Summary of procedure

α_1 fraction of building weight effective in pushover mode

$$\alpha_1 = \frac{\left[\sum_{i=1}^{N}(m_i\phi_i)\right]^2}{\sum_{i=1}^{N}m_i \cdot \sum_{i=1}^{N}(m_i\phi_i^2)}$$

α_2 fraction of building height at the elevation where pushover- mode displacement is equal to spectral displacement.

$$\alpha_2 = \frac{\sum_{i=1}^{N}(m_i\phi_i^2)}{\sum_{i=1}^{N}(m_i\phi_i)\cdot\phi_{cp}}$$

φ_i amplitude of pushover (1^{st}) mode at i^{th} degree of freedom
φ_{cp} amplitude of pushover (1^{st}) mode at control point (roof)

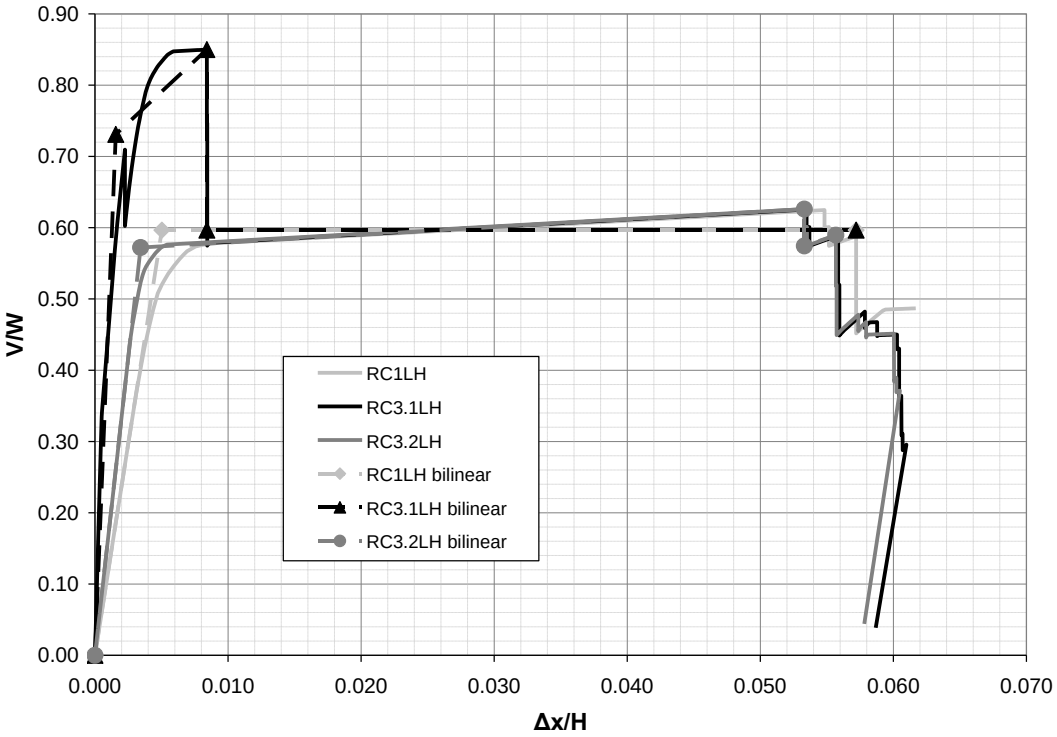
$PF_{R1}=1/\alpha_2$

$$S_a = \frac{V/W}{\alpha_1}$$

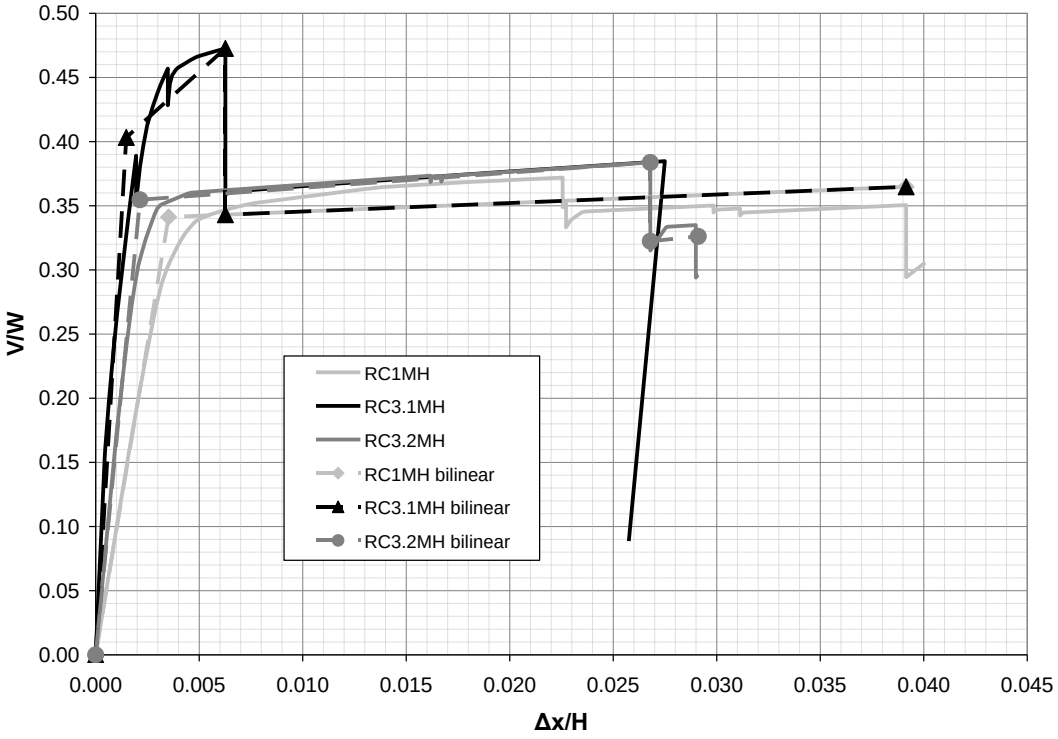
$$S_d = \frac{\delta}{PF_{R1}}$$

$$T_e = 0.32\sqrt{S_{dy}/S_{ay}}$$ (if S_d in inches, S_a in gravities)

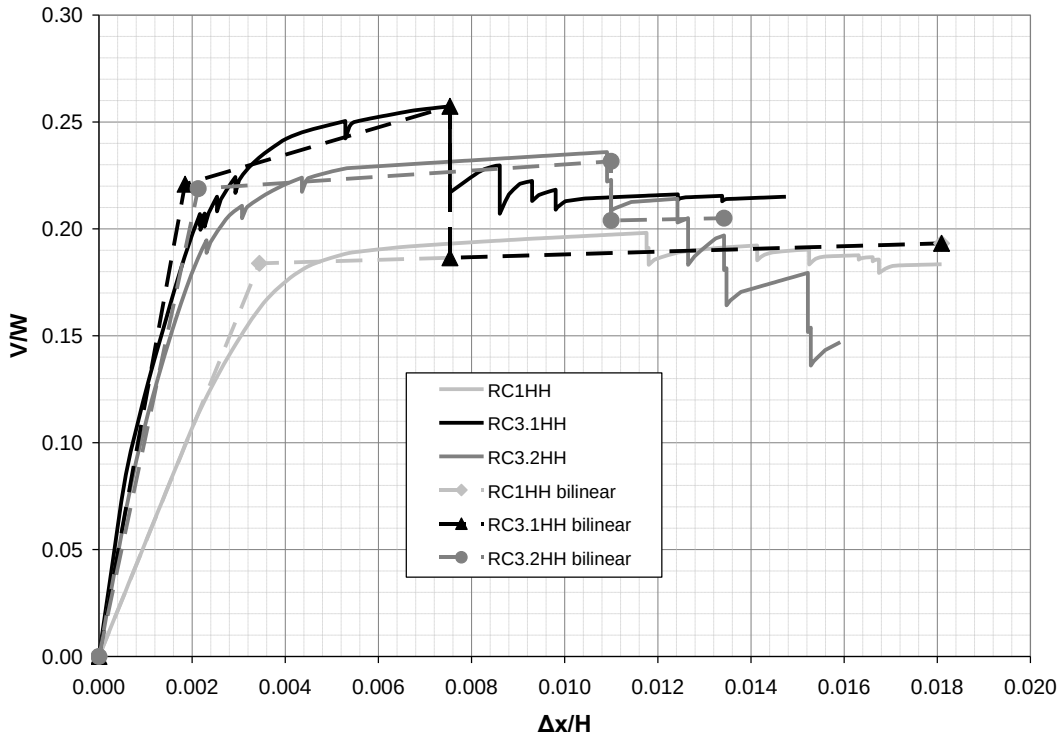
High Code



Low-Rise



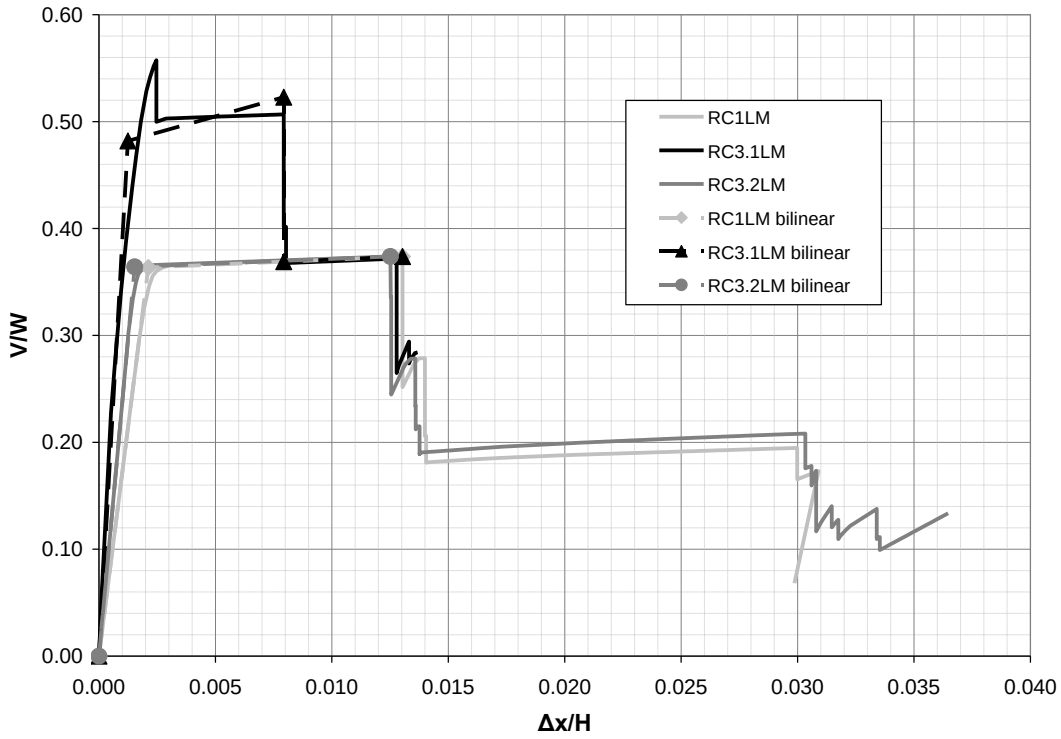
Medium-Rise



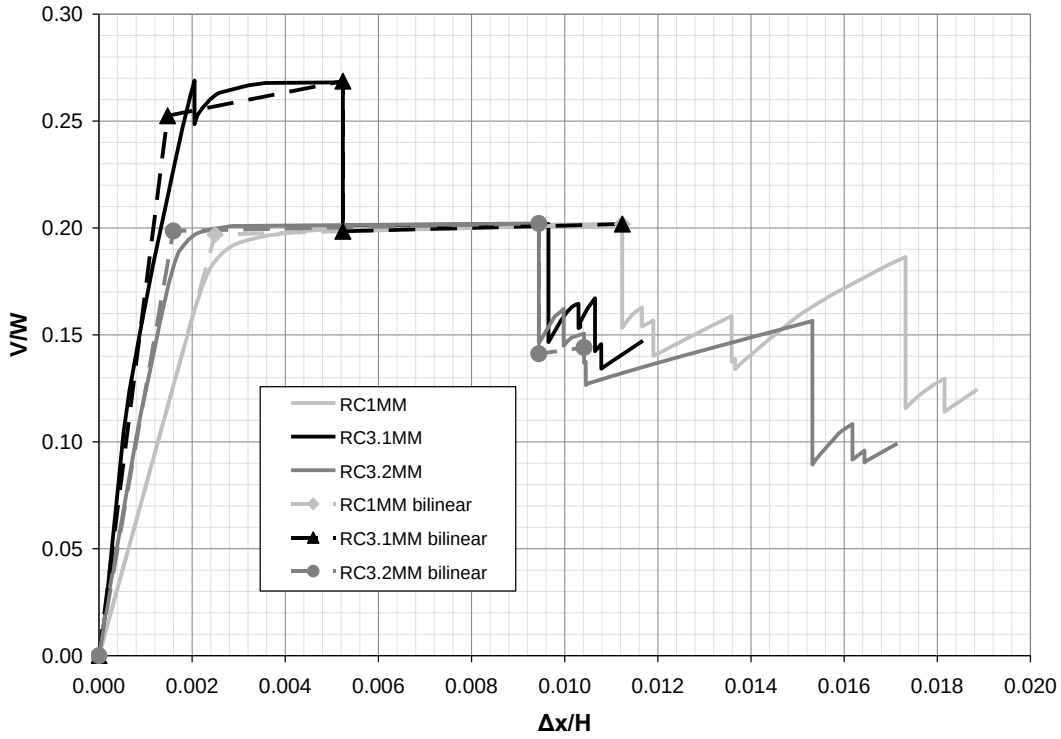
High-Rise

Building Code	W (kN)	a_1	PF_{R1}	h	$(V/W)_y$	$(V/W)_u$	$(\delta/H)_y$	$(\delta/H)_u$	S_{au}	S_{au}	S_{dy}	S_{du}	T_{ef}
RC1LH	1077.6	0.972	1.177	7.5	0.597	0.597	0.005	0.057	0.61	0.61	3.20	36.46	0.46
RC3.1LH	1077.6	0.975	1.169	7.5	0.731	0.850	0.002	0.008	0.75	0.87	1.00	5.40	0.23
RC3.2LH	1077.6	0.998	1.055	7.5	0.572	0.626	0.003	0.053	0.57	0.63	2.44	37.91	0.41
RC1MH	2470.3	0.922	1.280	13.5	0.341	0.365	0.004	0.039	0.37	0.40	3.72	41.28	0.64
RC3.1MH	2470.3	0.921	1.266	13.5	0.403	0.473	0.001	0.006	0.44	0.51	1.58	6.68	0.38
RC3.2MH	2470.3	0.986	1.129	13.5	0.355	0.384	0.002	0.027	0.36	0.39	2.56	32.04	0.54
RC1HH	5895.3	0.826	1.384	28.5	0.184	0.193	0.003	0.018	0.22	0.23	7.09	37.25	1.13
RC3.1HH	5895.3	0.836	1.356	28.5	0.221	0.257	0.002	0.008	0.26	0.31	3.88	15.84	0.77
RC3.2HH	5895.3	0.917	1.296	28.5	0.219	0.232	0.002	0.011	0.24	0.25	4.69	24.19	0.89

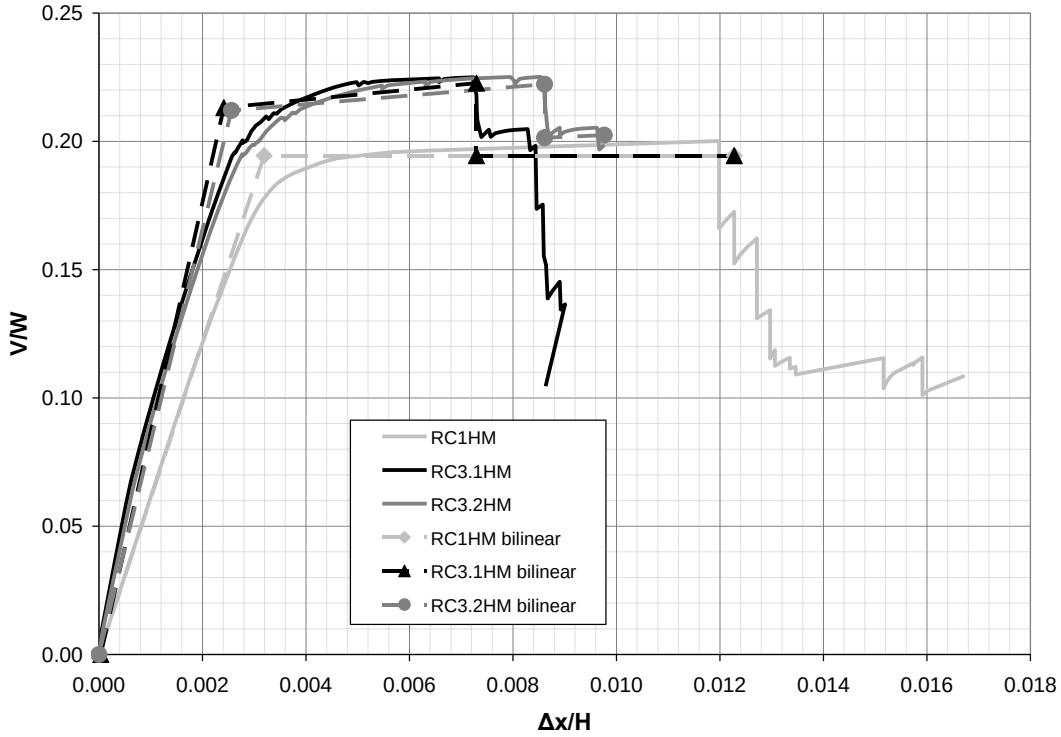
Moderate Code



Low-Rise



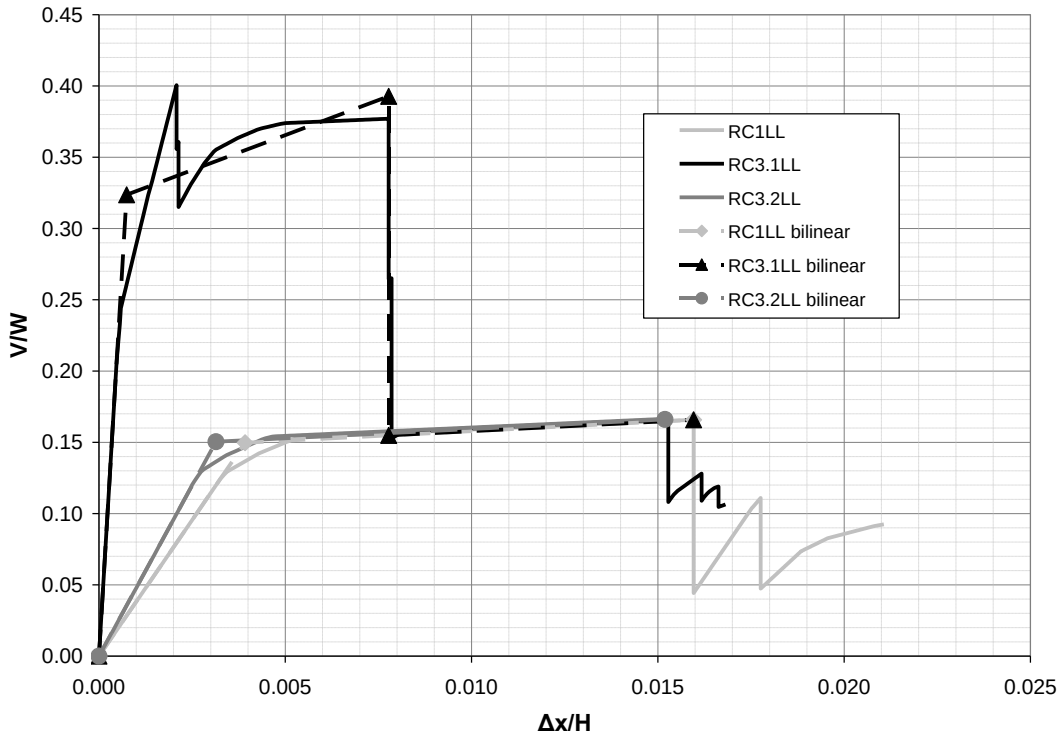
Medium-Rise



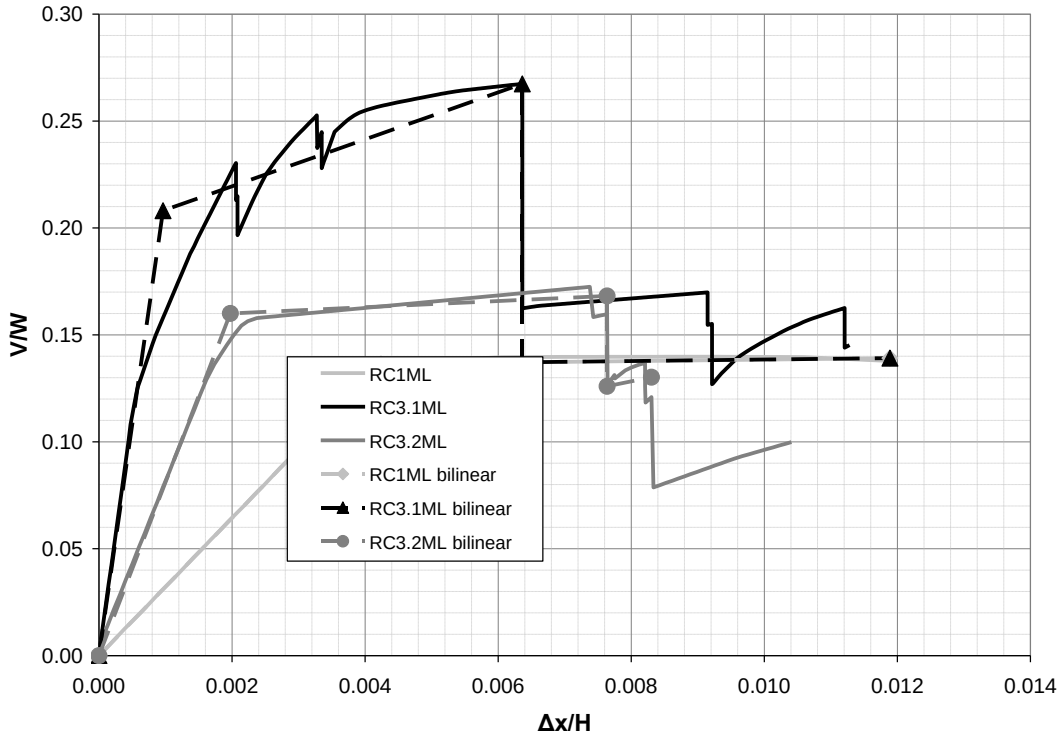
High-Rise

Building Code	W (kN)	a_1	PF_{R1}	h	$(V/W)_y$	$(V/W)_u$	$(\delta/H)_y$	$(\delta/H)_u$	S_{au}	S_{au}	S_{dy}	S_{du}	T_{ef}
RC1LM	2108.8	0.915	1.231	6.0	0.336	0.336	0.002	0.026	0.37	0.37	1.05	12.48	0.34
RC3.1LM	2108.8	0.938	1.210	6.0	0.482	0.523	0.001	0.008	0.51	0.56	0.62	3.93	0.22
RC3.2LM	2108.8	0.986	1.120	6.0	0.364	0.374	0.002	0.013	0.37	0.38	0.82	6.70	0.30
RC1MM	4599.9	0.924	1.258	13.5	0.197	0.202	0.002	0.011	0.21	0.22	2.67	12.05	0.71
RC3.1MM	4599.9	0.920	1.255	13.5	0.252	0.269	0.001	0.005	0.27	0.29	1.58	5.63	0.48
RC3.2MM	4599.9	0.979	1.148	13.5	0.199	0.202	0.002	0.009	0.20	0.21	1.88	11.11	0.61
RC1HM	10982.0	0.817	1.377	28.5	0.194	0.194	0.003	0.012	0.24	0.24	6.61	25.41	1.06
RC3.1HM	10982.0	0.828	1.355	28.5	0.213	0.223	0.002	0.007	0.26	0.27	5.08	15.35	0.89
RC3.2HM	10982.0	0.874	1.332	28.5	0.212	0.222	0.003	0.009	0.24	0.25	5.48	18.43	0.95

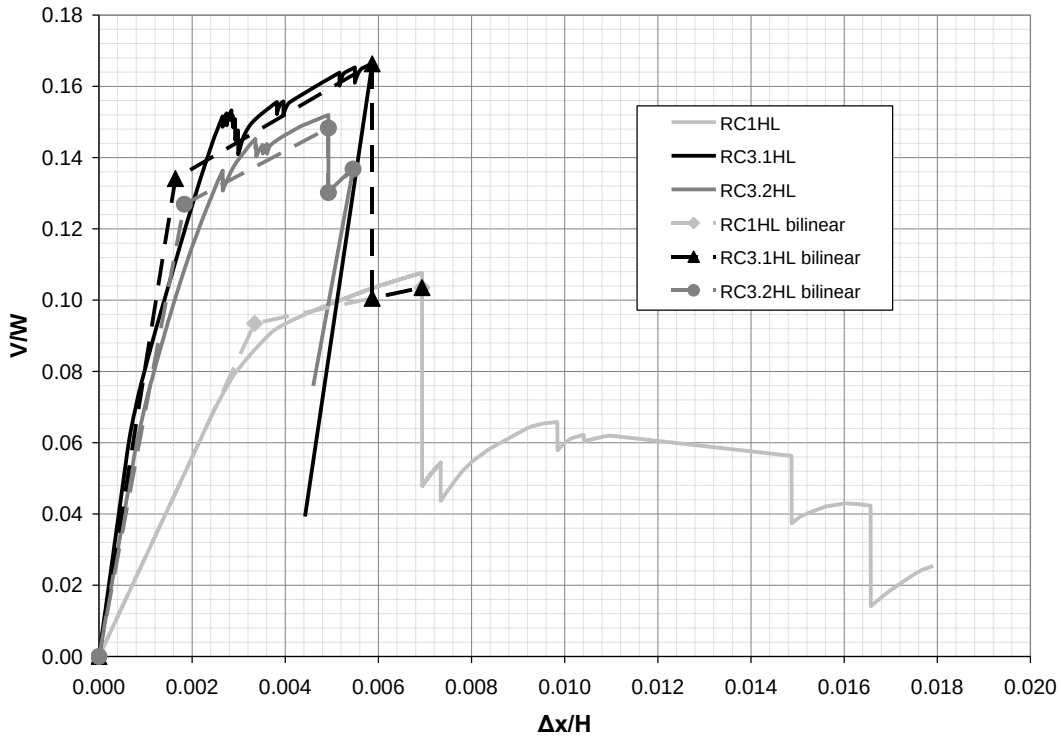
Low Code



Low-Rise



Medium-Rise



High-Rise

Building Code	W (kN)	a_1	PF_{R1}	h	$(V/W)_y$	$(V/W)_u$	$(\delta/H)_y$	$(\delta/H)_u$	S_{au}	S_{au}	S_{dy}	S_{du}	T_{ef}
RC1LL	501.68	0.989	1.095	7.5	0.150	0.166	0.004	0.016	0.15	0.17	2.69	10.93	0.85
RC3.1LL	1003.37	0.970	1.142	7.5	0.324	0.393	0.001	0.008	0.33	0.40	0.49	5.11	0.24
RC3.2LL	1003.37	1.000	1.017	7.5	0.150	0.166	0.003	0.015	0.15	0.17	2.32	11.20	0.79
RC1ML	1031.87	0.920	1.238	13.5	0.136	0.139	0.004	0.012	0.15	0.15	4.62	12.96	1.12
RC3.1ML	2063.75	0.906	1.263	13.5	0.208	0.267	0.001	0.006	0.23	0.30	1.03	6.80	0.42
RC3.2ML	2063.75	0.998	1.046	13.5	0.160	0.168	0.002	0.008	0.16	0.17	2.55	9.85	0.80
RC1HL	2401.77	0.806	1.390	28.5	0.093	0.104	0.003	0.007	0.12	0.13	6.86	14.23	1.54
RC3.1HL	4803.54	0.801	1.393	28.5	0.134	0.166	0.002	0.006	0.17	0.21	3.36	12.00	0.90
RC3.2HL	4803.54	0.938	1.269	28.5	0.127	0.148	0.002	0.005	0.14	0.16	4.12	11.06	1.11