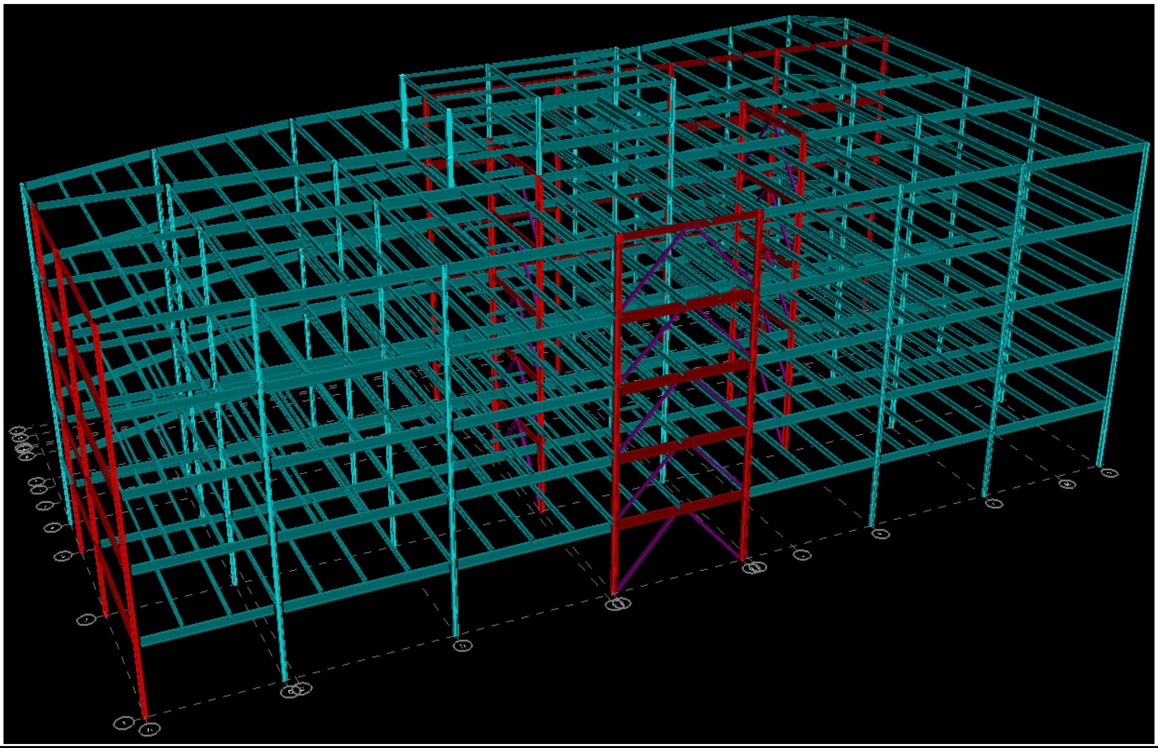
David Lee
AE 481W
Structural Option

Advisor: Andres Lepage
URS Office Building
October 27, 2006



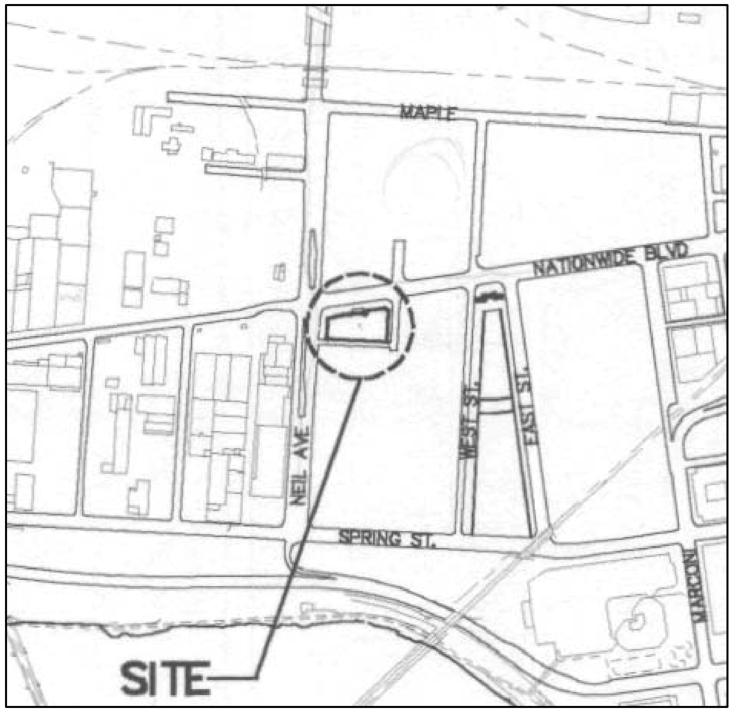
STRUCTURAL TECHNICAL REPORT 3

Lateral System Analysis and Confirmation Design

TABLE OF CONTENTS

INTRODUCTION

This report provides a thorough analysis of the lateral system employed by the URS Office Building located in Columbus, Ohio. The 5 story, 100,000 square foot building is the forerunner in design for the Arena District being developed by Nationwide Realty Investors. The curvature and the setback on the North facade of the building (facing Nationwide Boulevard) along with careful consideration for proportion gives distinction to the otherwise rectangular building. Designed as mercantile/office building, the URS Office Building provides retail area on the first floor and office area from second to fifth floor. Completed construction in January 2001, this design, bid, build project's total cost was $7 million.



LOAD COMBINATIONS

Load combinations were taken directly out of the ASCE 7-05. Applicable loads in this report include dead, live, wind, and seismic.

1. $1.4(D + F)$
2. $1.2(D + F + T) + 1.6(L + H) + 0.5(L_r \text{ or } S \text{ or } R)$
3. $1.2D + 1.6(L_r \text{ or } S \text{ or } R) + (L \text{ or } 0.8W)$
4. $1.2D + 1.6W + L + 0.5(L_r \text{ or } S \text{ or } R)$
5. $1.2D + 1.0E + L + 0.2S$
6. $0.9D + 1.6W + 1.6H$
7. $0.9D + 1.0E + 1.6H$

EXISTING LATERAL SYSTEM

Concentric braced frames are used to resist most of the lateral loads in the URS Office Building. Three K-bracing and along with 2 moment frames compose the complete lateral system *(see Figure 1)*. The bracing members are rectangular hollow structural sections and moment frame elements are W-shapes. Brace frame 1 resists the east-west lateral loads. Brace frames 2 and 3 provide lateral resistance in the north-south direction. Moment frames 1 and 2 exist to provide stability against torsion. Moment frames were employed due to architectural constraint. North face of the building being the street façade prevented the use of braced frame. The composite floor system provides a rigid diaphragm to distribute the lateral loads to the frames.

Upon further investigation of lateral analysis, applied loads were reduced. Factors that led to the reduction are accurate calculation of the building period and mass. With the aid of RAM model, actual period of the building was calculated which reduced the applied wind loads. Also instead of conservative estimate of building mass performed in previous report, RAM's ability to compute floor mass led to reduction in seismic loads.

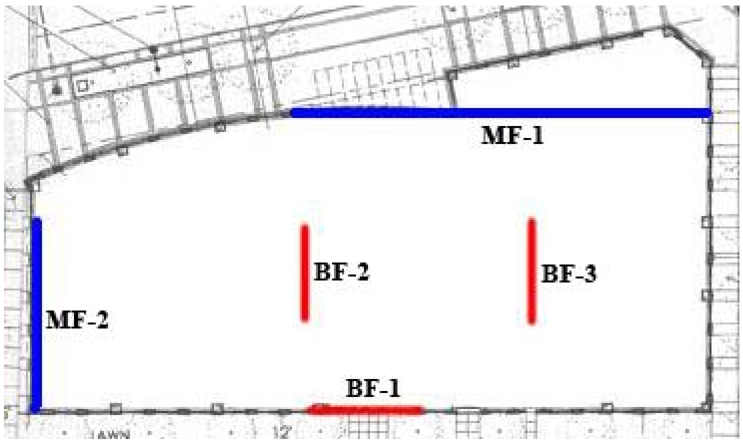


Figure 1

Found in this report are controlling lateral load combination, distribution of lateral forces through the structure, strength check, serviceability check, and torsion analysis.

CONTROLLING LOADS

As was determined in the first technical report, north-south loading is controlled by wind but east-west loading is controlled by seismic. The *Figures 2.1* through *2.5* are un-factored lateral loads due to wind and seismic. Through the use of RAM model, excel spreadsheet, and hand calculation the lateral loads below were calculated. All three methods provided comparable numbers which also agrees with the construction document. For excel output and hand calculations turn to *Appendix A.*

In the north-south direction, un-factored base shear due to wind is 175.86 kips. Multiplying the 1.6 factor, base shear turns out to be 281 kips. In the east-west direction seismic base shear controls with 169 kips.

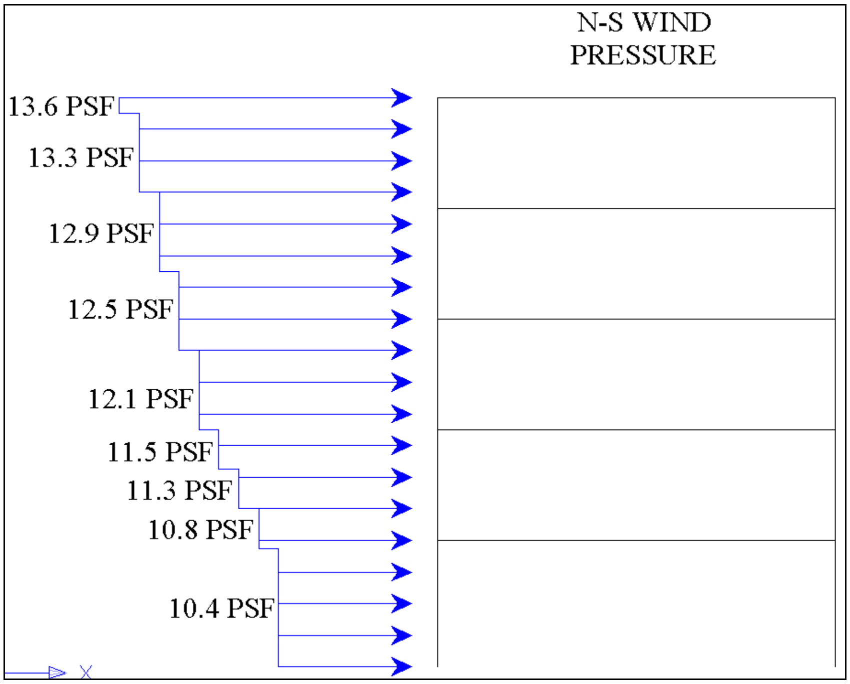


Figure 2.1

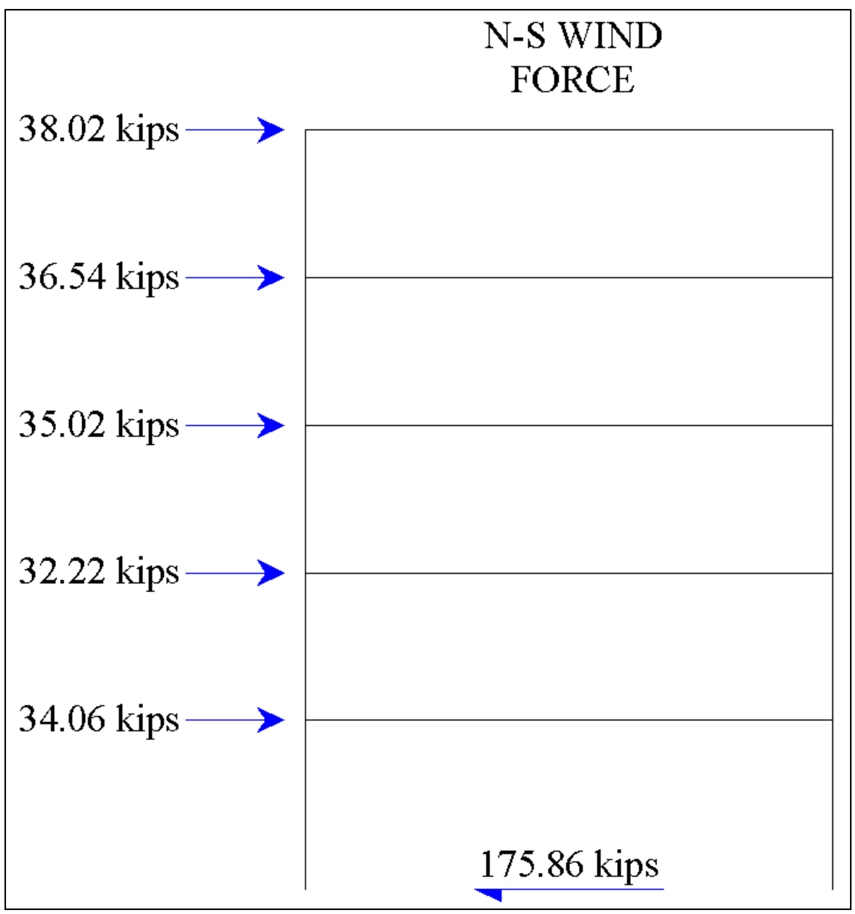


Figure 2.2

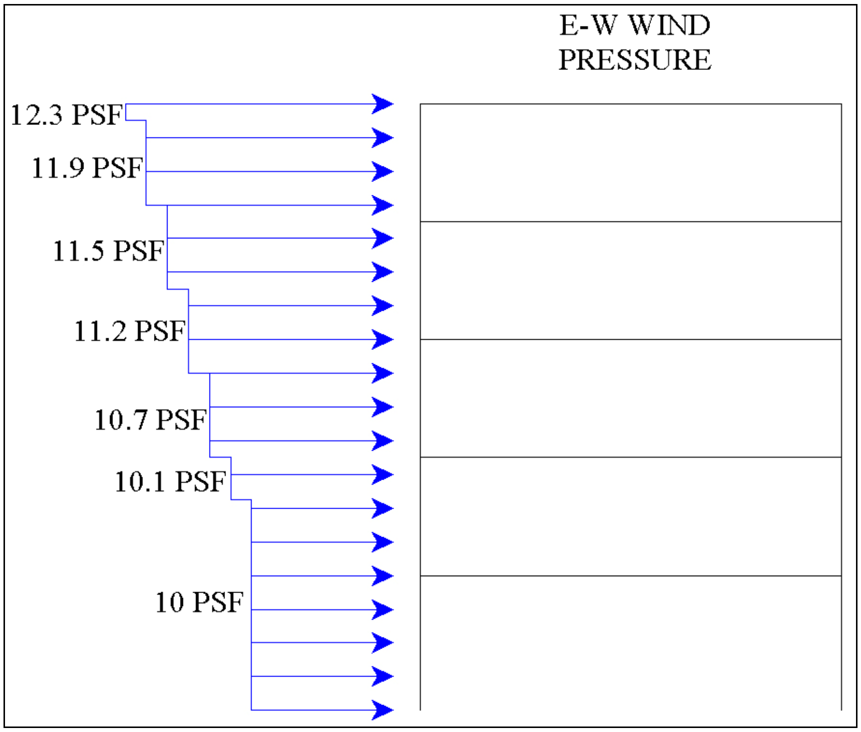


Figure 2.3

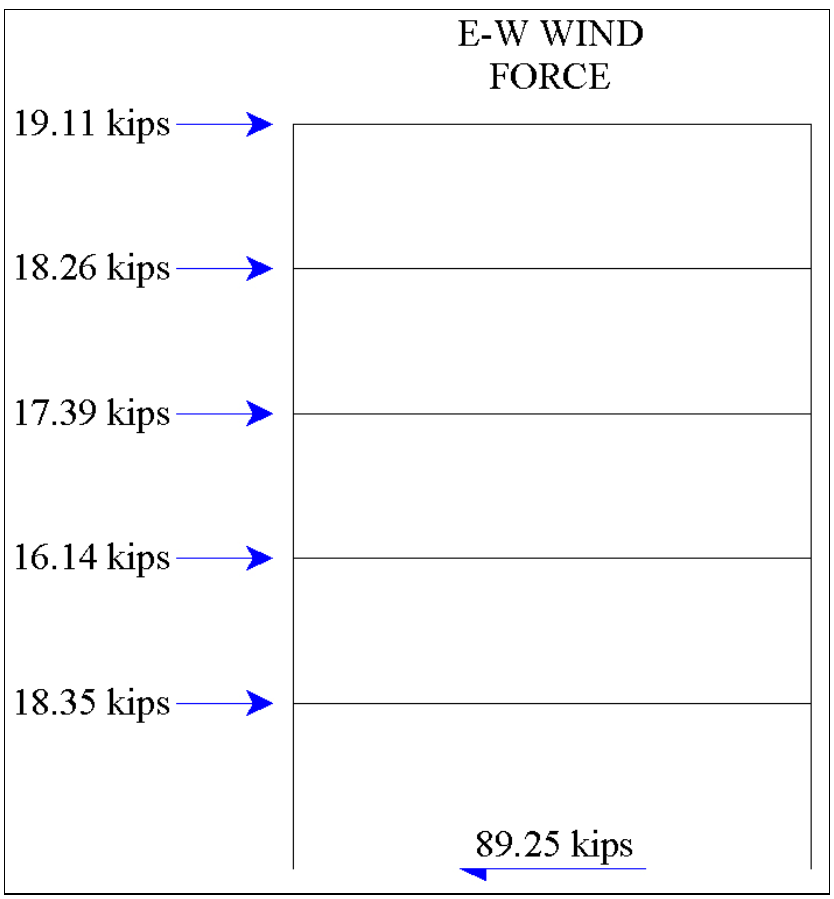


Figure 2.4

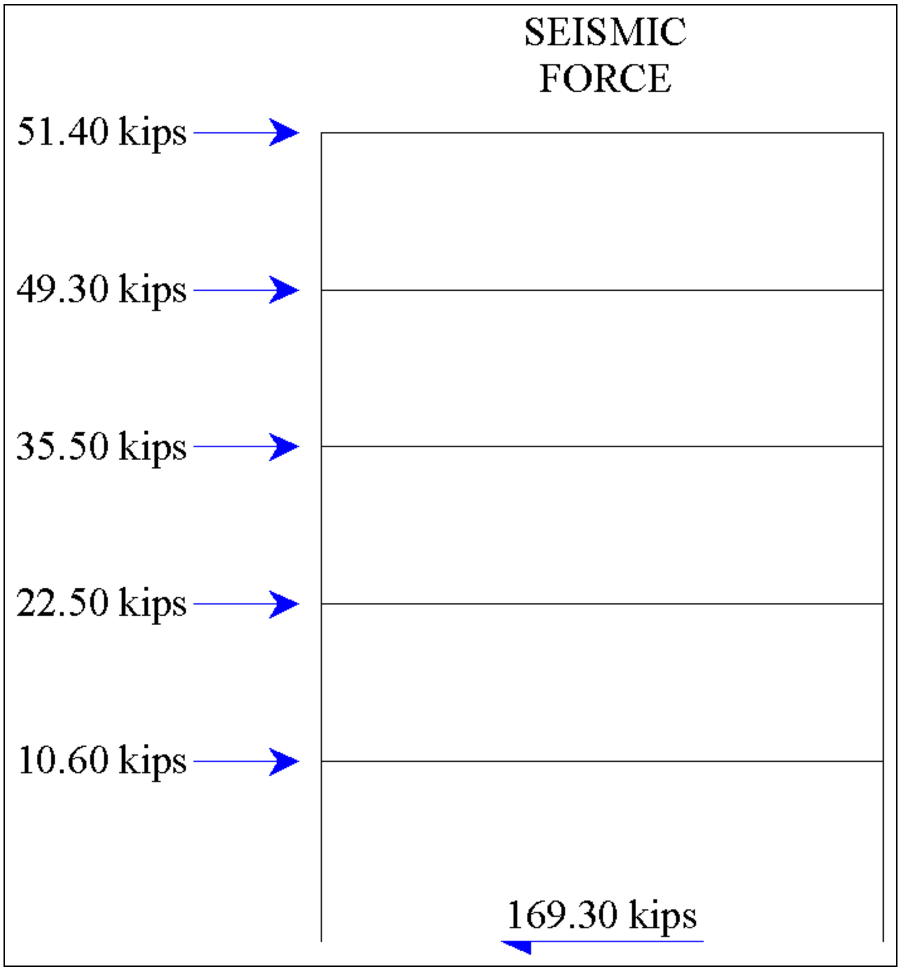
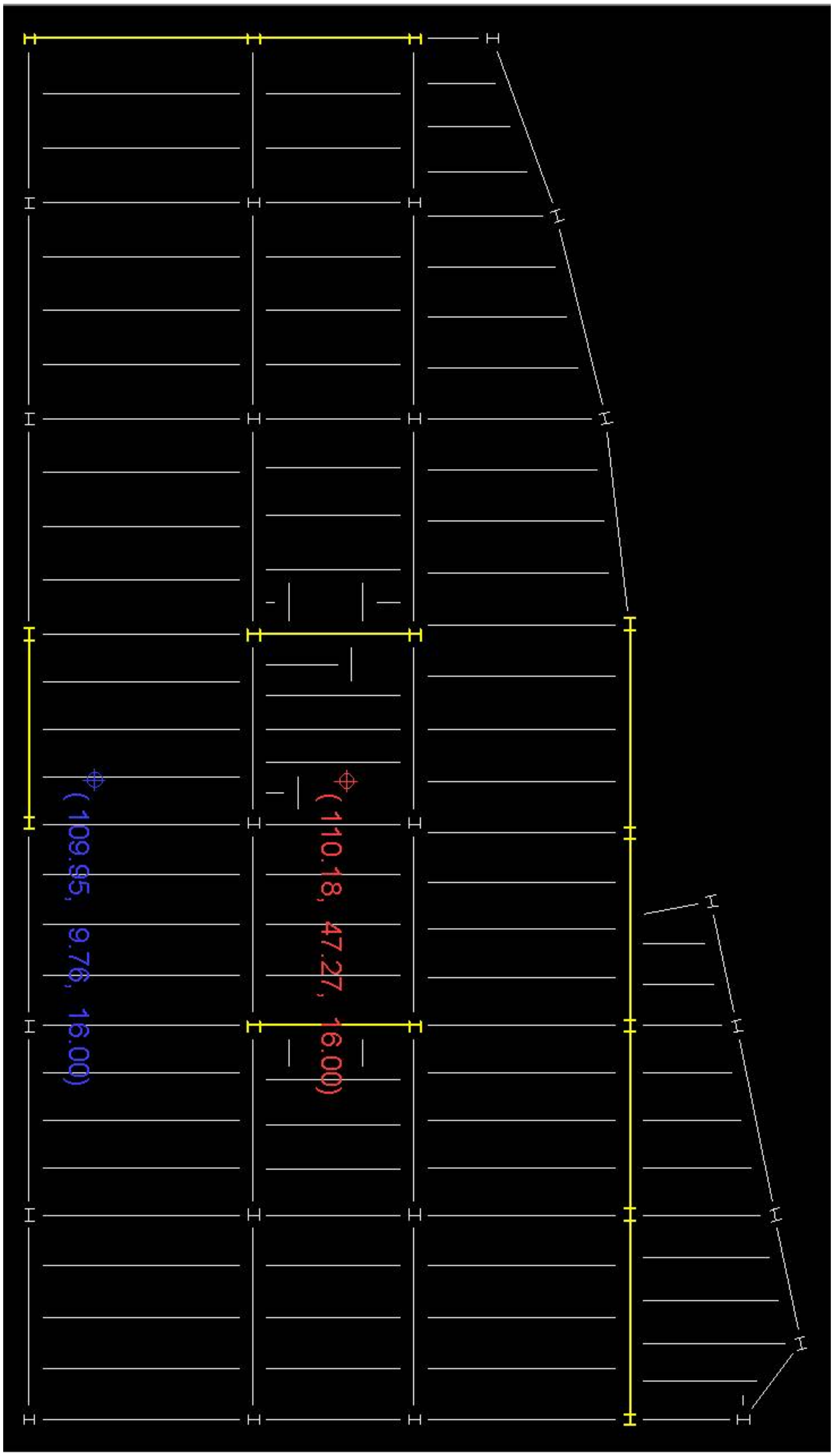


Figure 2.5

LATERAL LOAD DISTRIBUTION

Relative stiffness method was employed to distribute the computed lateral loads. Stiffness was calculated from the positions of frames to the center of rigidity *(see Figure 3)*. For the north-south direction because of the rigid diaphragm provided by the floor system, braced frames 2 and 3 were assigned equal stiffness. After running the numbers, the moment frame only resisted 6.3% of the north-south lateral load which turned out to be 18 kips leaving 264 kips to be resisted by the braced frames. In the east-west direction braced frame 1 resisted 150 kips and the moment frame 19 kips. Detailed calculations for lateral load distribution can be found in A*ppendix B.*

Logical load path in the URS Office Building is as stated, lateral loads being resisted mostly by the braced frames and moment frames helping to prevent torsion all the while the floor system works to transfer the lateral loads to braced frames and moment frames.



Red is the Center of Mass and blue is the Center of Rigidity

Figure 3

STRENGTH / SERVICEABILITY

Critical members are checked for strength and serviceability. In the *Appendix C* is a spot check for bracing members and lateral columns. Also drift, story drift, overturning, as well as foundations were checked. RAM analysis shows the adequacy of framing member. As shown in *Figure 4.1* most members are more than sufficient to carry the computed loads. Also performed in RAM was drift and story drift calculations. Shown in *Figure 4.2* is the deflected shape of the frames at scale factor of 100.

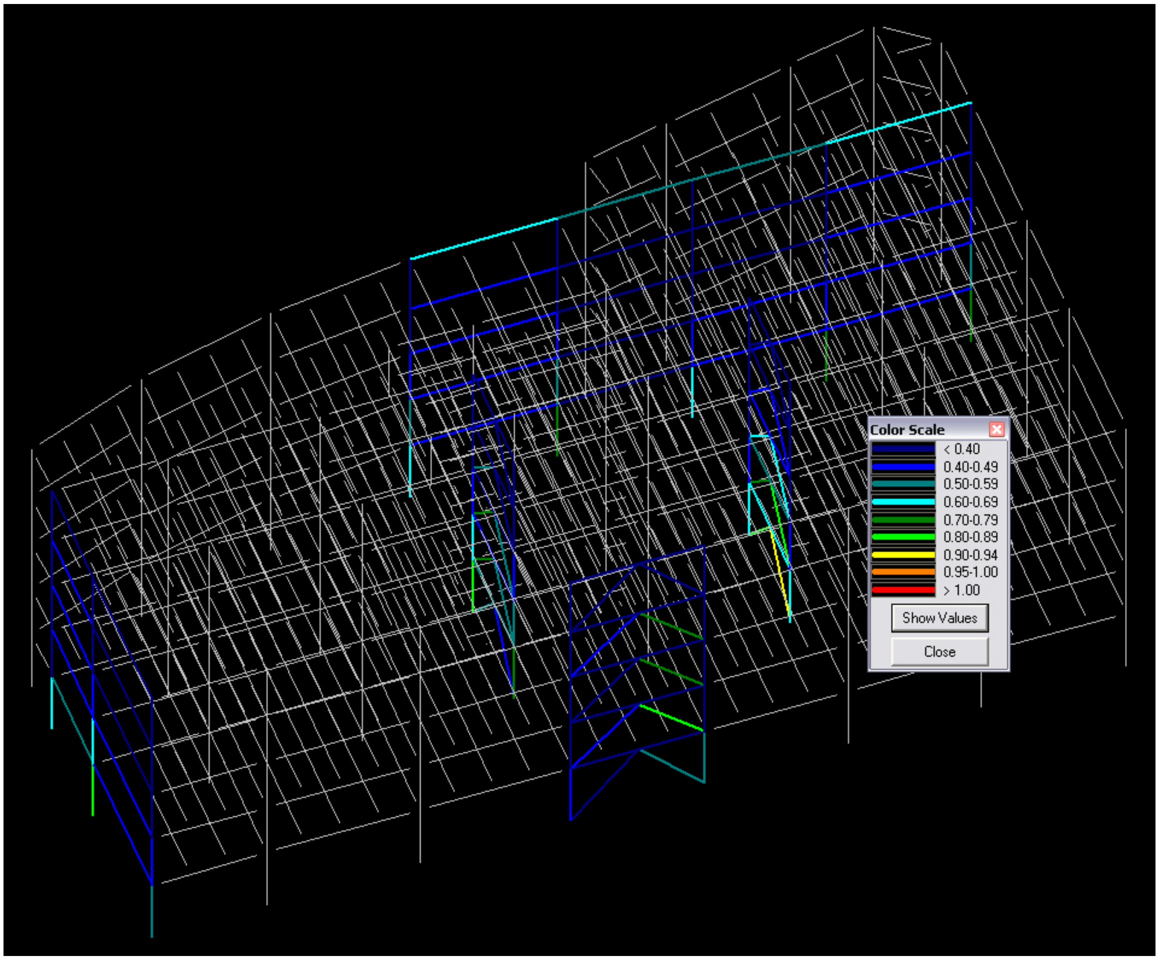
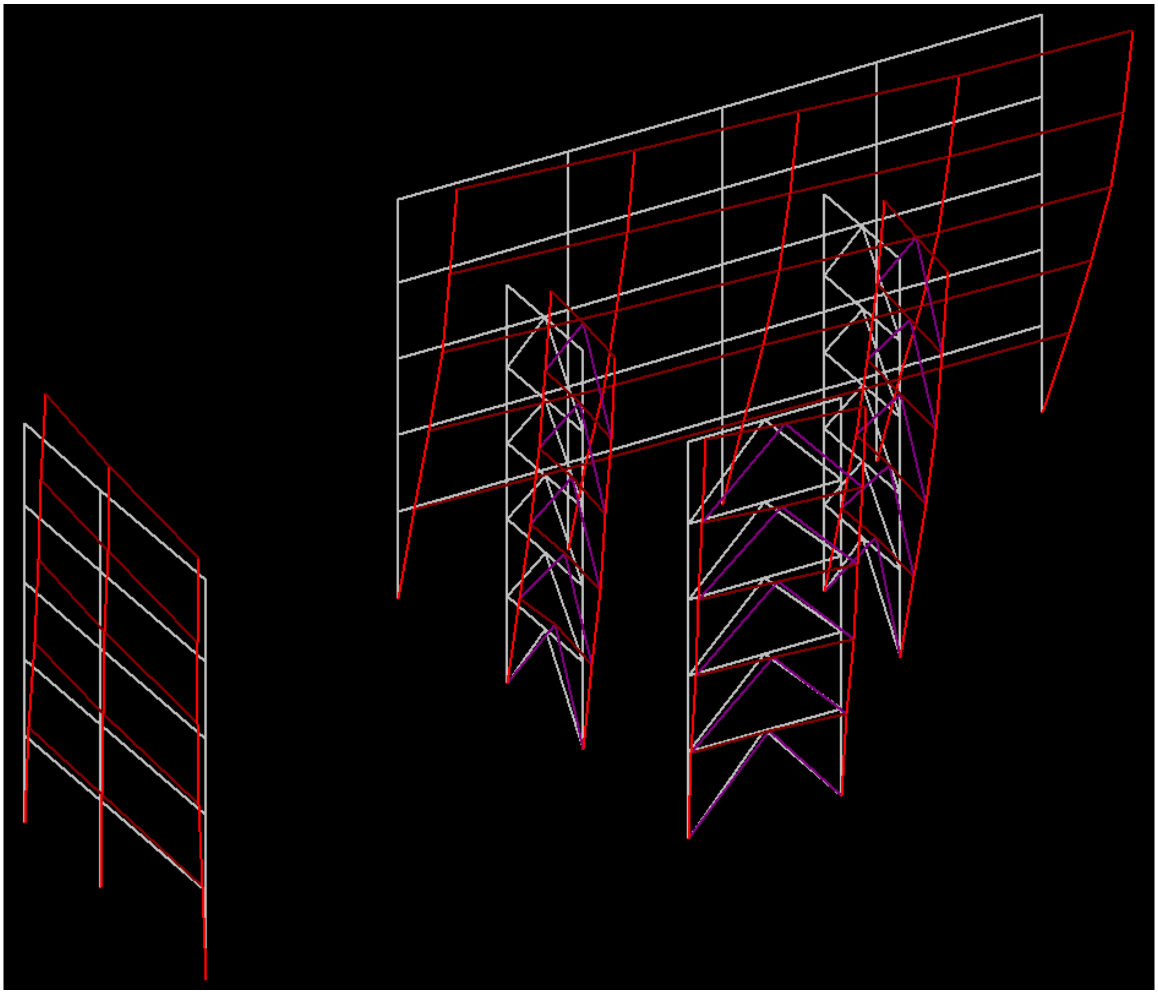


Figure 4.1



White members before lateral loads applied
Red members deflected shape at scale factor of 100

Figure 4.2

Drift limit was set to H/400. This is a rule of thumb for building drift commonly used in the industry. Maximum allowed drift was 2.16” and largest displacement due to controlling lateral load was 1.5”. Story drift was also calculated and typical allowable story drift was 0.42”. Actual story drift was less than 0.4”.

Drift Calculations from RAM

Floor	Height (feet)	Floor to Floor Height	Max Displacement		H/400 Drift	Story Drift		H/400 Story Drift
			X (inch)	Y (inch)		X (inch)	Y (inch)	
R	72	14	1.456	1.019	2.16	0.224	0.164	0.42
5	58	14	1.232	0.855	1.74	0.275	0.185	0.42
4	44	14	0.957	0.67	1.32	0.316	0.232	0.42
3	30	14	0.641	0.438	0.9	0.337	0.229	0.42
2	16	16	0.304	0.209	0.48	0.304	0.209	0.48

Overturning moments were calculated using only the controlling lateral loads. North-south direction controlled by wind resulted in 12,655 foot-kips of overturning and 264 kip column force. In the east-west direction seismic controlled which produced 8,962 foot-kips of overturning and 320 kip column force.

With the aid of CRSI Design Handbook, foundation spot check was performed. Using bearing capacity of 4000 PSF along with square footing sizes in the structural drawing, capacity was found in page 13-7. Comparing the axial load calculated to the capacity, footings were found to be adequate.

TORSION ANALYSIS

Due to the asymmetrical layout of the frames torsion had to be accounted for in this report. Torsion due to wind and seismic loading were calculated *(see Figure 5.1 – 5.3)*. Wind load normal to east or west face of the building produced 1,842 foot-kips. In the north-south direction torsion was 6,479 foot-kips.

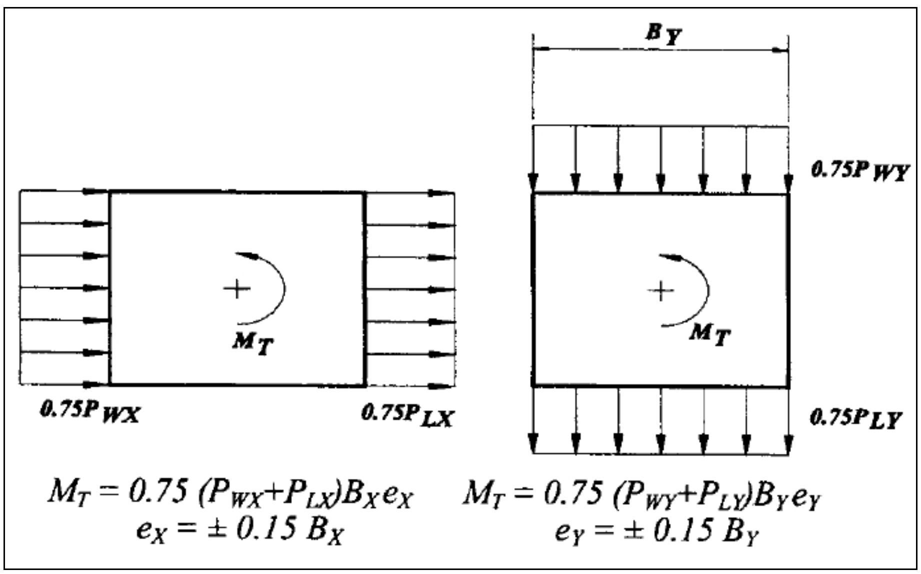


Figure 5.1

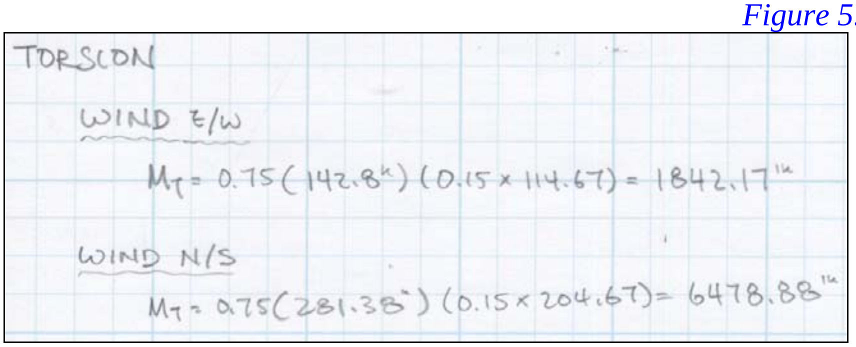


Figure 5.2

For the seismic loading case, eccentricity was taken as the distance between center of mass and center of rigidity. Also accidental torsion was taken into account as 5% of the dimension normal to lateral load multiplied by the lateral load. The total torsion in the east-west direction is 7308 foot-kip and in the north-south direction is 1768 foot-kip. Hand calculation of center of rigidity, eccentricity, torsion, along with distribution of forced due to torsion can be found in appendix D.

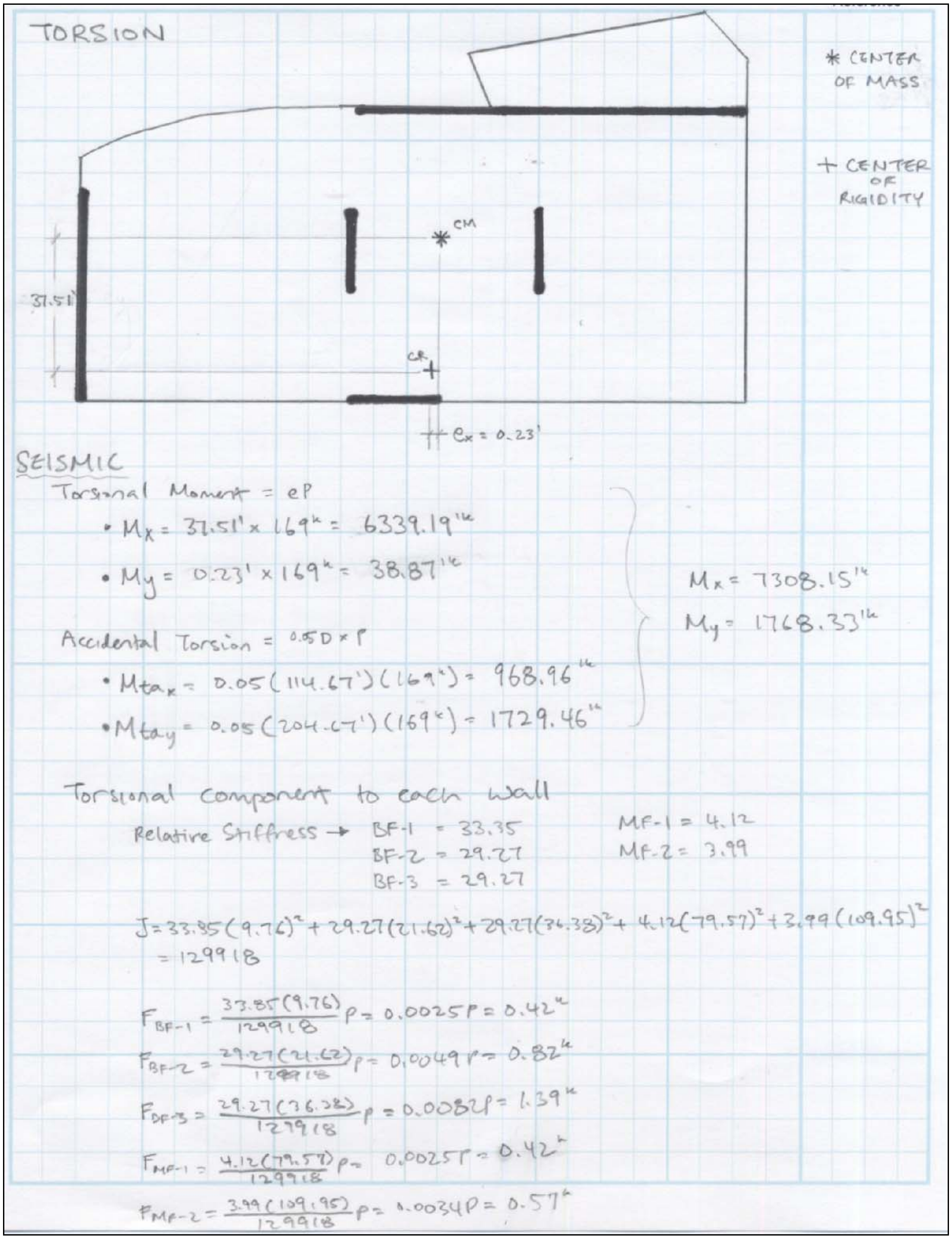


Figure 5.3

CONCLUSION

A thorough analysis of the lateral system was performed and the URS Office Building was found to be structurally sound. Located in Columbus, Ohio wind was expected to control. However in the east-west direction seismic base shear was greater than wind. Once the controlling lateral loads were calculated, they were distributed through the building by the floor system which was considered rigid diaphragm. As expected the braced frames resisted the majority of lateral forces and the moment frames added stiffness against torsion.

Strength checks were performed for critical bracing members and lateral columns. In all cases, the lateral members possessed sufficient strength. Also drift was checked for serviceability. Total drift as well as story drift were both in the acceptable range. Calculations for the overturning due to the controlling loads in each direction are contained in this report as well as the column force due to the overturning. Torsion was significant due to asymmetric placement of frames. Torsion was also calculated for the controlling loads in each direction.

The RAM model, hand calculations, and the construction document are in agreement indicating the stability of the lateral system. Although the existing solution is not the ideal lateral system, the braced frames together with the moment frames perform well.

APPENDICES

APPENDIX A

Wind Calculation

Input Parameters:		
	Basic Wind Speed (V, mph) =	80
	Exposure Category =	B
	Bldg. Classification Category =	II
	Wind Importance Factor (I_W) =	1.00
	Mean Building Height (h, ft) =	76.666666
Multipilers to obtain Topographic factor:	K1 =	1
	K2 =	1
	K3 =	1
	Topographic Factor (K_{zt})=	1
	Wind Directionality Factor (K_d)=	0.85

Height Above Ground	K_z	q_z (psf)	Windward Wall			Leeward Wall		
			External Pressure (psf)	External +Int. Press. (psf)	External - Int. Press. (psf)	External Pressure (psf)	External +Int. Press. (psf)	External - Int. Press. (psf)
0-15	0.57	7.9	5.2	**7.5**	2.9	-5.2	-2.9	**-7.5**
20	0.62	8.6	5.6	**7.9**	3.3	-5.2	-2.9	**-7.5**
25	0.67	9.3	6.1	**8.4**	3.8	-5.2	-2.9	**-7.5**
30	0.70	9.7	6.3	**8.6**	4.0	-5.2	-2.9	**-7.5**
40	0.76	10.6	6.9	**9.2**	4.6	-5.2	-2.9	**-7.5**
50	0.81	11.3	7.3	**9.6**	5.0	-5.2	-2.9	**-7.5**
60	0.85	11.8	7.7	**10.0**	5.4	-5.2	-2.9	**-7.5**
70	0.89	12.4	8.1	**10.4**	5.8	-5.2	-2.9	**-7.5**
80	0.93	13.0	8.4	**10.7**	6.1	-5.2	-2.9	**-7.5**
90	0.96	13.4	8.7	**11.0**	6.4	-5.2	-2.9	**-7.5**

Seismic Calculations Period etc

LOAD CASE: SEISMIC

Seismic ASCE 7-02 / IBC 2003 Equivalent Lateral Force

Site Class: D	Importance Factor: 1.00	Ss: 0.120 g	S1: 0.050 g
Fa: 1.600	Fv: 2.400	SDs: 0.128 g	SD1: 0.080 g

Seismic Use Group: I Seismic Design Category: B

Provisions for: Force

Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	3.3	Std,Ct=0.020,x=0.75	Calculated
Y	+ And -	3.3	Std,Ct=0.020,x=0.75	Calculated

Dir	Ta	Cu	T	T-used	Eq95521-1	Eq95521-2	Eq95521-3	k
X	0.575	1.700	1.192	0.977	0.039	0.025	0.0056	1.238
Y	0.575	1.700	1.242	0.977	0.039	0.025	0.0056	1.238

Seismic Calculation Applied Forces

LOAD CASE: SEISMIC

Seismic ASCE 7-02 / IBC 2003 Equivalent Lateral Force

Site Class: D	Importance Factor: 1.00	Ss: 0.120 g	S1: 0.050 g
Fa: 1.600	Fv: 2.400	SDs: 0.128 g	SD1: 0.080 g

Seismic Use Group: I Seismic Design Category: B

Provisions for: Force

Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	3.3	Std,Ct=0.020,x=0.75	Calculated
Y	+ And -	3.3	Std,Ct=0.020,x=0.75	Calculated

Dir	Ta	Cu	T	T-used	Eq95521-1	Eq95521-2	Eq95521-3	k
X	0.575	1.700	1.192	0.977	0.039	0.025	0.0056	1.238
Y	0.575	1.700	1.242	0.977	0.039	0.025	0.0056	1.238

Total Building Weight (kips) = 6582.33

APPLIED STORY FORCES:

Type: EQ_IBC03_X_+E_F

Level	Ht ft	Fx kips	Fy kips	X ft	Y ft
PENTHOSE	88.00	0.00	0.00	93.50	46.58
MACH	79.00	0.00	0.00	98.66	48.83
ROOF	73.00	53.27	0.00	103.21	51.21
5TH	58.00	47.81	0.00	110.18	53.12
4TH	44.00	33.95	0.00	110.18	53.12
3RD	30.00	21.13	0.00	110.18	53.12
2ND	16.00	9.70	0.00	110.18	53.12
		165.86	0.00		

East/West Wind Pressure

Height Above Ground	Windward External Pressure (psf)	Leeward External Pressure (psf)	Windward +Leeward (psf)
0-15	5.3	-3.7	**10.0**
20	5.7	-3.7	**10.0**
25	6.2	-3.7	**10.0**
30	6.5	-3.7	**10.1**
40	7.0	-3.7	**10.7**
50	7.5	-3.7	**11.2**
60	7.9	-3.7	**11.5**
70	8.2	-3.7	**11.9**
80	8.6	-3.7	**12.3**
90	8.9	-3.7	**12.6**

East/West Applied Forces

Level	Elevation	Applied Force in kips
1	0	0
2	16'	18.35
3	30'	16.14
4	44'	17.39
5	58'	18.26
Roof	72'	19.11
Sum of Forces		89.25

North/South Wind Pressure

Height Above Ground	Windward External Pressure (psf)	Leeward External Pressure (psf)	Windward +Leeward (psf)
0-15	5.2	-5.2	**10.4**
20	5.6	-5.2	**10.8**
25	6.1	-5.2	**11.3**
30	6.3	-5.2	**11.5**
40	6.9	-5.2	**12.1**
50	7.3	-5.2	**12.5**
60	7.7	-5.2	**12.9**
70	8.1	-5.2	**13.3**
80	8.4	-5.2	**13.6**
90	8.7	-5.2	**13.9**

North/South Applied Forces

Level	Elevation	Applied Force in kips
1	0	0
2	16'	34.06
3	30'	32.22
4	44'	35.02
5	58'	36.54
Roof	72'	38.02
Sum of Forces		175.86

Seismic

Level	Elevation in feet	Surface DL+SDL (psf)	Floor Surface Area (sq.ft)	Story Force (kips)	Story Shear (kips)
L1	0	0	0	0.0	169
L2	16	67.5	20290	10.6	169
L3	30	67.5	20290	22.5	159
L4	44	67.5	20290	35.5	136
L5	58	67.5	20290	49.3	101
roof	72	54.5	20290	51.4	51

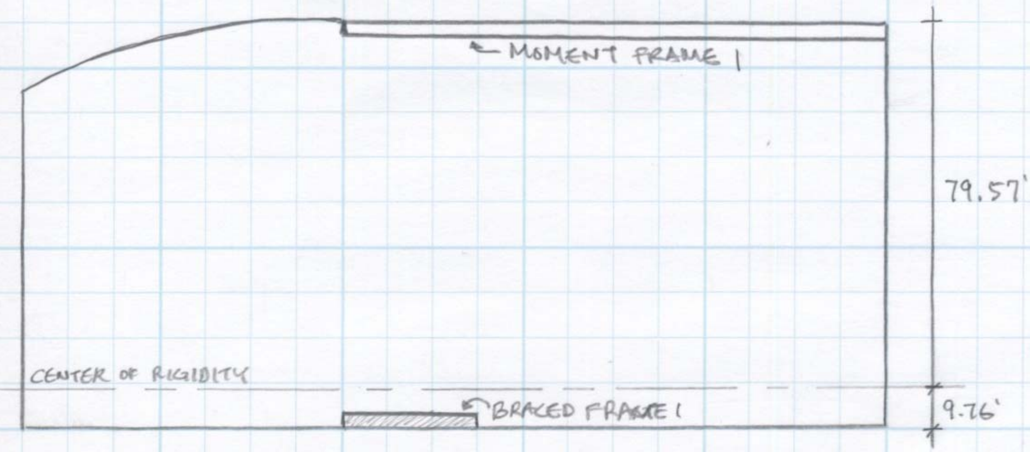
APPENDIX B

E-W LATERAL LOADS

WIND → BASE SHEAR = 89.25^k

factored load = 142.8^k

SEISMIC → BASE SHEAR = 169^k (*) CONTROLS



Lateral Load Distribution

Braced Frame 1 → $\frac{79.57}{79.57+9.76} * 100\% = 89\%$ ⇒ $169 \times 0.89 = 150.41^k$

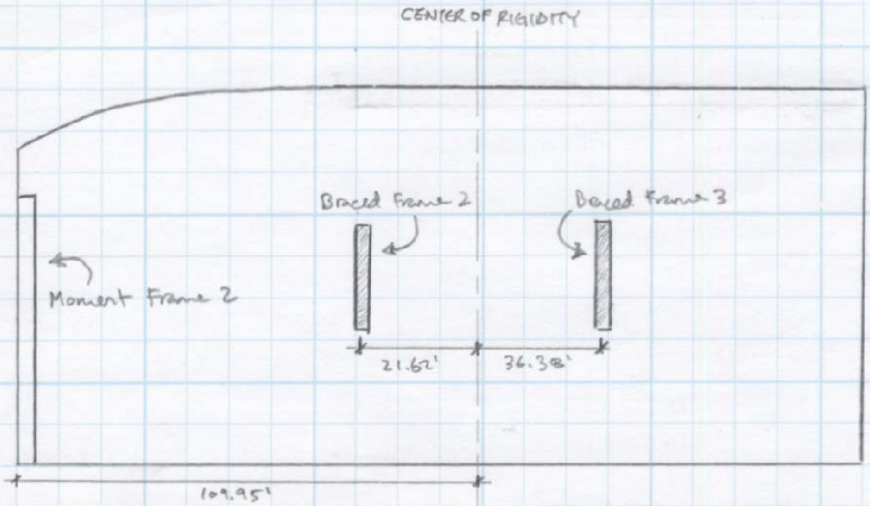
Moment Frame 1 → $\frac{9.76}{79.57+9.76} * 100\% = 11\%$ ⇒ $169 \times 0.11 = 18.59^k$

N-S LATERAL LOADS

WIND → BASE SHEAR = 175.86^k

factored load = 281.38^k (*) CONTROLS

SEISMIC → BASE SHEAR = 169^k



(*) Assume equal stiffness on Braced Frames 2 and 3

Lateral Load Distribution

$109.95 M_2 + 21.62 B_2 - 36.38 B_3$

$109.95 M_2 + 21.62 B_2 - 36.38 B_2 = 109.95 M_2 - 14.76 B_2 = 0$

$M_2 = \frac{14.76}{109.95} B_2 = 0.134 B_2$

$M_2 + B_2 + B_3 = 100\%$

$0.134 B_2 + B_2 + B_2 = 100\%$

$2.134 B_2 = 100\%$

$B_2 = 46.85\%$

$M_2 = 0.134 (46.85\%) = 6.3\%$

$B_3 = B_2 = 46.85\%$

BRACED FRAME 2 → 281.38 × 0.4685 = 132^k

BRACED FRAME 3 → 281.38 × 0.4685 = 132^k

MOMENT FRAME 2 → 281.38 × 0.063 = 18^k

APPENDIX C

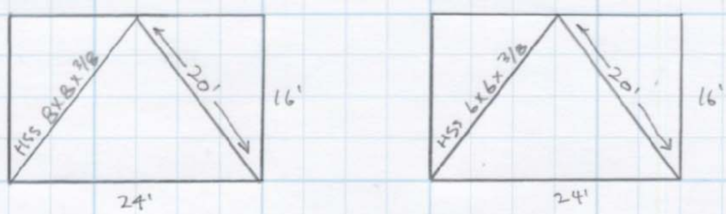
BRACING SPOT CHECK

N-S LATERAL LOAD

WIND CONTROLS → $1.6(175.86) = 281.4^k$

(*) DISTRIBUTE TO BRACED FRAMES 2 AND 3 ONLY

BF-2 BF-3



DL = 55 PSF

LL = 80 PSF

1.2DL + 1.6LL = 194 PSF

tributary width ≈ 8' conservative

194 PSF × 8' = 1552 PLF = 1.552 KLF

$1.552\text{ KLF} \times 24' = 37.25^k$

LRFD 3RD Edition Table 4-6

(BF-2) Capacity → HSS 8×8×3/8, KL = 20' } $\phi P_n = 272^k$

(BF-3) Capacity → HSS 6×6×3/8, KL = 20' } $\phi P_n = 141^k$

} $\phi P_n = 413^k$

$P_u = 281.4^k + 37.25^k + 37.25^k = 356^k < \phi P_n = 413^k$ ✓

∴ Braced Frames alone are adequate in resisting lateral forces

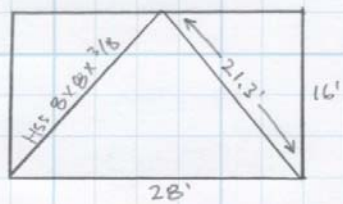
BRACING SPOT CHECK

E-W LATERAL LOAD

SEISMIC CONTROLS → 169^k

(*) ASSUME ONLY BRACED FRAME 1 RESISTS THE LATERAL LOAD

BF-1



DL = 55 PSF
LL = 80 PSF } 1.2 DL + 1.6 LL = 194 PSF

tributary width ≈ 16.7'

0.194 KSF × 16.7' × 28' = 91^k

LRFD 3RD Edition Table 4-6

(BF-1) Capacity → HSS 8x8x3/8, KL = 21.3' } $\phi P_n = 257.7^k$

$P_u = 169^k + 91^k = 260^k > \phi P_n = 257.7^k$ ✗

∴ BRACED FRAME ALONE CANNOT RESIST LATERAL LOADS

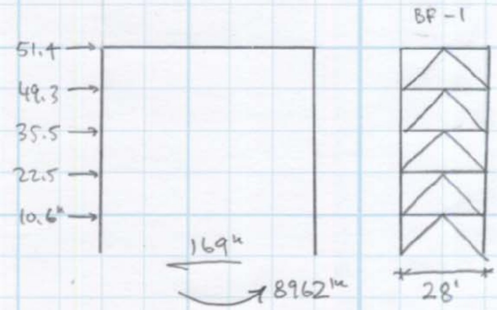
HOWEVER MOMENT FRAME CAN RESIST 11% of LATERAL LOAD

$P_u = (1 - 0.11)\,169^k + 91^k = 241.4^k < \phi P_n = 257.7^k$ ✓

OVERTURNING MOMENT

E-W

R → 0
5 → 51 × 14 = 714
4 → 714 + 101 × 14 = 2128
3 → 2128 + 136 × 14 = 4036
2 → 4036 + 159 × 14 = 6258
1 → 6258 + 169 × 16 = 8962



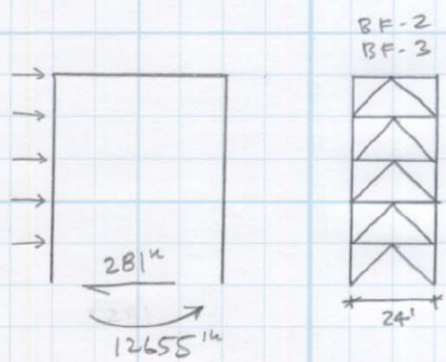
Column Force

$\frac{8962'^{k}}{28'} = 320^{k}$

N-S

R → 0
5 → 38.02 × 14 = 532
4 → 532 + 74.56 × 14 = 1576
3 → 1576 + 109.58 × 14 = 3110
2 → 3110 + 141.80 × 14 = 5095
1 → 5095 + 175.86 × 16 = 7909.2

7909.2 × 1.6 = 12654.7



Column Force

$\frac{12655'^{k}}{2(24)'} = 264^{k}$

FOUNDATION SPOT CHECK

$f'_c = 3000$ psi
$f_y = 60000$ psi
Bearing Capacity = 4000 psf

} GOTO CRSI page 13-7

SQUARE FOOTING UNDER BF-1 & BF-3

11.5' × 11.5' × 30" (11)#8 EW

Factored column capacity = 777^k

SQUARE FOOTING UNDER BF-2

14' × 14' × 35" (12)#9 EW

Factored column capacity = 1134^k

max axial load calculated in RAM 770^k

∴ FOOTINGS ARE ADEQUATE

APPENDIX D

WB-1

$K = \Sigma AE\cos^2\theta / L$

$= (2\times 10.4)(29000)\cos^2(48.81)/21.26(in)$

$= 1025.26$

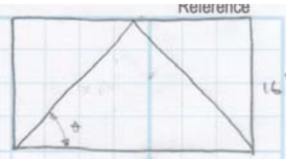
TS → 8×8×3/8

$A \to 10.4\ in^2$

$\theta \to \tan^{-1}\left(\frac{16}{14}\right) = 48.81°$

$L \to \sqrt{14^2+16^2} = 21.26'$

$E \to 29000\ ksi$



WB-2

$K = (2\times 10.4)(29000)\cos^2(53.13)/20(in)$

$= 904.8$

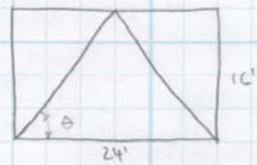
TS → 8×8×3/8

$A \to 10.4\ in^2$

$\theta \to \tan^{-1}\left(\frac{16}{12}\right) = 53.13°$

$L \to \sqrt{12^2+16^2} = 20'$

$E \to 29000\ ksi$



WB-3

$K = (2\times 7.58)(29000)\cos^2(53.13)/20(12)$

$= 659.46$

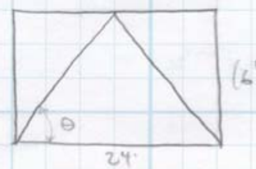
TS → 6×6×3/8

$A \to 7.58\ in^2$

$\theta \to 53.13°$

$L \to 20'$

$E \to 29000\ ksi$



MF-1

$$K = \frac{24E}{H^2}\left[\frac{1}{\frac{2}{\Sigma K_c} + \frac{1}{\Sigma K_{bb}} + \frac{1}{\Sigma K_{bt}}}\right] = \frac{24(29000)}{(192)^2}\left[\frac{1}{\frac{2}{17.24} + \frac{1}{21.06}}\right] = 115.48$$

$E = 29000\ ksi$

$H = 16' = 192''$

$$\Sigma K_c = \Sigma \frac{I_c}{H} = \frac{5(662\ in^4)}{192} = 17.24$$

$$\Sigma K_{bb} = \Sigma \frac{I_{bb}}{L} = 0$$

$$\Sigma K_{bt} = \Sigma \frac{I_{bt}}{L} = \frac{1830}{28\times 12} + \frac{1830}{30\times 12} + \frac{1830}{28\times 12} + \frac{1830}{30\times 12} = 21.06$$

$I_c = 662\ in^4 \Rightarrow$ W12×79

$I_{bt} = 1830\ in^4 \Rightarrow$ W24×68

MF-2

$$K = \frac{24(29000)}{(192)^2}\left[\frac{1}{\frac{2}{6.16} + \frac{1}{4.74}}\right] = 35.25$$

$$\Sigma K_c = \frac{3(394)}{192} = 6.16$$

$$\Sigma K_{bb} = 0$$

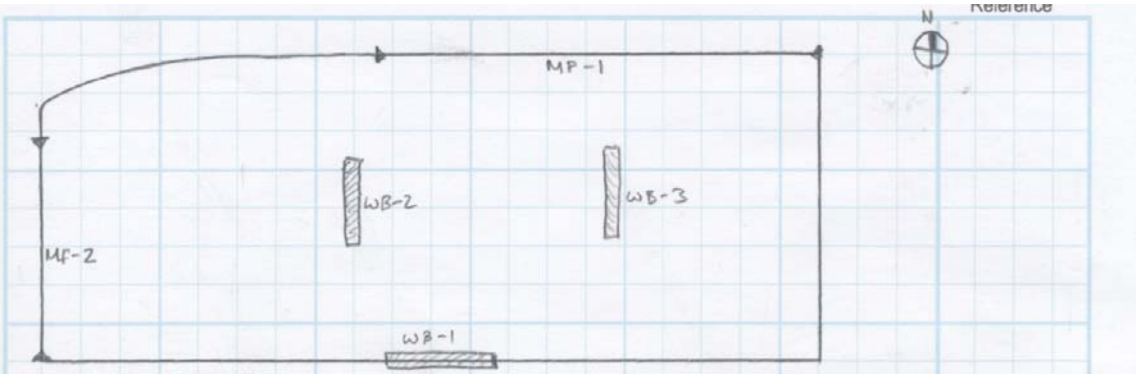
$$\Sigma K_{bt} = \frac{1360}{33\times 12} + \frac{375}{24\times 12} = 4.74$$

$I_c = 394 \Rightarrow$ W10×68

$I_{bt} = 1360 \Rightarrow$ W24×55

$375 \Rightarrow$ W16×31

Reference



CENTER OF RIGIDITY

$y_r = [1025.26(0) + 115.48(89.\bar{3})]/(1025.26 + 115.48) = 9.04'$ from the bottom

$x_r = [35.25(0) + 904.8(88.\bar{3}) + 659.46(146.\bar{3})]/(35.25 + 904.8 + 659.46) = 110.30'$ from the left

CENTER OF MASS

$\bar{y} = 47.27'$

$\bar{x} = 110.18'$

ECCENTRICITY

$e_y = |\bar{y} - y_r| = |47.27 - 9.04| = 38.23'$

$e_x = |\bar{x} - x_r| = |110.18 - 110.30| = 0.12'$

APPLIED TORSION

$T_{x_a} = Ve_x = 169.30(0.12) = 20^{'k}$

$T_{y_a} = Ve_y = 169.30(38.23) = 6472^{'k}$

ACCIDENTAL TORSION

$T_{ax} = 0.05(89.\bar{3})(169.30) = 756.21^{'k}$

$T_{ay} = 0.05(204.\bar{7})(169.30) = 1732.50^{'k}$

$T_x = 777^{'k}$

$T_y = 8205^{'k}$

BASE SHEAR

WB-1 = 146.1^k
MF-1 = 23.2^k
WB-2 = 94.4^k
WB-3 = 68.8^k
MF-2 = 6.1^k

Reference

TORSIONAL SHEAR FORCE

$F_T = Trk/\Sigma r^2 k$

$r_{WB-1} = 9.04'$

$r_{WB-2} = 21.97'$

$r_{WB-3} = 36.03'$

$r_{MF-1} = 80.29'$

$r_{MF-2} = 110.30'$

$$F_{T_{WB-1}} = \frac{8205(9.04)(1025.26)}{9.04^2(1025.26) + 21.97^2(904.8) + 36.03^2(659.43) + 80.29^2(115.48) + 110.3^2(35.25)}$$

$$= \frac{8205(9.04)(1025.26)}{2549856.465} = 29.82 \quad 14\%$$

$$F_{T_{WB-2}} = \frac{8025(21.97)(904.8)}{2549856.465} = 63.97 \quad 30\%$$

$$F_{T_{WB-3}} = \frac{8025(36.03)(659.43)}{2549856.465} = 76.45 \quad 36\%$$

$$F_{T_{MF-1}} = \frac{8025(80.29)(115.48)}{2549856.465} = 29.84 \quad 14\%$$

$$F_{T_{MF-2}} = \frac{8025(110.30)(35.25)}{2549856.465} = 12.51 \quad 6\%$$