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APPENDICES

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APPENDIX A

DERIVATION OF EQUIVALENT POISSON'S RATIO

Under the applied axial strain, ε_z , the elastic area strain, ε_A , can be written in the following form:

$$\varepsilon_A = \frac{2(1-\nu)\sigma}{E} - 2\nu\varepsilon_z \quad (\text{A-1})$$

Rearranging Eq. (A-1) results in the following equation:

$$\nu = \frac{\left(\frac{\sigma}{E} - \frac{\varepsilon_A}{2}\right)}{\left(\frac{\sigma}{E} + \varepsilon_z\right)} \quad (\text{A-2})$$

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APPENDIX B

Table B1 Details on determination peak confined compressive strength for column CS-24

ϵ_z	σ_{eff} (MPa)	f'_{cc} (MPa)	e'_{cc}	e_v	$\epsilon_{A,h}$ (trial)	F_h (N)	M_p (N-mm)	u_f (mm)	$\epsilon_{a,p}$	$\epsilon_{a,c}$	$\epsilon_{A,h}$ (cal)	f_c (MPa)	V_e
0.0000	0.00E+00	5.10E+01	0.002173	0.000000	0.000000	0.00	96193.13	0.0000	0.000000	0.000000	0.000000	0.00E+00	0.200
0.0010	-8.30E-01	5.44E+01	0.002897	-0.000547	0.000385	2271.77	95812.79	0.0068	0.000113	0.000227	0.000385	3.08E+01	0.246
0.0020	-1.66E+00	5.78E+01	0.003623	-0.000785	0.001082	6397.96	93190.16	0.0186	0.000319	0.000639	0.001082	4.92E+01	0.396
0.0030	-2.63E+00	6.18E+01	0.004473	-0.000901	0.001905	11382.26	86795.98	0.0300	0.000568	0.001136	0.001905	5.82E+01	0.459
0.0034	-2.98E+00	6.32E+01	0.004777	-0.000920	0.002240	13446.08	83165.20	0.0339	0.000671	0.001342	0.002240	6.06E+01	0.489
0.0044	-3.56E+00	6.56E+01	0.005278	-0.000749	0.003380	16139.42	77614.53	0.1442	0.000805	0.001611	0.003380	6.49E+01	0.500
0.0054	-4.11E+00	6.78E+01	0.005760	-0.000458	0.004641	18955.78	70888.98	0.2700	0.000946	0.001892	0.004641	6.78E+01	0.500
0.0058	-4.33E+00	6.87E+01	0.005952	-0.000299	0.005211	20174.33	67706.92	0.3298	0.001007	0.002002	0.005211	6.87E+01	0.500
0.0062	-4.40E+00	6.91E+01	0.006019	0.000001	0.005936	20879.32	65795.10	0.4280	0.001042	0.002037	0.005936	6.90E+01	0.500

Table B2 Details on determination peak confined compressive strength for column Unit 3

ϵ_z	σ_{eff} (MPa)	f'_{cc} (MPa)	e'_{cc}	e_v	$\epsilon_{A,h}$ (trial)	F_h (N)	M_p (N-mm)	u_f (mm)	ϵ_{ap}	ϵ_{ac}	$\epsilon_{A,h}$ (cal)	f_c (MPa)	v_e
0.0000	0.00E+00	9.24E+01	0.002454	0.000000	0.000000	0.00	29268.00	0.0000	0.000000	0.000000	0.000000	0.00E+00	0.200
0.0010	-1.16E+00	9.72E+01	0.003088	-0.000564	0.000406	691.02	29235.38	0.0022	0.000121	0.000243	0.000406	4.14E+01	0.239
0.0020	-2.26E+00	1.02E+02	0.003682	-0.000812	0.001130	1926.92	29014.64	0.0061	0.000339	0.000677	0.001130	7.68E+01	0.392
0.0030	-3.58E+00	1.07E+02	0.004405	-0.000901	0.002015	3445.43	28460.55	0.0098	0.000605	0.001211	0.002015	9.73E+01	0.473
0.0040	-5.02E+00	1.13E+02	0.005188	-0.000922	0.002968	5084.48	27519.13	0.0136	0.000893	0.001787	0.002968	1.09E+02	0.500
0.0050	-6.51E+00	1.19E+02	0.005999	-0.000907	0.003957	6780.42	26182.21	0.0178	0.001191	0.002383	0.003957	1.17E+02	0.500
0.0057	-7.61E+00	1.24E+02	0.006596	-0.000880	0.004700	8049.31	24951.05	0.0214	0.001414	0.002829	0.004700	1.23E+02	0.500
0.0067	-8.74E+00	1.28E+02	0.007211	-0.000661	0.005699	9342.78	23503.15	0.0952	0.001642	0.003283	0.005699	1.28E+02	0.500
0.0077	-9.78E+00	1.32E+02	0.007776	-0.000352	0.007189	10706.65	21777.95	0.1769	0.001881	0.003763	0.007189	1.32E+02	0.500
0.0084	-1.05E+01	1.36E+02	0.008182	-0.000108	0.008131	11877.06	20146.15	0.2499	0.002087	0.004025	0.008131	1.35E+02	0.500
0.0087	-1.07E+01	1.36E+02	0.008261	0.000001	0.008440	12397.06	19379.17	0.2698	0.002178	0.004117	0.008440	1.36E+02	0.500

Table B3 Details on determination peak confined compressive strength for column 2A5-14

ε_z	σ_{eff} (MPa)	f'_{cc} (MPa)	e'_{cc}	e_v	$\varepsilon_{A,h}$ (trial)	F_h (N)	M_p (N-mm)	u_f (mm)	ε_{ap}	ε_{ac}	$\varepsilon_{A,h}$ (cal)	f_c (MPa)	v_e
0.0000	0.00E+00	2.68E+01	0.002000	0.000000	0.000000	0.00	64812.12	0.0000	0.000000	0.000000	0.000000	0.00E+00	0.200
0.0010	-6.49E-01	2.94E+01	0.002993	-0.000544	0.000410	2036.89	64489.73	0.0128	0.000139	0.000196	0.000410	2.01E+01	0.247
0.0020	-1.24E+00	3.19E+01	0.003895	-0.000814	0.001099	5480.65	62490.16	0.0336	0.000373	0.000528	0.001099	2.84E+01	0.379
0.0031	-1.99E+00	3.49E+01	0.005048	-0.001020	0.001939	9814.40	57464.50	0.0550	0.000669	0.000946	0.001939	3.33E+01	0.421
0.0041	-2.24E+00	3.60E+01	0.005430	-0.000892	0.003053	11128.55	55417.14	0.2075	0.000758	0.001072	0.003053	3.54E+01	0.500
0.0051	-2.51E+00	3.71E+01	0.005836	-0.000631	0.004301	12730.04	52612.67	0.3745	0.000867	0.001227	0.004301	3.69E+01	0.500
0.0061	-2.78E+00	3.82E+01	0.006258	-0.000271	0.005648	14131.79	49891.71	0.5640	0.000963	0.001362	0.005648	3.82E+01	0.500
0.0067	-2.96E+00	3.89E+01	0.006526	0.000001	0.006543	15022.42	48039.85	0.6910	0.001023	0.001447	0.006543	3.89E+01	0.500

Table B4 Details on determination peak confined compressive strength for column 4B6-21

ε_z	σ_{eff} (MPa)	f'_{cc} (MPa)	e_{cc}	e_v	$\varepsilon_{A,h}$ (trial)	F_h (N)	M_p (N-mm)	μ_f (mm)	ε_{ap}	ε_{ac}	$\varepsilon_{A,h}$ (cal)	f_c (MPa)	v_e
0.0000	0.00E+00	3.02E+01	0.002000	0.000000	0.000000	0.00	20910.58	0.0000	0.000000	0.000000	0.000000	0.00E+00	0.200
0.0010	-6.53E-01	3.29E+01	0.002887	-0.000539	0.000429	827.04	20837.34	0.0038	0.000127	0.000254	0.000429	2.20E+01	0.249
0.0020	-1.28E+00	3.54E+01	0.003740	-0.000790	0.001149	2217.34	20386.07	0.0098	0.000340	0.000680	0.001149	3.16E+01	0.389
0.0030	-1.99E+00	3.83E+01	0.004703	-0.000943	0.001969	3814.62	19370.97	0.0154	0.000585	0.001169	0.001969	3.66E+01	0.439
0.0040	-2.64E+00	4.10E+01	0.005585	-0.001011	0.002878	5276.99	17997.64	0.0508	0.000809	0.001618	0.002878	4.01E+01	0.479
0.0050	-3.11E+00	4.29E+01	0.006218	-0.000915	0.003959	6471.82	16581.71	0.1450	0.000992	0.001984	0.003959	4.25E+01	0.500
0.0059	-3.59E+00	4.49E+01	0.006875	-0.000807	0.004993	7583.35	15046.49	0.2381	0.001162	0.002325	0.004993	4.47E+01	0.500
0.0069	-3.72E+00	4.54E+01	0.007054	-0.000271	0.006524	8171.95	14155.15	0.5069	0.001253	0.002379	0.006524	4.54E+01	0.500
0.0073	-3.74E+00	4.55E+01	0.007085	0.000001	0.007172	8318.40	13925.43	0.6231	0.001275	0.002401	0.007172	4.55E+01	0.500

Table B5 Details on d etermination peak confined compressive strength for column 4D6-24

ε_z	σ_{eff} (MPa)	f'_{cc} (MPa)	e_{cc}	e_v	$\varepsilon_{A,h}$ (trial)	F_h (N)	M_p (N-mm)	u_f (mm)	ε_{ap}	ε_{ac}	$\varepsilon_{A,h}$ (cal)	f_c (MPa)	v_e
0.0000	0.00E+00	3.05E+01	0.002000	0.000000	0.000000	0.00	20910.58	0.0000	0.000000	0.000000	0.000000	0.00E+00	0.200
0.0010	-6.71E-01	3.32E+01	0.002903	-0.000541	0.000433	688.20	20859.86	0.0055	0.000105	0.000262	0.000433	2.22E+01	0.248
0.0020	-1.31E+00	3.58E+01	0.003763	-0.000796	0.001154	1838.27	20549.61	0.0144	0.000282	0.000700	0.001154	3.19E+01	0.387
0.0030	-2.03E+00	3.88E+01	0.004730	-0.000953	0.001975	3165.15	19846.48	0.0227	0.000485	0.001206	0.001975	3.69E+01	0.437
0.0040	-2.78E+00	4.19E+01	0.005744	-0.001079	0.002829	4541.64	18739.51	0.0314	0.000696	0.001730	0.002829	4.08E+01	0.453
0.0050	-3.31E+00	4.41E+01	0.006454	-0.001038	0.003854	5498.09	17754.89	0.1207	0.000843	0.002095	0.003854	4.35E+01	0.500
0.0060	-3.75E+00	4.58E+01	0.007039	-0.000876	0.005006	6497.12	16549.03	0.2566	0.000996	0.002361	0.005006	4.56E+01	0.500
0.0070	-4.05E+00	4.71E+01	0.007444	-0.000529	0.006345	8071.68	14310.62	0.4214	0.001237	0.002603	0.006345	4.70E+01	0.500
0.0078	-4.10E+00	4.73E+01	0.007521	0.000001	0.007648	8364.68	13852.20	0.6553	0.001282	0.002648	0.007648	4.73E+01	0.500

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Mr. Jaruek Teerawong was born in Bangkok, 1968. He graduated from Faculty of Engineering, Chiang Mai University in 1990. He received his Master Degree in Civil Engineering from Chulalongkorn University in 1994.



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