

**Supplementary Materials for**  
**Quantitative Accident Risk Estimation for Infrastructure Facilities**  
**Based on Accident Case Analysis**

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**Table S1.** Accident data by facility type

<b>Div.</b>	<b>number of fatalities</b>	<b>number of injuries</b>
Bridge	53	302
Dam	11	37
Road	122	708
Water and sewage	119	714
Retaining wall	23	132
Railroad	33	137
Tunnel	33	236
River	31	215
Port and harbor	19	157
Miscellaneous facilities	68	347
Infrastructure facilities	512	2993

**Table S2.** Annual construction cost by facility type

<b>Div.</b>	<b>construction cost (million dallars)</b>						<b>Sum</b>
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	
Bridge	1241.63	1327.42	1282.26	1187.02	1257.45	1269.28	7565.05
Dam	223.73	136.87	129.49	134.18	168.43	158.99	951.69
Road	7204.92	6037.56	4891.09	5524.88	6029.26	5902.92	35,590.63
Water and sewage	1590.86	1502.46	1628.80	1843.70	1911.29	1980.80	10,457.91
Retaining wall	2560.68	2547.47	2547.62	2476.73	2297.85	2361.21	14,791.55
Railroad	2788.33	2756.84	2593.47	2268.97	1833.49	1798.62	14,039.71
Tunnel	904.07	854.69	912.90	809.60	746.01	697.31	4924.58
River	1720.66	1607.07	1447.31	1471.04	1581.95	1746.24	9574.27
Port and harbor	1028.96	1191.40	1368.05	1437.56	1338.25	1496.93	7861.14
Miscellaneous facilities	6011.52	6399.46	6723.58	6954.38	6683.56	6463.21	39,235.71
Infrastructure facilities	25,275.35	24,361.21	23,524.58	24,108.06	23,847.54	23,875.50	144,992.24

Note: The exchange rate (KRW/USD) is KRW 1302 to USD 1 (as of 7 August 2023).

**Table S3.** Construction cost classification by collected data

<b>Construction Cost Classification (million dallars)</b>		
<b>1<sup>st</sup> Accident data(MOLIT)</b>	<b>2<sup>nd</sup> Accident data(COMWEL)</b>	<b>Construction Cost data(CAK)</b>
Less than 0.01	Less than 0.01	Less than 0.03
Not less than 0.01 and less than 0.02	Not less than 0.01 and less than 0.02	
Not less than 0.02 and less than 0.03	Not less than 0.02 and less than 0.03	
Not less than 0.03 and less than 0.08	Not less than 0.03 and less than 0.08	Not less than 0.03 and less than 0.04
		Not less than 0.04 and less than 0.08
Not less than 0.08 and less than 0.15	Not less than 0.08 and less than 0.15	Not less than 0.08 and less than 0.15
Not less than 0.15 and less than 0.23	Not less than 0.15 and less than 0.23	Not less than 0.15 and less than 0.38
Not less than 0.23 and less than 0.38	Not less than 0.23 and less than 0.38	
Not less than 0.38 and less than 0.77	Not less than 0.38 and less than 0.77	Not less than 0.38 and less than 0.77
Not less than 0.77 and less than 1.54	Not less than 0.77 and less than 1.54	Not less than 0.77 and less than 2.30
Not less than 1.54 and less than 3.84	Not less than 1.54 and less than 3.84	Not less than 2.30 and less than 3.84
Not less than 3.84 and less than 7.68	Not less than 3.84 and less than 7.68	Not less than 3.84 and less than 7.68
Not less than 7.68 and less than 11.52	Not less than 7.68 and less than 9.22	Not less than 7.68 and less than 15.36
	Not less than 9.22 and less than 11.52	
Not less than 11.52 and less than 15.36	Not less than 11.52 and less than 15.36	Not less than 15.36 and less than 38.40
Not less than 15.36 and less than 23.04	Not less than 15.36 and less than 23.04	
Not less than 23.04 and less than 38.40	Not less than 23.04 and less than 38.40	
Not less than 38.40 and less than 76.80	Not less than 38.40 and less than 76.80	Not less than 38.40 and less than 76.80
Not less than 76.80	Not less than 76.80	Not less than 76.80

Note: The exchange rate (KRW/USD) is KRW 1302 to USD 1 (as of 7 August 2023).

**Table S4.** Recalculated NAFC\* and CCC\*\* by proposed cost classification

Facility type		Proposed Cost Classification***				
		PC-1	PC-2	PC-3	PC-4	PC-5
Bridge	NAFC	3.25	1.18	1.18	0.89	1.33
	CCC	182.74	474.65	400.81	184.50	18.14
Dam	NAFC	0.59	0.15	0.44	0.30	0.15
	CCC	35.83	94.39	25.38	3.01	3.01
Road	NAFC	6.64	4.13	1.62	3.40	1.48
	CCC	942.38	1636.10	1734.45	1292.83	326.01
Water and sewage	NAFC	5.76	3.84	5.02	2.21	0.74
	CCC	336.15	927.55	374.01	80.71	24.56
Retaining wall	NAFC	1.03	1.33	0.30	0.44	0.30
	CCC	148.59	572.32	961.66	740.09	42.59
Railroad	NAFC	0.59	0.44	0.44	1.48	1.62
	CCC	44.10	390.45	691.05	851.09	363.26
Tunnel	NAFC	0.44	0.30	0.15	1.77	1.77
	CCC	29.47	188.24	265.91	294.79	42.36
River	NAFC	1.48	0.89	2.07	0.15	0.00
	CCC	567.40	887.88	134.68	5.76	5.76
Port and harbor	NAFC	0.74	0.30	0.59	0.74	0.44
	CCC	137.81	441.15	369.78	281.69	79.75
Miscellaneous facilities	NAFC	4.28	1.33	1.03	1.92	1.03
	CCC	1594.20	1919.99	1716.46	1216.03	92.60
Infrastructure facilities	NAFC	24.81	13.88	12.85	13.29	8.86
	CCC	4018.68	7532.73	6674.19	4950.50	989.27

Note: The exchange rate (KRW/USD) is KRW 1302 to USD 1 (as of 7 August 2023). \*NAFC is the number of annualized fatalities by cost classification, and the unit is person/year. \*\*CCC is the annual construction cost by cost classification, and the unit is million dollars/year. \*\*\* Proposed Cost Classification is confirmed in Table 7.

**Table S5.** Recalculated FRC\* and CRC\*\* by proposed cost classification\*\*\*

Facility type		Proposed Cost Classification				
		PC-1	PC-2	PC-3	PC-4	PC-5
Bridge	FRC	0.01778	0.00249	0.00295	0.00480	0.07326
	CRC	0.14494	0.37646	0.31789	0.14633	0.01439
Dam	FRC	0.01648	0.00156	0.01745	0.09817	0.04908
	CRC	0.22169	0.58403	0.15706	0.01861	0.00319
Road	FRC	0.00705	0.00253	0.00094	0.00263	0.00453
	CRC	0.15887	0.27582	0.29240	0.21795	0.05496
Water and sewage	FRC	0.01713	0.00414	0.01342	0.02744	0.03005
	CRC	0.19286	0.53216	0.21458	0.04631	0.01409
Retaining wall	FRC	0.00696	0.00232	0.00031	0.00060	0.00693
	CRC	0.06027	0.23216	0.39009	0.30021	0.01728
Railroad	FRC	0.01339	0.00113	0.00064	0.00173	0.00447
	FRC	0.01885	0.16686	0.29533	0.36372	0.15524
Tunnel	CRC	0.01503	0.00157	0.00056	0.00601	0.04183
	FRC	0.03590	0.22934	0.32398	0.35917	0.05161
River	FRC	0.00260	0.00100	0.01535	0.02563	0.00000
	CRC	0.35430	0.55441	0.08410	0.00360	0.00360
Port and harbor	FRC	0.00536	0.00067	0.00160	0.00262	0.00555
	CRC	0.10519	0.33671	0.28223	0.21500	0.06087
Miscellaneous facilities	FRC	0.00269	0.00069	0.00060	0.00158	0.01116
	CRC	0.24379	0.29361	0.26248	0.18596	0.01416
Infrastructure facilities	FRC	0.00617	0.00184	0.00192	0.00268	0.00896
	CRC	0.16630	0.31172	0.27619	0.20486	0.04094

Note: The exchange rate (KRW/USD) is KRW 1302 to USD 1 (as of 7 August 2023). \*FRC is the fatality rate by cost classification, and the unit is person/ million dollars.

\*\*CRC is the construction rate by cost classification. \*\*\* Proposed Cost Classification is confirmed in Table 7.