ASCE 7-22

SEISMIC BASE SHEAR, DIAPHRAGM LOAD AND ELEMENTS' LATERAL FORCE

IBCPRO

Project : Client
Building : Building

REQUIRED INPUT ARE INDICATED BY BLUE COLOR NUMBERS

INPUT

Risk Category Per Table 1.5-1		II	ndim	
Site Classification Per Geotechnical Engineer or Table 20.3-1		CD	ndim	
Adjusted 0.2 Second Spectral Acceleration **Sms** Per Fig. 22-1, **3, 5, 7**	Sms =	1.800	g	
Adjusted 1.0 Second Spectral Acceleration **Sm1** Per Fig. 22- 2, **6, 8, 9**	Sm1 =	0.750	g	
1.0 Second Spectral Acceleration **S1**	Ss1 =	0.064	g	
R Factor per Table 12.2-1	R =	3	ndim	**OSBF**
Redundancy Factor - Section 12.3.4	ρ =	1	ndim	
Period Parameters Ct - Table 12.8-2	Ct =	0.020	ndim	
Long Period Transition Period TL - Fig. 22-12 to 16	TL =	8.000	second	
Regular Structure and 5 Stories and Less in Height ?		Yes		
Component Importance Factor Per Section 13.1.3	Ip =	1.00	ndim	
Horizontal Force Factors Per Tables 13.5-1 &13.6-1				
Component Response Modification Factor	Rpo =	1.5	ndim	Ceiling
Component Overstrength Factor	Ωo =	2	ndim	
Component Resonant Ductility Factor	C ar =	1	ndim	

SEISMIC DESIGN PARAMETERS

Importance Factor Per Table 1.5-2	I =	1.00	ndim	
Total Building Height	H =	78	ft	
Approximate Fundamental Period Per Eq. (12.8-8)	Ta =	0.525	sec	
Design Spectral Acceleration **SDs for Base Shear**	SDs =	1.200	g	
Design Spectral Acceleration **SD1**	SD1 =	0.500	g	
SEISMIC DESIGN CATEGORY		**D**		
Seismic Response/ Base Shear Coefficient Without ρ Factor	Cs =	0.318	ndim	
DESIGN BASE SHEAR	**V =**	**19050.18**	kips	

STORY LATERAL FORCE PER SECTION 12.8.3

STORY LEVEL ID	HEIGHT hi ft	WEIGHT w_i kips	$w_x*(h_x)^k$ kips.ft	LATERAL FORCE Fx kips	Fx/1.4 kips	STORY SHEAR Vx kips	Vx/1.4 kips	STORY OTM Mot k ft	Mot/1.4 k ft
Roof	78	20000	1647059	11060	7900	11060	7900		
2nd Fl	40	20000	837644	5625	4018	16685	11918	420285	300204
1st FL	17	20000	352222	2365	1689	19050	13607	804040	574314
Basement	0	0	0	0	0	19050	13607	1127893	805638
SUM		60000		19050	13607				

DIAPHRAGM LOAD PER SECTION 12.10.1.1

STORY LEVEL ID	HEIGHT hi ft	Ft +Σ Fi kips	Σ w_i kips	(Ft + ΣFi) / Σw_i	DIAPHRAGM LOAD Fpx kips	Fpx/1.4 kips
Roof	78	11060	20000	0.55	9600	6857
2nd Fl	40	16685	40000	0.42	8342	5959
1st FL	17	19050	60000	0.32	6350	4536
Basement	0	19050	60000	0.32	0	0

COMPONENTS' LATERAL & VERTICAL FORCE PER SECTION 13.3

Design Spectral Acceleration **SDs** & **Ta min** **SDs =** 1.200 g **Ta min =** 0.525 sec

Ductility Reduction for Comp Above Grade **Rmu =** 1.30 ndim Rmu at or below Grade = 1.00

STORY LEVEL ID	HEIGHT hi ft	Wp lbs	COEF. Hf	COEF. (Fp / Wp)	LATERAL/HORZ FORCES Fp lbs	Fp/1.4 lbs	Max Fp lbs	VERT SEISMIC Fpv lbs	Fpv/1.4 lbs
Roof	78	100	3.32	0.82	82	58	164	24	17
2nd Fl	40	100	1.98	0.49	49	35	97	24	17
1st FL	17	100	1.42	0.36	36	26	72	24	17
Basement	0	100	1.00	0.36	36	26	72	24	17

STRUCTURAL WALL'S OUT OF PLANE ANCHORAGE FORCES PER SECTION 12.11

Design Spectral Acceleration **SDs** SDs = 1.200 g Lf = 0 ft

STORY LEVEL ID	HEIGHT hi ft	Tributary Wp psf	FOR WALL DESIGN Fp psf	FOR WALL DESIGN Fp/1.4 psf	FOR GENERAL ANCHOR DESIGN Fp psf	FOR GENERAL ANCHOR DESIGN Fp/1.4 lbs/ft	ANCHOR NOT @ROOF & NO FLEX DIAPH Fp psf	ANCHOR NOT @ROOF & NO FLEX DIAPH Fp/1.4 psf
Roof	78	100	48	34	48	34		
2nd Fl	40	100	48	34	48	34	32	23
1st FL	17	100	48	34	48	34	23	16
Basement	0	100	48	34	48	34	20	14

END OF CALCULATIONS