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Functional recovery time of low-rise concentrically braced frame buildings: Probabilistic assessment of footing size effects. Supplément

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Supplemental Material

Table S1 Seismic design parameters for the archetype buildings

Building	T_a (s)	$S(T_a)$ (g)	W (kN)	Base Shear (kN)	M_p (kN.m)	M_{nom} (kN.m)	$M_{RdRo = 2.0}$ (kN.m)	$M_{RdRo = 1.0}$ (kN.m)
1-story	0.11	1.17	2983	895	3562	2737	1998	3996
2-story	0.21	1.17	8408	2522	10643	8102	8580	17160
3-story	0.32	1.17	13833	4150	22919	17251	19822	39644

T_a = Fundamental period of the building, $S(T_a)$ = Spectral acceleration at the fundamental period, W = seismic weight, M_p = probable moment capacity, M_{nom} = nominal moment capacity, $M_{RdRo = 2.0}$ = overturning moment associated with $R_dR_o = 2.0$; and $M_{RdRo = 2.0}$ = overturning moment associated with $R_dR_o = 1.0$

Stabilization Delay

For the stabilization delay, the median estimate of 6n and 0.014n was used for $n \leq 3$ for structural components and $n \leq 20$ for curtain walls. For $n \geq 7$ for structural components and $n \geq 100$ for curtain walls, the median estimate of 4n and 0.07n was applied. The dispersion is 0.4 for all cases. Linear interpolation is assumed for intermediate values of n, where n represents the number of damaged structural components in repair class 5 or curtain wall components posing a falling hazard. These estimates, originally based on reinforced concrete shear wall buildings with flat slabs and curtain walls, are applied here as an approximation for steel CBF buildings due to the lack of available data.

Table S2 Example 2-story building performance model

Assembly description	Component ID	Unit	EDP	Story	Median Quantity
Bolted shear tab gravity connections	B1031.001	EA	SDR-Tot	1, 2	40
Steel Column Base Plates (Column W < 150 PLF)	B1031.011a	EA	SDR-Tot; SDR-CBF	1	20; 8
HSS braces (w < 40 PLF)	B1033.013a	EA	SDR-CBF	1, 2	4
Moment connections (one-sided, ≤W27)	B1035.021	EA	SDR-Tot; SDR-CBF	1, 2	4
Column (≤ W27)	B1035.021	EA	SDR-Tot; SDR-CBF	1, 2	20; 8
Curtain Walls	B2022.002	ft^2	SDR-Tot; SDR-CBF	1, 2	2907; 1453
Interior Partition	C1011.001a	ft	SDR-Tot; SDR-CBF	1, 2	1292; 161
Prefabricated steel stair	C2011.001b	EA	SDR-Tot	1, 2	2
Interior Partition - Coating	C3011.001a	ft	SDR-Tot; SDR-CBF	1, 2	97.8; 12.2
Raised Access Floor	C3027.002	ft^2	PFA	1, 2	10899
Suspended Ceiling	C3032.003c	ft^2	PFA	1, 2	13079, 727, 436, 291
Independent Pendant Lighting	C3034.001	EA	PFA	1, 2	218, 218
Hydraulic Elevator	D1014.021	EA	PFA	1	1
Cold or Hot Potable - Small Diameter - Piping	D2021.013a	ft	PFA	1, 2	610.3
Cold or Hot Potable - Small Diameter - Bracing	D2021.013b	ft	PFA	1, 2	610.3
Heating hot Water Piping - Small Diameter - Piping	D2022.013a	ft	PFA	1, 2	1220.7
Heating hot Water Piping - Small Diameter - Bracing	D2022.013b	ft	PFA	1, 2	1220.7
Heating hot Water Piping - Large Diameter - Piping	D2022.023a	ft	PFA	1, 2	72.7
Heating hot Water Piping - Large Diameter - Bracing	D2022.023b	ft	PFA	1, 2	72.7
Sanitary Waste Piping - Piping	D2031.023a	ft	PFA	1, 2	828.3
Sanitary Waste Piping - Bracing	D2031.023b	ft	PFA	1, 2	828.3
Chiller - Capacity: 100 to <350 Ton	D3031.013e	EA	PFA	1	1
Cooling Tower - Capacity: 350 to <750 Ton	D3031.023h	EA	PFA	2	1
HVAC Fan in Line Fan	D3041.001c	EA	PFA	1, 2	72.7, 29.1
HVAC Galvanized Sheet Metal Ducting (A < 6 ft^2)	D3041.011c	ft	PFA	1, 2	1089.9
HVAC Galvanized Sheet Metal Ducting (A ≥ 6 ft^2)	D3041.012c	ft	PFA	1, 2	290.6
HVAC Drops	D3041.032c	EA	PFA	1, 2	130.8
Variable Air Volume Box	D3041.041b	EA	PFA	1, 2	72.7, 29.1
Air Handling Unit - Capacity: 10000 to <25000 CFM	D3052.013h	EA	PFA	2	2
Fire Sprinkler Water Piping	D4011.023a	ft	PFA	1, 2	2906.4
Fire Sprinkler Drop	D4011.053a	EA	PFA	1, 2	130.8
Transformer/primary service - Capacity: <100 kVA	D5011.013b	EA	PFA	1	1
Motor Control Center	D5012.013c	EA	PFA	1	2
Low Voltage Switchgear - Capacity: 100 to <350 Amp	D5012.023b	EA	PFA	1, 2	1.2
Distribution Panel - Capacity: 100 to <350 Amp	D5012.033b	EA	PFA	1	1