Figure 1. The evaluation system of monitoring risk for deep excavation.

Figure 2. Process of monitoring risk evaluation.

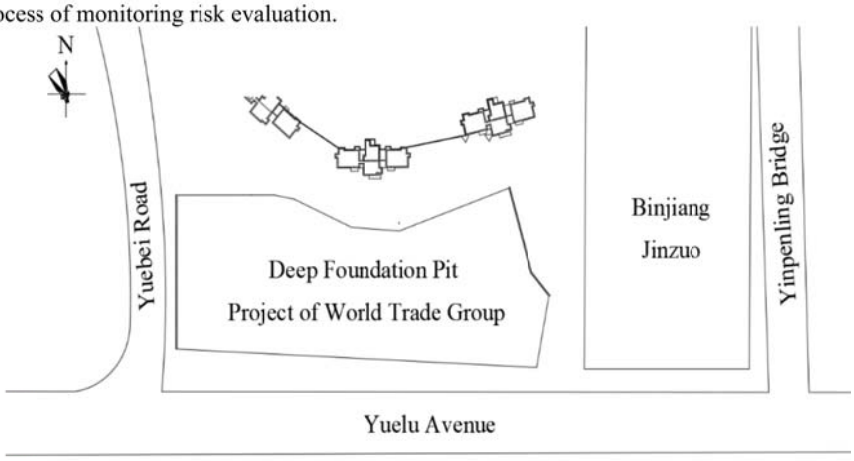

Figure 3. Layout of deep foundation pit.

Table 1. Comparison of the importance of evaluation indexes.

scale	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Weak importance of one over another	Experience and judgment slight favor one activity over another
5	Essential or strong importance	Experience and judgment strongly favor one activity over another
7	Demonstrated importance	An activity is strongly favored and its dominance is demonstrated in practice
9	Absolutely importance	The evidence favoring one activity over anther is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values between the two adjacent judgments	The importance is between two adjacent scales.
Inverse	In contrast to the above	

Table 2. Random indexes.[25]

order	RI	order	RI	order	RI
1	0	6	1.25	11	1.52
2	0	7	1.35	12	1.54
3	0.52	8	1.40	13	1.56
4	0.89	9	1.45	14	1.58
5	1.11	10	1.49	15	1.59

Table 3. Weight of experts' comments.

Experts' comments (W_e)	Minimal	Very small	smaller	medium	larger	Very large	maximal
Risk probability (w_k)	0.1	0.2	0.4	0.5	0.6	0.8	0.9

Table 4. Risk acceptance criteria.

Grade	Evaluation value ()	Acceptance degree	Suggestions or measures	Whether alarming
Level 1	0 ~ 0.2	Negligible	Daily inspection and monitoring	No
Level 2	0.2 ~ 0.4	Admissible but needing to pay little attention to	Strengthening daily inspection and management	No
Level 3	0.4 ~ 0.6	Acceptable but needing to pay much attention to	Needing prevention, analyzing the causes and strengthening monitoring	Yes
Level 4	0.6 ~ 0.8	Unsuitable to accept	Alarming for engineering and improving monitoring frequency	Yes
Level 5	0.8 ~ 1.0	Refusing to accept	Stopping construction and activating contingency plan immediately	Yes

Table 5. Judgment matrix of the weight of risk indexes.

Judgment index	u_{11}	u_{12}	u_{13}	u_{14}	u_{15}	u_{21}	u_{22}	u_{23}	u_{31}	u_{32}	u_{33}
u_{11}	1	1/3	1/4	1/6	1/6	1/5	1/5	1/5	1/9	1/6	1/7
u_{12}	3	1	1/2	1/3	1/3	1/2	1/2	1/2	4	2	2
u_{13}	4	2	1	1/3	1/3	1/2	1/2	1/2	3	2	2
u_{14}	6	3	3	1	1	1/2	1/2	1/2	2	1	1
u_{15}	6	3	3	1	1	1/2	1/2	1/2	2	1	1
u_{21}	5	2	2	2	2	1	1	1	2	2	1
u_{22}	5	2	2	2	2	1	1	1	2	2	1
u_{23}	5	2	2	2	2	1	1	1	2	2	1/2
u_{31}	9	1/4	1/3	1/2	1/2	1/2	1/2	1/2	1	1/2	1
u_{32}	6	1/2	1/2	1	1	1/2	1/2	1/2	2	1	1
u_{33}	7	1/2	1/2	1	1	1	1	2	1	1	1

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