

Appendix A- Passenger demand & Train information

Table A.1 Hour-dependent passenger demand

OD	Period																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1-2	25	29	38	40	64	56	47	48	46	39	40	44	50	30	42	36	15	20
1-3	28	48	57	32	51	64	40	45	30	56	42	68	46	34	35	32	38	30
1-4	32	40	38	40	52	61	24	35	37	30	44	48	34	20	24	37	32	20
1-5	19	28	28	33	34	33	44	48	34	43	41	42	47	32	22	42	32	18
1-6	17	51	43	72	70	91	65	36	56	35	56	64	86	71	48	56	41	64
1-7	17	32	30	54	46	51	48	36	31	39	56	45	75	28	48	46	22	40
1-8	24	20	44	41	44	42	45	36	30	48	32	61	60	25	28	30	28	43
1-9	35	51	60	60	81	51	34	53	40	27	51	58	46	48	58	20	20	20
1-10	28	17	25	45	48	60	24	22	29	35	28	61	52	42	48	38	17	14
1-11	28	38	38	30	36	55	29	32	38	34	25	44	60	32	34	37	25	28
1-12	20	16	37	40	60	58	27	38	38	40	25	40	32	30	36	38	36	32
1-13	12	17	36	44	58	48	25	44	32	42	25	47	43	28	33	38	13	41
1-14	28	40	37	24	64	34	43	42	22	22	35	42	54	30	47	41	21	47
1-15	28	29	32	22	53	62	42	28	42	39	43	44	45	25	44	34	0	35
1-16	13	24	30	57	66	53	52	60	58	34	36	76	60	35	38	51	30	44
1-17	48	48	65	70	57	86	63	44	42	52	58	54	92	34	57	51	54	28
2-3	13	0	15	12	32	35	22	17	25	15	25	26	31	28	31	23	0	22
2-4	0	0	15	12	13	20	0	0	12	12	17	22	16	0	10	0	0	0
2-5	0	0	0	12	22	16	0	17	0	15	16	15	22	0	0	13	0	0
2-6	0	28	22	29	58	44	30	45	29	32	42	54	60	48	32	29	28	14
2-7	16	25	17	12	26	31	28	22	29	22	22	35	20	15	25	13	10	27
2-8	0	13	0	0	20	17	12	0	0	0	17	0	12	0	12	14	0	0
2-9	12	16	16	22	28	33	18	16	22	12	12	24	24	16	17	12	21	17
2-10	0	15	15	0	22	15	0	14	0	0	17	17	13	0	12	0	0	0
2-11	11	0	0	0	22	13	0	0	11	16	0	19	20	0	0	0	0	15
2-12	0	0	0	12	0	17	0	17	12	14	0	16	17	17	0	0	0	0
2-13	0	0	0	0	17	12	11	0	0	15	0	13	12	0	12	0	0	12
2-14	0	0	0	0	19	13	12	0	0	0	12	20	22	0	16	0	0	0
2-15	0	0	0	12	12	19	12	16	17	0	10	16	13	12	0	0	0	0
2-16	20	12	13	21	23	32	19	30	18	24	20	35	38	20	25	27	20	20
2-17	32	38	33	25	41	44	21	38	32	30	24	60	63	28	38	36	17	35
3-4	13	16	12	12	29	35	19	32	17	22	19	23	31	25	19	23	12	10
3-5	0	27	16	17	36	40	22	17	17	30	12	30	28	17	31	0	22	24
3-6	16	22	53	60	79	64	58	54	46	51	38	64	75	34	44	28	25	30
3-7	19	25	28	36	33	48	35	36	20	38	42	45	32	34	20	35	16	20
3-8	12	0	25	31	38	25	22	13	12	16	24	29	28	12	21	16	0	0
3-9	27	28	30	38	38	32	19	42	29	32	42	30	33	33	24	24	0	16
3-10	18	19	20	29	22	32	30	25	22	28	25	32	28	18	12	10	0	22
3-11	12	25	28	28	34	22	12	20	22	23	32	28	25	32	15	25	12	24

OD	Period																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
3-12	22	16	12	25	27	35	19	17	13	19	20	40	35	26	32	18	0	24
3-13	10	25	16	20	25	30	31	25	15	19	18	22	32	28	17	12	20	22
3-14	17	16	25	28	38	36	25	27	25	27	22	25	22	16	25	25	0	0
3-15	0	24	22	25	35	36	25	28	22	16	24	30	25	32	20	20	0	12
3-16	0	32	38	24	33	48	35	16	17	24	36	32	40	33	24	20	31	32
3-17	28	28	30	54	68	56	32	28	46	44	54	73	64	44	41	44	20	34
4-5	12	0	15	15	0	22	12	10	13	17	10	19	17	0	0	12	0	0
4-6	20	30	34	47	44	37	48	48	34	20	21	48	50	25	0	30	0	41
4-7	18	16	12	28	29	20	23	17	12	28	22	32	24	21	0	15	16	0
4-8	0	0	0	0	12	12	13	0	17	0	17	0	22	0	0	13	0	0
4-9	0	15	25	25	39	22	14	25	26	14	29	37	37	16	0	23	23	20
4-10	0	0	0	0	20	20	12	0	0	0	16	13	17	12	0	0	0	0
4-11	0	0	0	0	22	21	0	14	0	15	0	16	22	17	0	0	0	0
4-12	12	0	0	16	20	0	17	11	0	12	0	17	22	12	0	0	0	0
4-13	0	0	16	15	12	12	0	0	0	12	16	20	23	13	0	0	10	0
4-14	0	0	0	0	17	19	0	17	17	0	0	13	24	16	0	12	0	0
4-15	12	12	0	12	19	22	12	10	17	14	0	12	12	10	0	0	0	0
4-16	22	25	19	22	35	32	15	13	20	24	30	38	28	30	0	14	14	28
4-17	29	28	24	48	32	53	28	28	34	29	22	55	53	25	0	39	15	36
5-6	24	41	22	44	52	54	41	48	44	44	46	60	45	42	0	32	17	16
5-7	0	16	20	20	35	25	32	12	12	24	13	40	28	25	0	18	20	25
5-8	0	0	0	17	12	12	17	12	16	0	0	19	17	0	0	0	0	0
5-9	0	26	14	17	32	38	22	16	25	28	22	37	40	22	0	17	0	0
5-10	0	0	12	13	16	17	0	0	0	17	0	21	15	0	0	0	0	16
5-11	0	0	12	16	13	13	13	17	0	0	17	0	22	0	0	0	0	0
5-12	0	0	0	13	14	12	12	17	16	15	0	24	22	0	0	13	0	12
5-13	0	0	17	0	24	21	0	12	13	0	10	18	22	12	0	0	0	0
5-14	0	12	0	0	12	22	0	16	0	0	0	22	20	12	0	0	0	0
5-15	10	12	0	0	19	16	12	15	12	0	12	17	17	0	0	10	0	0
5-16	20	20	28	29	32	32	15	18	28	16	30	38	22	12	0	20	17	13
5-17	30	38	28	44	52	55	27	44	47	41	28	64	64	21	0	20	13	44
6-7	28	34	51	28	76	44	54	28	60	56	51	68	48	40	53	0	34	22
6-8	34	28	38	40	58	39	27	24	42	34	28	32	60	40	32	0	12	12
6-9	20	49	60	34	51	61	44	37	31	54	53	54	56	27	43	0	20	40
6-10	33	20	38	28	48	33	25	45	28	28	48	40	38	38	36	0	28	43
6-11	34	30	40	27	47	32	45	32	39	42	44	46	48	48	29	0	20	20
6-12	11	24	31	20	34	32	37	22	38	25	24	38	48	37	32	0	17	32
6-13	16	16	24	48	35	34	33	28	20	24	33	50	57	31	34	0	12	24
6-14	12	42	36	24	60	64	39	48	32	33	24	64	48	42	45	0	17	24
6-15	36	25	47	35	32	53	45	42	37	37	45	56	64	25	48	0	17	44
6-16	17	34	44	28	64	48	31	35	32	60	51	49	67	36	51	0	46	43
6-17	25	38	48	38	79	77	54	32	64	54	38	86	60	73	60	0	24	56

OD	Period																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
7-8	12	17	30	13	26	27	22	14	25	25	24	22	30	16	14	0	20	20
7-9	19	24	36	21	44	42	28	28	22	20	34	35	52	24	24	0	0	40
7-10	0	17	16	13	34	30	12	19	31	20	31	32	28	18	17	0	20	14
7-11	0	17	26	20	40	28	16	25	30	32	28	33	36	25	22	0	10	26
7-12	15	22	16	20	24	22	13	32	14	13	25	32	39	14	28	0	0	16
7-13	11	16	17	30	32	25	12	15	25	12	16	20	40	25	19	0	0	22
7-14	20	28	15	19	31	32	17	16	25	20	17	35	24	28	17	0	11	0
7-15	18	0	19	20	32	34	12	18	15	17	32	20	36	29	28	0	19	14
7-16	25	36	32	32	48	40	22	40	31	25	40	51	40	20	20	0	12	14
7-17	38	51	58	38	49	56	39	31	37	53	56	71	79	52	52	0	16	52
8-9	20	12	24	12	35	36	21	28	12	12	16	22	32	15	22	17	0	17
8-10	0	12	0	12	20	22	13	0	17	0	15	22	12	15	0	0	0	0
8-11	0	0	16	12	12	0	10	14	10	17	0	19	12	16	0	0	0	0
8-12	12	12	16	0	13	22	11	12	17	0	0	0	0	12	0	0	0	0
8-13	0	0	0	14	22	16	0	16	0	0	12	19	22	0	12	13	0	0
8-14	0	0	17	0	12	13	12	0	16	16	0	15	20	16	16	0	0	0
8-15	0	0	0	12	15	19	12	0	12	16	16	12	20	12	11	0	0	12
8-16	0	16	28	22	30	30	12	16	13	22	21	38	36	15	12	16	10	16
8-17	24	39	22	22	54	36	33	28	32	38	40	38	35	36	30	22	14	13
9-10	16	25	17	13	36	25	32	26	12	16	18	22	36	32	25	17	0	0
9-11	0	21	21	20	21	20	16	30	12	16	30	40	38	17	12	12	0	0
9-12	20	25	12	28	22	34	31	28	30	32	30	40	36	20	27	17	0	0
9-13	21	19	28	30	37	21	24	30	25	12	22	25	35	12	28	10	0	0
9-14	0	22	30	21	35	38	20	18	13	24	20	26	36	25	12	19	0	0
9-15	0	0	13	20	36	22	13	17	30	12	17	35	27	30	24	13	0	0
9-16	17	32	38	19	32	44	42	24	40	27	20	28	33	42	17	31	0	0
9-17	32	22	54	52	76	42	52	56	52	52	51	80	71	25	31	38	0	0
10-11	0	0	10	12	13	12	0	17	12	0	0	17	19	13	16	0	0	0
10-12	0	0	15	0	17	0	16	0	0	0	0	0	12	0	0	10	0	0
10-13	0	12	17	0	16	16	0	0	0	16	16	20	17	0	12	0	0	0
10-14	0	0	0	16	21	22	12	0	0	13	0	21	12	0	0	0	0	0
10-15	0	0	0	17	15	22	0	12	16	0	12	18	17	0	17	12	0	0
10-16	0	18	23	20	23	22	30	27	15	25	15	32	26	20	31	13	0	0
10-17	33	39	38	41	62	42	27	27	40	32	44	35	47	35	37	42	0	0
11-12	0	0	0	0	0	12	17	0	0	0	15	22	0	16	0	13	0	0
11-13	0	0	0	16	22	12	12	0	16	0	0	12	20	16	12	0	0	0
11-14	10	15	0	12	12	20	16	0	12	0	16	21	22	12	0	0	0	0
11-15	0	10	12	0	15	0	16	17	14	17	16	20	12	0	12	0	12	0
11-16	0	20	16	13	21	39	28	22	13	24	16	28	20	13	12	17	0	0
11-17	13	28	44	36	48	62	25	24	24	33	32	56	52	44	22	24	33	0
12-13	0	0	10	0	17	17	0	0	0	0	11	12	20	0	16	0	0	0
12-14	0	0	0	0	19	16	16	15	17	0	12	15	16	0	0	12	0	0

OD	Period																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
12-15	0	0	0	13	24	0	0	0	16	15	17	22	15	10	16	12	0	0
12-16	13	0	25	17	28	25	12	28	17	22	27	33	30	22	22	20	16	0
12-17	25	22	24	42	51	50	47	40	33	32	38	60	47	40	32	20	34	0
13-14	0	0	0	13	12	18	12	12	11	12	12	16	17	0	13	0	0	0
13-15	12	15	16	0	19	15	15	0	16	0	17	22	13	0	0	15	0	0
13-16	20	25	12	25	24	35	17	22	26	14	24	32	25	19	27	12	17	0
13-17	12	17	31	24	60	45	44	30	25	36	44	47	38	44	38	28	16	0
14-15	12	0	0	0	16	16	13	10	13	14	13	19	20	0	13	0	0	0
14-16	22	11	17	18	29	24	32	29	19	17	31	38	36	12	15	0	0	0
14-17	36	28	35	47	53	58	28	47	22	31	36	38	33	32	40	17	19	0
15-16	17	25	25	22	34	34	21	17	20	12	12	40	38	30	17	17	0	0
15-17	28	40	21	38	63	38	45	32	25	24	27	41	38	25	27	30	30	0
16-17	16	48	45	45	76	48	42	40	51	43	51	71	80	32	56	25	22	25

Table A.2 Train information

Train ID	Earliest departure times	Starting station	Ending station	Train capacity
0	2	Changsha	Guangzhou South	500
1	5	Wuhan	Guangzhou South	1000
2	13	Wuhan	Guangzhou South	1000
3	20	Changsha	Guangzhou South	500
4	26	Wuhan	Changsha	500
5	30	Changsha	Guangzhou South	500
6	36	Changsha	Guangzhou South	500
7	42	Wuhan	Guangzhou South	1000
8	48	Changsha	Guangzhou South	500
9	53	Changsha	Guangzhou South	500
10	57	Wuhan	Guangzhou South	1000
11	69	Changsha	Guangzhou South	500
12	75	Changsha	Guangzhou South	500
13	80	Changsha	Guangzhou South	500
14	89	Changsha	Guangzhou South	500
15	92	Wuhan	Guangzhou South	1000
16	140	Wuhan	Guangzhou South	1000
17	140	Changsha	Guangzhou South	500
18	145	Wuhan	Guangzhou South	1000
19	146	Changsha	Guangzhou South	500
20	157	Changsha	Guangzhou South	500
21	164	Wuhan	Guangzhou South	1000
22	170	Wuhan	Guangzhou South	1000
23	176	Changsha	Guangzhou South	500
24	185	Wuhan	Guangzhou South	1000
25	192	Changsha	Guangzhou South	500
26	198	Wuhan	Guangzhou South	1000
27	204	Changsha	Guangzhou South	500
28	207	Wuhan	Guangzhou South	1000
29	210	Changsha	Guangzhou South	500
30	222	Wuhan	Guangzhou South	1000
31	227	Wuhan	Guangzhou South	1000
32	235	Changsha	Guangzhou South	500
33	245	Wuhan	Changsha	500
34	250	Changsha	Guangzhou South	500
35	260	Changsha	Guangzhou South	500
36	266	Wuhan	Changsha	500
37	272	Wuhan	Guangzhou South	1000
38	278	Wuhan	Changsha	500
39	286	Wuhan	Guangzhou South	1000
40	294	Wuhan	Guangzhou South	1000

Train ID	Earliest departure times	Starting station	Ending station	Train capacity
41	296	Changsha	Guangzhou South	500
42	299	Wuhan	Changsha	500
43	305	Wuhan	Guangzhou South	1000
44	310	Wuhan	Changsha	500
45	315	Changsha	Guangzhou South	500
46	326	Wuhan	Guangzhou South	1000
47	335	Changsha	Guangzhou South	500
48	340	Wuhan	Changsha	500
49	345	Wuhan	Guangzhou South	1000
50	347	Changsha	Guangzhou South	500
51	352	Changsha	Guangzhou South	500
52	353	Wuhan	Changsha	500
53	357	Changsha	Guangzhou South	500
54	358	Wuhan	Changsha	500
55	362	Changsha	Guangzhou South	500
56	367	Wuhan	Changsha	500
57	376	Wuhan	Guangzhou South	1000
58	378	Changsha	Guangzhou South	500
59	394	Wuhan	Guangzhou South	1000
60	404	Wuhan	Changsha	500
61	409	Wuhan	Changsha	500
62	410	Changsha	Guangzhou South	500
63	414	Wuhan	Changsha	500
64	420	Wuhan	Guangzhou South	1000
65	421	Changsha	Guangzhou South	500
66	425	Wuhan	Changsha	500
67	436	Wuhan	Guangzhou South	1000
68	443	Wuhan	Guangzhou South	1000
69	447	Changsha	Guangzhou South	500
70	448	Wuhan	Changsha	500
71	460	Wuhan	Guangzhou South	1000
72	474	Changsha	Guangzhou South	500
73	479	Wuhan	Guangzhou South	1000
74	484	Wuhan	Changsha	500
75	489	Wuhan	Changsha	500
76	490	Changsha	Guangzhou South	500
77	494	Wuhan	Guangzhou South	1000
78	500	Wuhan	Changsha	500
79	500	Changsha	Guangzhou South	500
80	505	Wuhan	Guangzhou South	1000
81	511	Wuhan	Guangzhou South	1000
82	529	Wuhan	Guangzhou South	1000

Train ID	Earliest departure times	Starting station	Ending station	Train capacity
83	530	Changsha	Guangzhou South	500
84	540	Changsha	Guangzhou South	500
85	550	Wuhan	Guangzhou South	1000
86	555	Changsha	Guangzhou South	500
87	560	Wuhan	Guangzhou South	1000
88	572	Changsha	Guangzhou South	500
89	581	Wuhan	Guangzhou South	1000
90	586	Wuhan	Guangzhou South	1000
91	591	Wuhan	Guangzhou South	1000
92	603	Wuhan	Guangzhou South	1000
93	605	Changsha	Guangzhou South	500
94	608	Wuhan	Guangzhou South	1000
95	613	Wuhan	Guangzhou South	1000
96	618	Wuhan	Guangzhou South	1000
97	624	Wuhan	Guangzhou South	1000
98	629	Wuhan	Changsha	500
99	637	Wuhan	Changsha	500
100	643	Wuhan	Changsha	500
101	644	Changsha	Guangzhou South	500
102	648	Wuhan	Guangzhou South	1000
103	660	Wuhan	Guangzhou South	1000
104	665	Wuhan	Guangzhou South	1000
105	667	Changsha	Guangzhou South	500
106	677	Wuhan	Guangzhou South	1000
107	683	Wuhan	Changsha	500
108	688	Wuhan	Guangzhou South	1000
109	695	Wuhan	Guangzhou South	1000
110	701	Wuhan	Guangzhou South	1000
111	708	Wuhan	Guangzhou South	1000
112	680	Changsha	Guangzhou South	500
113	718	Wuhan	Guangzhou South	1000
114	724	Wuhan	Guangzhou South	1000
115	732	Wuhan	Changsha	500
116	740	Changsha	Guangzhou South	500
117	775	Changsha	Guangzhou South	500
118	745	Wuhan	Guangzhou South	1000
119	750	Wuhan	Guangzhou South	1000
120	790	Changsha	Guangzhou South	500
121	789	Wuhan	Changsha	500
122	799	Wuhan	Changsha	500
123	820	Changsha	Guangzhou South	500
124	828	Changsha	Guangzhou South	500

Train ID	Earliest departure times	Starting station	Ending station	Train capacity
125	850	Changsha	Guangzhou South	500
126	843	Wuhan	Changsha	500
127	860	Changsha	Guangzhou South	500
128	859	Wuhan	Changsha	500
129	670	Changsha	Guangzhou South	500
130	865	Wuhan	Changsha	500
131	879	Wuhan	Changsha	500