

APPENDIX C
Verification Data

Table C.1 Comparison of the compressive strength of conventional concrete between experiment and the model

Mix	T(°C)	Experiment (MPa)							Model (Mpa)							Error (%)						
		3-day	7-day	28-day	91-day	180-day	365-day	3-day	7-day	28-day	91-day	180-da	365-day	e3	e7	e28	e90	e180	e365			
g1.1w/c0.4	30	35.68	50.57	54.77	56.48	59.00	62.03	40.99	44.48	46.89	51.18	54.03	57.20	14.88	-12.03	-14.39	-9.38	-8.42	-7.79			
g1.1w/c0.6	30	17.84	23.39	26.87	31.68	33.00	35.08	20.49	25.54	27.43	38.29	42.33	42.33	14.84	9.20	2.07	20.88	28.27	20.66			
g1.3w/c0.35	30	38.75	47.89	52.14	60.38	66.75	73.26	48.30	50.28	51.89	57.77	61.57	65.73	24.66	4.99	-0.47	-4.32	-7.75	-10.28			
g1.3w/c0.5	30	23.75	31.60	36.71	41.06	43.00	45.28	27.50	33.14	36.18	43.09	44.69	46.37	15.79	4.89	-1.45	4.95	3.93	2.40			
g1.3w/c0.65	30	10.89	18.03	21.75	25.03	28.07	31.16	16.17	21.95	22.64	31.77	38.31	45.59	48.52	21.76	4.07	26.94	36.46	46.31			
g1.5w/c0.4	30	23.72	31.01	38.22	48.81	54.06	59.41	30.56	39.25	45.23	53.11	58.34	64.15	28.82	26.58	18.35	8.82	7.92	7.98			
g1.5w/c0.6	30	12.57	18.38	21.07	27.57	30.82	34.13	19.84	24.43	26.15	35.36	38.78	38.78	57.85	32.94	24.09	28.27	25.84	13.64			
g1.54w0.4	30	31.07	38.99	51.94	62.85	69.33	75.93	28.41	39.08	46.42	55.17	60.97	67.42	-8.57	0.23	-10.63	-12.22	-12.06	-11.21			
g1.65w0.45	30	24.89	31.24	41.65	50.41	55.61	60.91	20.40	32.80	40.35	51.11	57.40	60.53	-18.01	4.98	-3.11	1.39	3.22	-0.63			
g1.75w0.5	30	20.88	26.71	36.23	44.26	49.02	53.88	19.71	29.40	34.61	47.89	50.96	54.18	-5.60	10.08	-4.48	8.20	3.95	0.55			
ta28w40	30	30.00	38.50	47.15	53.20	56.90	61.10	15.69	32.45	48.59	55.77	58.74	61.24	-47.69	-15.72	3.06	4.83	3.24	0.23			
ta28w50	30	21.68	28.43	37.03	42.53	46.40	49.50	20.28	30.65	38.35	47.48	49.44	50.21	-6.48	7.81	3.57	11.64	6.55	1.43			
ta28w60	30	14.65	22.35	29.77	35.98	39.25	43.00	10.41	22.87	28.72	37.53	37.80	37.80	-28.96	2.35	-3.53	4.30	-3.70	-12.10			
ta35w40	30	29.22	38.11	45.30	51.42	56.39	59.15	35.33	42.32	49.12	56.60	59.71	62.32	20.91	11.04	8.42	10.08	5.88	5.35			
ta35w50	30	22.12	30.70	38.10	44.20	47.50	50.20	19.27	30.34	38.64	47.03	48.84	49.55	-12.87	-1.17	1.41	6.40	2.82	-1.30			
ta35w60	30	14.60	22.16	29.01	34.67	37.50	41.45	6.70	21.29	28.21	35.85	36.08	36.08	-54.13	-3.91	-2.74	3.40	-3.78	-12.95			
ta40w40	30	30.25	40.90	50.94	55.75	59.02	61.35	38.24	43.99	49.62	57.97	61.43	64.34	26.42	7.56	-2.59	3.98	4.09	4.88			
ta40w50	30	24.00	32.95	39.30	45.14	48.40	51.50	17.52	29.55	38.66	47.48	49.38	50.13	-27.02	-10.31	-1.64	5.19	2.03	-2.66			
ta40w60	30	16.75	25.65	31.00	36.86	40.15	42.32	9.43	21.97	27.97	35.49	35.72	35.72	-43.72	-14.33	-9.77	-3.71	-11.03	-15.59			
ta45w40	30	30.00	40.90	47.26	52.90	57.20	60.45	32.42	40.71	48.85	59.31	63.65	67.30	8.07	-0.47	3.37	12.12	11.28	11.33			
ta45w50	30	23.25	31.20	37.51	43.20	47.31	50.75	12.31	26.62	37.53	48.20	50.50	51.40	-47.06	-14.68	0.05	11.57	6.75	1.29			
ta45w60	30	16.00	23.60	29.50	35.10	39.25	42.00	18.40	24.19	26.98	34.71	34.95	34.95	14.99	2.51	-8.54	-1.10	-10.96	-16.79			
c4T30	30	26.16	38.08	43.39	49.80	54.76	58.47	42.75	45.83	47.96	52.57	55.63	59.04	63.44	20.36	10.53	5.57	1.59	0.97			
c6T30	30	13.36	16.36	28.19	36.42	39.76	40.15	20.14	25.80	27.91	38.58	42.54	42.54	50.72	57.75	-0.97	5.92	6.98	5.94			
g1.54w0.4T40	40	36.86	43.10	53.30	61.90	67.00	72.20	37.68	43.42	46.42	55.07	60.81	67.19	2.22	0.74	-12.91	-11.03	-9.25	-6.94			
g1.65w0.45T40	40	33.30	36.66	42.16	46.78	49.53	52.33	31.80	37.66	40.35	41.94	45.67	48.58	-4.52	2.73	-4.28	-10.36	-7.79	-7.17			
g1.75w0.5T40	40	27.73	31.26	37.04	41.90	44.79	47.73	31.45	33.97	34.61	43.33	46.19	49.20	13.40	8.65	-6.55	3.42	3.14	3.08			
g1.54w0.4T60	60	41.87	44.08	47.69	50.73	52.54	54.38	40.18	43.11	46.42	50.26	52.91	55.95	-4.04	-2.20	-2.66	-0.93	0.70	2.89			
g1.65w0.45T60	60	34.44	36.35	39.46	42.09	43.65	45.24	32.23	35.26	40.35	39.60	41.31	39.40	-6.42	-3.00	2.25	-5.92	-5.35	-12.92			
g1.75w0.5T60	60	31.41	32.01	32.98	33.81	34.30	34.80	30.01	31.56	34.61	34.63	34.67	36.14	-4.45	-1.39	4.93	2.43	1.08	3.85			
g1.15c4T50	50	26.28	34.04	44.78	52.67	-	-	32.8745	43.48	47.96	56.637	-	-	25.08	27.73	7.09	7.53	-	-			
g1.15c6T50	50	15.67	19.35	27.57	30.21	-	-	18.5697	24.12	27.91	32.26	-	-	18.51	24.64	1.24	6.79	-	-			
g1.15c4T65	65	30.63	32.71	35.08	41.69	-	-	31.49	35.97	38.37	47.43	-	-	2.81	9.95	9.35	13.78	-	-			
g1.15c6T65	65	23.03	24.22	24.43	25.26	-	-	23.78	26.19	27.91	29.14	-	-	3.28	8.11	14.25	15.36	-	-			

Table C.2 Comparison of the compressive strength of roller-compacted concrete between experiment and the model

Mix	CaO	w/b	S/C	Experiment (MPa)			Model (MPa)			Error (%)				
				3-day	7-day	28-day	3-day	7-day	28-day	e3	e7	e28	e91	
A308a	55.86	0.30	1.79	11.20	11.70	19.80	27.50	13.70	22.33	30.07	-19.12	17.12	12.80	9.35
A308b	62.07	0.30	1.79	11.70	13.70	23.80	33.90	15.56	25.36	34.15	-12.08	13.59	6.56	0.73
A308c	63.31	0.30	1.79	14.70	16.90	28.20	40.50	10.52	25.93	34.91	-28.46	-5.86	-8.05	-13.79
A308d	65.17	0.30	1.79	13.30	15.90	28.70	40.60	10.85	26.76	36.03	-18.39	3.27	-6.75	-11.25
A308e	68.27	0.30	1.79	13.00	13.90	27.60	39.10	11.39	17.24	37.83	-12.35	24.02	1.80	-3.25
A368a	51.89	0.36	1.79	3.90	6.80	15.70	22.30	6.16	10.30	17.98	58.06	51.45	14.53	11.51
A368b	57.66	0.36	1.79	4.60	7.90	20.70	28.30	7.08	11.83	20.65	53.89	49.71	-0.24	0.92
A368c	58.81	0.36	1.79	6.50	9.80	20.90	29.70	7.25	12.12	21.15	11.56	23.63	1.21	-1.50
A368d	60.54	0.36	1.79	5.00	8.30	19.10	27.20	7.50	12.54	21.89	50.08	51.05	14.60	11.29
A368e	63.42	0.36	1.79	4.40	8.20	18.60	26.00	7.91	13.21	23.06	79.69	61.10	24.00	22.69
A365a	101.21	0.36	0.83	25.30	30.00	42.10	59.00	21.14	27.14	38.29	-16.42	-9.52	-9.04	-6.27
A365b	112.45	0.36	0.83	28.30	31.40	45.30	63.10	22.76	29.22	41.22	-19.58	-6.95	-9.01	-7.13
A365c	114.70	0.36	0.83	29.50	35.60	49.40	69.60	23.06	29.61	41.77	-21.82	-16.83	-15.45	-9.20
A365d	118.08	0.36	0.83	28.60	35.70	47.70	68.10	23.51	30.18	42.58	-17.80	-15.46	-10.74	-4.55
A365e	123.70	0.36	0.83	26.60	32.40	46.60	63.90	24.22	31.10	43.87	-8.93	-4.02	-5.86	-13.43
B355	121.25	0.35	0.83	24.80	32.20	39.80	50.90	25.01	31.80	44.41	0.85	-1.25	11.57	9.45
C300	253.16	0.30	0.32	53.90	59.00	67.30	75.40	63.73	69.20	79.38	18.24	17.30	17.94	17.37
C302	196.75	0.30	0.46	42.80	54.80	57.60	69.70	49.91	56.29	68.14	16.61	2.71	18.29	13.00
C304	146.97	0.30	0.67	35.80	41.80	54.80	70.10	36.57	43.40	56.10	2.16	3.84	2.37	-3.74
C306	102.78	0.30	1.04	27.70	34.50	41.50	54.30	23.44	30.12	42.52	-15.39	-12.71	2.47	-1.20
C308	63.31	0.30	1.79	14.70	16.90	28.20	40.10	10.52	15.91	25.93	-28.46	-5.86	-8.05	-12.93
C322	190.95	0.32	0.46	41.50	46.90	56.00	68.40	46.31	52.67	64.49	11.58	12.30	15.17	9.79
C324	142.89	0.32	0.67	33.80	36.70	48.80	62.00	33.66	40.43	53.00	-0.41	10.15	8.60	3.65
C326	100.09	0.32	1.04	26.10	30.20	37.60	48.90	21.30	27.86	40.04	-18.40	-7.76	6.49	4.22
C328	61.74	0.32	1.79	11.70	15.60	26.40	36.70	9.30	14.52	24.22	-20.53	-6.92	-8.25	-10.30
C360	230.83	0.36	0.32	44.80	53.00	61.70	68.50	52.11	57.66	67.95	16.32	8.78	10.14	12.68
C362	180.33	0.36	0.46	35.80	43.60	52.00	64.40	40.02	46.32	58.03	11.79	6.25	11.60	6.42
C364	135.38	0.36	0.67	27.50	34.20	43.60	55.40	28.60	35.21	47.48	4.01	2.95	8.90	5.56
C366	95.11	0.36	1.04	22.30	29.20	34.40	45.70	17.63	23.92	35.62	-20.94	-18.07	3.55	0.89
C368	58.81	0.36	1.79	6.50	9.80	20.90	29.70	7.25	12.12	21.15	11.56	23.63	1.21	-1.50
C400	217.96	0.40	0.32	31.70	35.30	51.30	56.40	45.81	51.35	61.63	44.51	45.46	20.13	25.62
C402	170.83	0.40	0.46	29.30	31.40	47.50	57.00	34.70	40.91	52.44	18.43	30.28	10.40	10.14

Table C.3 Comparison of the compressive strength of self-compacting concrete between experiment and the model

from	water (kg/m ³)	cement (kg/m ³)	fly ash (kg/m ³)	w/b	CaO (kg/m ³)	logC	γ	f _c (MPa)	Model (MPa)	error (%)
Sing1	149	219	219	0.34	165.13	2.22	1.45	37.4	35.98	3.79
Sing2	151	279.5	279.5	0.27	210.74	2.32	1.67	66.1	68.58	-3.76
Sing3	157	301.3	301.3	0.26	227.18	2.36	1.77	73.8	87.79	-18.96
Sing4	174	218	218	0.4	164.37	2.22	1.56	30.2	29.94	0.85
Sing5	168	312	312	0.27	235.25	2.37	1.85	77.2	76.46	0.96
Sing6	178	286.7	286.7	0.31	216.17	2.33	1.81	47	48.87	-3.97
Van1	166	281	281	0.3	211.71	2.33	1.67	54.6	51.16	6.31
Van2	166	281	281	0.3	211.71	2.33	1.67	47.2	51.16	-8.38
Van3	182	393	169	0.32	275.01	2.44	1.66	57.8	53.63	7.22
Van4	154	169	393	0.28	148.40	2.17	1.69	43.4	41.37	4.67
Van5	172	274	274	0.31	206.43	2.31	1.68	58.1	47.38	18.46
Van6	180	257	257	0.35	193.62	2.29	1.65	33.1	38.94	-17.65
Kim1	195	390	167	0.35	252.51	2.40	1.79	47	45.75	2.65
Kim2	185	370	159	0.35	239.59	2.38	1.71	47	44.45	5.42
Kim3	175	350	150	0.35	226.62	2.36	1.62	46	42.99	6.55
Kim4	165	330	141	0.35	213.65	2.33	1.53	37	41.43	-11.98
Kim5	190	300	200	0.38	197.16	2.29	1.71	34	36.22	-6.53

Table C.4 Comparison of the compressive strength of high air content concrete between experiment and the model

Mix	CaO	w/b	Experiment (MPa)			Model (Mpa)			Error (%)		
			7-day	28-day	91-day	7-day	28-day	91-day	e7	e28	e91
K1	105	0.32	24	34	48.6	23.61	34.50	50.26	-1.62	1.48	3.41
K1R	103	0.32	20.5	30	43.2	22.09	33.82	49.39	7.76	12.75	14.34
K2	157	0.32	33.3	45.7	52.8	34.50	47.58	62.09	3.61	4.10	17.60
K2R	158	0.32	36.2	47.7	58.8	36.37	48.30	63.03	0.47	1.25	7.20