

**Tab. 1 Statistical table of safety accidents ①**

Time	Location	Cause	Death toll	Dominant factors	Recessive factors
2020.06.27	Foshan,Guangdong	Formwork collapse	3	B3	B4
2020.05.19	Baotou, Inner Mongolia	Fall of construction lift	3	B2	B1,B4
2020.05.16	Yulin,Guangxi	Fall of construction lift	6	B2	B3,B4
2020.04.18	Yuanyang,Henan	Soil collapse	4	B1	B4
2020.01.05	Wuhan,Hubei	Collapse of high formwork	6	B1	B4
2019.11.20	Qingyang,Gansu	Tower crane overturning	3	B2	B1,B4
2019.11.15	Zhengzhou,Henan	Foundation pit collapse	3	B3	B1,B4
2019.10.28	Guizhou,Guiyang	Collapse of construction body	8	B4	B1,B2
2019.09.26	Chengdu,Sichuan	Foundation pit collapse	3	B3	B1,B4
2019.09.01	Nyingchi,Tibet	Tower crane overturning	3	B2	B1,B4
2019.08.28	Zhengzhou,Henan	Tower crane collapsed	3	B2	B1,B4
2019.06.16	Langfang,Hebei	Foundation pit collapse	3	B3	B1,B4
2019.04.25	Hengshui,Hebei	Fall of construction lift	11	B2	B1,B4
2019.04.10	Yangzhou,Jiangsu	Foundation pit collapse	5	B3	B1,B4
2019.01.23	Huarong,Hunan	Tower crane collapsed	4	B2	B1,B4
2018.12.29	Minhang,Shanghai	Foundation pit collapse	3	B3	B1,B4
2018.12.10	Hanzhong,Shaanxi	Tower crane collapsed	3	B2	B1,B4
2018.10.15	Heze,Shandong	Tower crane collapsed	3	B2	B1,B4
2018.10.04	Tianmen,Hubei	Fall of construction lift	3	B2	B1,B4
2018.09.10	Pudong,Shanghai	Poisoning choke	3	B3	B1,B4
2018.08.31	Dezhou,Shandong	Support frame collapsed	6	B1	B2,B4
2018.08.24	Hefei,Anhui	Poisoning choke	3	B3	B1,B4
2018.07.02	Bijie,Guizhou	Tower crane collapsed	3	B2	B1,B4
2018.06.29	Baodi,Tianjin	Electric shock	3	B1	B3,B4
2018.05.17	Wuzhishan,Hainan	Tower crane collapsed	4	B2	B1,B4
2018.04.09	Shantou,Guangdong	Fall of construction lift	4	B2	B1,B4
2018.02.08	Hechi,Guangxi	Tower crane collapsed	3	B2	B1,B4
2018.01.24	Xuchang,Henan	Fall of construction lift	4	B2	B1,B4
2018.01.21	Fuyang,Anhui	Fall of construction lift	3	B2	B1,B4

**Tab. 2 Statistical table of accident factors**

Accident statistics	B1	B2	B3	B4
Dominant factors	4	16	8	1
Recessive factors	23	2	2	28

**Tab. 3 Criteria for judging the importance of indicators**

Scale selects	Equally important	Slight important	Little important	Even more important	Obviously important	Very important	Strongly important	More strongly important	Extremely important
5/5-9/1	5/5	5.5/4.5	6/4	6.5/3.5	7/3	7.5/2.5	8/2	8.5/1.5	9/1
1-9	1	2	3	4	5	6	7	8	9

**Tab. 4 R.I. value table for random consistency index**

Order and scale	1	2	3	4	5	6	7	8	9
5/5-9/1	0	0	0.1690	0.2598	0.3287	0.3694	0.4007	0.4167	0.4370
1-9	0	0	0.52	0.89	1.12	1.26	1.36	1.41	1.16

**Tab. 5 A - B judgment matrix**

A-B	B1	B2	B3	B4
B1	5/5	6/4	7/3	4/6
B2	4/6	5/5	6.5/3.5	3.5/6.5
B3	3/7	3.5/6.5	5/5	2.5/7.5
B4	6/4	6.5/3.5	7.5/2.5	5/5

**Tab. 6 B1-Ci(i=1,2,3) Judgment matrix**

B1-Ci	C1	C2	C3
C1	1	1/3	4
C2	3	1	5
C3	1/4	1/5	1

**Tab. 7 B2-Ci(i=4,5,6) Judgment matrix**

B2-Ci	C4	C5	C6
C4	1	1/6	3
C5	6	1	7
C6	1/3	1/7	1

**Tab. 8 B3-Ci(i=7,8,9) Judgment matrix**

B3-Ci	C7	C8	C9
C7	1	1/5	3
C8	5	1	7
C9	1/3	1/7	1

**Tab. 9 B4-Ci(i=10,11,12) Judgment matrix**

B4-Ci	C10	C11	C12
C10	1	1/3	5
C11	3	1	7
C12	1/5	1/7	1

**Tab. 10 Weight sequence**

Target layer	Criterion layer	Weight value	Index layer	Hierarchical order		
				Single sort	Total sort	Sort
Engineering safety accident occurred	The Human factor B1	0.2831	Professional quality of operators C1	0.2797	0.0792	6
			Safety awareness of operators C2	0.6267	0.1774	2
			Operator's self-protection ability C3	0.0936	0.0265	9
	The Machine or the Matter factor B2	0.2070	Degree of perfection of protective facilities C4	0.1713	0.0355	7
			High standard for mechanical installation and removal C5	0.7504	0.1553	3

			Normal machine and tool operation C6	0.0782	0.0162	11
	The Medium factor B3	0.1206	Regional natural environment C7	0.1884	0.0227	10
			Normal working environment C8	0.7306	0.0881	5
			Unpredictable environments C9	0.0810	0.0098	12
	The management factor B4	0.3893	Degree of management control C10	0.2790	0.1086	4
			Management system C11	0.6491	0.2527	1
			Management measures C12	0.0719	0.0280	8

**Tab. 11 Prefabricated construction safety evaluation index system**

Target layer	Criterion layer	Index layer	Attribute
Prefabricated building construction safety evaluation index system	The human factor X1	Operators's professional level X11	Quantitative indicators
		Operators's safety awareness X12	Qualitative indicators
		Operators's risk aversion ability X13	Qualitative indicators
	The object factor X2	Protective equipment and articles X21	Quantitative indicators
		Installation, dismantling and maintenance of large machines and tools X22	Quantitative indicators
		The operation of mechanical equipment X23	Quantitative indicators
	The environmental factors X3	Natural climatic environment X31	Qualitative indicators
		Workplace environment X32	Qualitative indicators
		Sudden natural disasters X33	Quantitative indicators
	The management factors X4	Control the intensity of the project X41	Qualitative indicators
		Control system and management system X42	Qualitative indicators
		Emergency treatment and measures for accidents X43	Quantitative indicators

**Tab. 12 Project initial score value**

Project s	Initial score											
	X11	X12	X13	X21	X22	X23	X31	X32	X33	X41	X42	X43
P1	87	76.3	80.2	78	85	80	79.4	81.5	80	85.4	87.3	85
P2	82	74.5	83.1	82	80	85	78.2	77.3	80	82.1	86.1	85

P3	85	81.2	76.7	85	80	80	78.6	84.9	80	83.3	83.4	80
P4	80	79.6	79.3	87	85	80	79.5	82.5	80	83.7	85.2	80

**Tab. 13** Calculation results of relative proximity

Projects	$S_i^+$	$S_i^-$	$L_i^+$
P1	0.9798	2.5429	0.7218
P2	2.5625	0.7521	0.2269
P3	2.1587	1.4481	0.4015
P4	2.2301	1.4057	0.3866