press. (p-)
Gable Roof	Gable Roof (Slope <= 7°)	2	U1	156	11.00	-37.06
Gable Roof	Gable Overhang (Slope <= 7°)	3	U1	12	19.92	-81.69
Gable Roof	Gable Roof (Slope <= 7°)	1	U1	780	11.00	-31.27
Flat Roof	Monoslope Roof (3° < Slope <= 10°)	1	U2	532	11.10	-37.39
Flat Roof	Monoslope Roof (3° < Slope <= 10°)	2	U2	18	13.28	-42.49
Flat Roof	Monoslope Roof (3° < Slope <= 10°)	3	U2	36	12.40	-48.09
Flat Roof	Monoslope Roof (3° < Slope <= 10°)	2'	U2	18	13.28	-51.25
Flat Roof	Monoslope Roof (3° < Slope <= 10°)	3'	U2	144	11.10	-52.00



# LATERAL ANALYSIS

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Story: MIDDLE

## Shear Wall / Connector Key

Direction: **N-S**

Grid	#	Distance From GLA	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holddown Strap/Anchor	Bolt/ATR
2	1	20	8	10	A	SB	3x6 STAN	MSTI60	-	SW Below	N/A
4	1	36	6	10	C	SB	3x6 NO.2	HDU8	4-1	SW Below	ATR-7/8"
4	2N	46	14	10	B	SB	2-2x6 NO.2	HDU8	4-2	Post	ATR-7/8"
4	2S						4x6 NO.2	HDU11	4-3	Post	ATR-1"
6	1	25	12	10	C	SB	6x6 NO.1	HDU11	6-1	Post	ATR-1"
6	2	16	4	10	D	SB	3x6 NO.2	HDU8	-	Post	ATR-7/8"
6	3		5	10	C	SB	3x6 NO.2	MSTC66	-	SW Below	N/A
8	1		9	10	B	SB	3x6 NO.2	HDU8	8-1	SW Below	ATR-7/8"
8	2		6	10	B	SB	3x6 STAN	MSTI72	-	SW Below	N/A

## Shear Wall / Connector Key

Direction: **E-W**

Grid	#	Distance From GLA	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holddown Strap/Anchor	Bolt/ATR
D	1	10	9	10	B	SB	4x6 NO.2	SW Below	-	HDU8	ATR-7/8"
D	2E	28	10	10	B	SB	3x6 NO.2	SW Below	-	MSTC66	N/A
	2W						4x6 NO.2	Post	D-1	HDU11	
B	1E	50	6	10	B	SB	4x6 NO.2	Post	-	MSTI60	N/A
	1W						4x6 NO.2	SW Below	B-1	HDU8	
B	2E	62	6	10	B	SB	4x6 NO.2	SW Below	B-2	HDU8	ATR-7/8"
	2W						4x6 NO.2	Post	-	MSTI72	
F	1	18	10	10	B	SB	4x6 NO.2	SW Below	-	HDU8	ATR-7/8"
F	2	40	10	10	B	SB	2-2x6 NO.2	SW Below	-	PHD6	ATR-7/8"
G	1	28	4	10	C	SB	4x6 NO.2	SW Below	G-1	HDU8	ATR-7/8"
G	2	46	4	10	C	SB	4x6 NO.2	SW Below	G-2	HDU8	ATR-7/8"

## Diaphragm Key

Running N-S

Running E-W

Name	Area (sqft)	East Grid	West Grid	Width (ft)	Governing Force	North Grid	South Grid	Width (ft)	Governing Force
M1	660	6	4	22	Wind	D	G	30	Seismic
M2	540	8	6	18	Wind	B	F	30	Wind
M3	360	4	2	18	Wind	D	F	20	Wind
M4	324	8	6	18	Wind	F	H	18	Wind

## Post Key

Direction: **N-S**

Grid	#	Height (ft)	Post Type	Connection Type	Holddown	Bolt/ATR
4		10	4x4 NO.2	Concrete	STHD10	N/A
4	3N	10	4x4 NO.2	Concrete	STHD8	N/A



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## Post Key

Direction: E-W

<u>Grid</u>	<u>#</u>	<u>Height</u> <u>(ft)</u>	<u>Post</u> <u>Type</u>	<u>Connection</u> <u>Type</u>	<u>Holdown</u>	<u>Bolt/ATR</u>
D	1E	10	4x4 NO.2	Concrete	STHD14	N/A
B	1E	10	4x4 NO.2	Concrete	STHD14	N/A
B	2W	10	4x4 NO.2	Concrete	STHD14	N/A
F	1	10	2-2x6 NO.2	Concrete	HHDQ14	B

## Components and Cladding

<u>Name</u>	<u>Type</u>	<u>Zone</u>	<u>Diaphragm</u>	<u>Effective</u> <u>Wind</u> <u>Area (sqft)</u>	<u>Positive</u> <u>Design</u> <u>Press. (p+)</u>	<u>Negative</u> <u>Design</u> <u>Press. (p-)</u>
Shed Roof	Monoslope Roof (10° < Slope <= 30°)	1	M3	360	13.06	-34.82
Shed Roof	Monoslope Roof (10° < Slope <= 30°)	2	M3	112	13.06	-37.55
Shed Roof	Multispan Gable Roof (10° < Slope <= 30°)	3	M3	8	21.22	-78.36
Shed Roof	Multispan Gable Roof (10° < Slope <= 30°)	1	M4	324	15.30	-41.69
Shed Roof	Multispan Gable Roof (10° < Slope <= 30°)	2	M4	98	15.35	-49.72
Shed Roof	Multispan Gable Roof (10° < Slope <= 30°)	3	M4	8	20.58	-75.99



# LATERAL ANALYSIS

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Story: LOWER

Shear Wall / Connector Key				Direction: N-S								
Grid	#	Distance From GLA	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holddown Strap/Anchor	Bolt/ATR	
1	1	20	3	10	B	SB	6x4 NO.2	STHD10	-	Concrete	N/A	
1	2	36	3	10	B	SB	6x4 NO.2	STHD10	-	Concrete	N/A	
2	1	46	8	10	C	SB	4x6 NO.2	HDU11	2-1	Concrete	A	
3	1	25	6	10	D	SB	4x6 NO.2	HDU11	-	Concrete	A	
4	1	16	6	10	D	SB	4x6 NO.2	HDU8	-	Concrete	SSTB28	
4	2		14	10	D	SB	6x6 NO.1	HDU11	4-2	Concrete	A	
6	1		4	10	D	SB	4x6 NO.2	HDU11	-	Concrete	A	
6	2		12	10	D	SB	4x6 NO.2	HDU8	-	Concrete	SSTB28	
6	3		5	10	E	SB	6x6 NO.1	HHDQ14	6-3	Concrete	B	
6	4		5	10	E	SB	4x6 NO.1	HDU11	-	Concrete	A	
6	5		4	10	D	SB	4x6 NO.1	HDU11	-	Concrete	A	
8	1		9	10	C	SB	4x6 NO.2	HDU11	8-1	Concrete	A	
8	2		6	10	D	SB	4x6 NO.1	HDU11	8-2	Concrete	A	

Shear Wall / Connector Key				Direction: E-W								
Grid	#	Distance From GLA	Length (ft)	Height (ft)	Wall Type	Site/Pre Built	Chord Member	Connection Type	U.L. Link	Holddown Strap/Anchor	Bolt/ATR	
B	1E	50	18	10	A	SB	4x6 NO.2	Concrete	B-1	HDU8	SSTB28	
A	1	15	8	10	A	SB	2-2x6 NO.2	Concrete	-	STHD14	N/A	
A	2	40	10	10	A	SB	2-2x6 NO.2	Concrete	-	STHD14	N/A	
D	1	10	9	10	D	SB	6x6 NO.1	Concrete	D-1	HHDQ14	B	
D	2E	24	14	10	D	SB	6x6 NO.1	Concrete	D-2	HHDQ14	B	
D	3		5	10	D	SB	4x6 NO.2	Concrete	-	HDU11	A	
E	1	34	10	10	A	SB	4x6 NO.1	Concrete	-	HHDQ14	B	
F	1	18	10	10	D	SB	4x6 NO.1	Concrete	F-1	HHDQ14	B	
F	2	40	10	10	D	SB	4x6 NO.1	Concrete	F-2	HHDQ14	B	
G	1	28	4	10	C	SB	4x6 NO.2	Concrete	G-1	HDU11	A	

## Diaphragm Key

Name	Area (sqft)	Running N-S				Running E-W			
		East Grid	West Grid	Width (ft)	Governing Force	North Grid	South Grid	Width (ft)	Governing Force
L1	660	6	4	22	Wind	D	G	30	Wind
L2	540	8	6	18	Wind	B	F	30	Wind
L3	324	8	6	18	Wind	F	H	18	Wind
L4	360	4	2	18	Wind	D	F	20	Wind
L5	1000	6	1	50	Wind	A	D	20	Wind



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## Post Key

Direction: N-S

<u>Grid</u>	<u>#</u>	<u>Height</u> <u>(ft)</u>	<u>Post</u> <u>Type</u>	<u>Connection</u> <u>Type</u>	<u>Holdown</u>	<u>Bolt/ATR</u>
4	2N	10	4x4 NO.2	Concrete	HDU8	SSTB28
4	2S	10	4x4 NO.2	Concrete	HDU8	SSTB28
6	1	10	6x6 NO.1	Concrete	(2) HDQ8	7/8" ATR
6	2	10	4x4 NO.1	Concrete	HDU8	SSTB28

## Post Key

Direction: E-W

<u>Grid</u>	<u>#</u>	<u>Height</u> <u>(ft)</u>	<u>Post</u> <u>Type</u>	<u>Connection</u> <u>Type</u>	<u>Holdown</u>	<u>Bolt/ATR</u>
D	2W	10	4x6 NO.2	Concrete	HDU11	A
B	1E	10	4x4 NO.2	Concrete	STHD14	N/A
B	2W	10	4x4 NO.1	Concrete	STHD14	N/A

## Components and Cladding

<u>Name</u>	<u>Type</u>	<u>Zone</u>	<u>Diaphragm</u>	<u>Effective</u> <u>Wind</u> <u>Area (sqft)</u>	<u>Positive</u> <u>Design</u> <u>Press. (p+)</u>	<u>Negative</u> <u>Design</u> <u>Press. (p-)</u>
Hip Roof	Gable/Hip Roof (7° < Slope <= 27°)	3	L5	27	14.74	-62.58
Hip Roof	Gable/Hip Roof (7° < Slope <= 27°)	2	L5	750	11.91	-34.25
Hip Roof	Gable/Hip Roof (7° < Slope <= 27°)	1	L5	223	11.91	-24.32