CHANG'AN UNIVERSITY

The reliability analysis of the slopes near the Shuidonggou landslide

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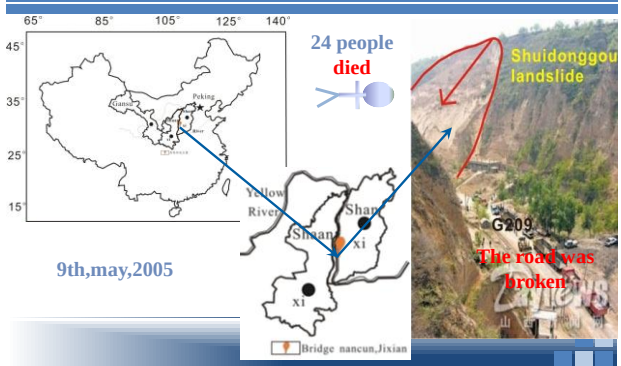
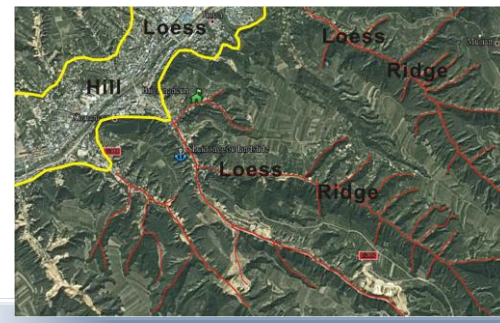
main points

1 Introduction



1 Introduction



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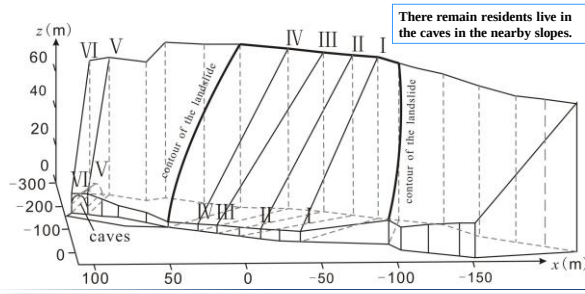
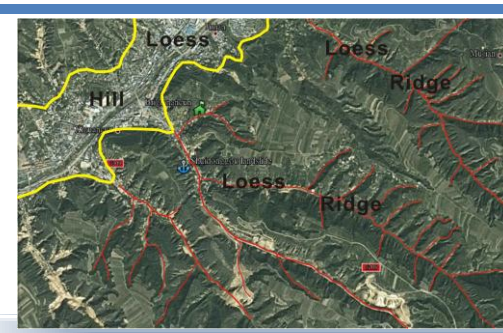
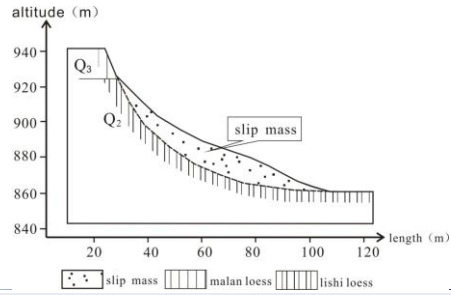


2 Engineering geological conditions

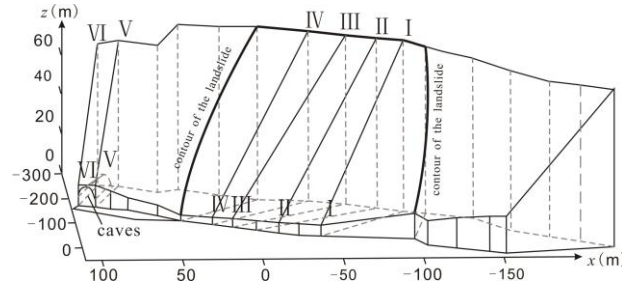
2.1 geographic & geomorphic



2 Engineering geological conditions
2.2 formation &lithology



3 Models and parameters
3.1 Models



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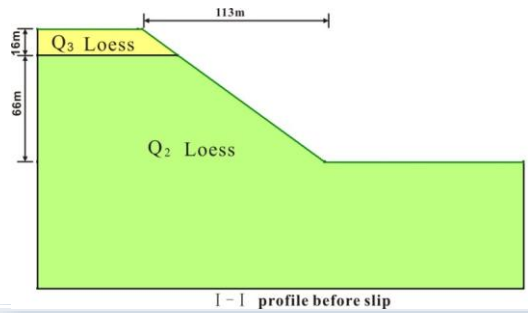

I－I **profile before slip**

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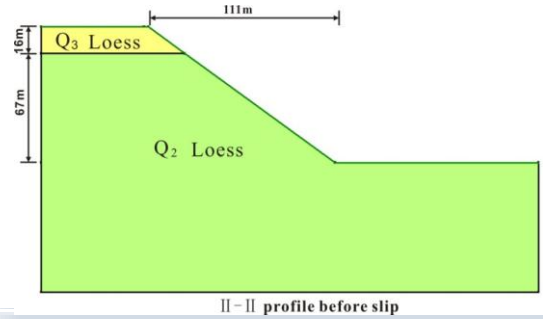

II－II **profile before slip**

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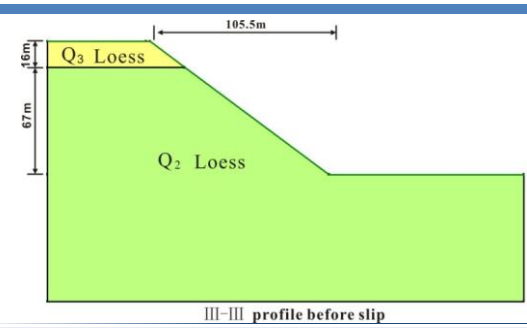

III－III **profile before slip**

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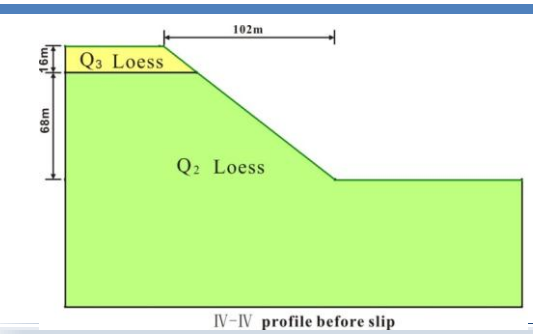
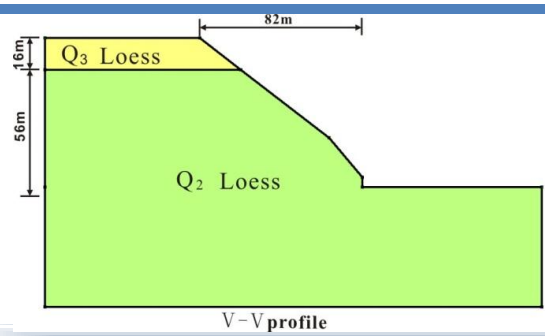
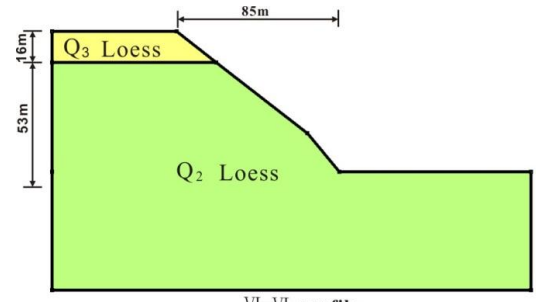


IV－IV **profile before slip**



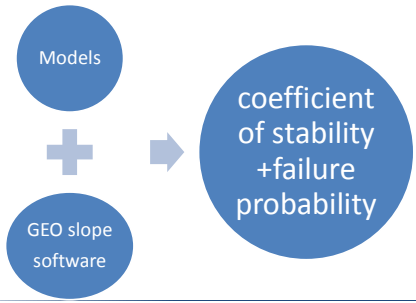
V－V profile

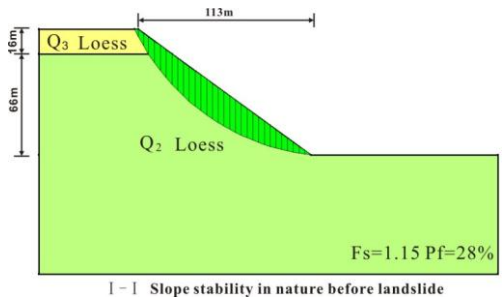


VI－VI profile

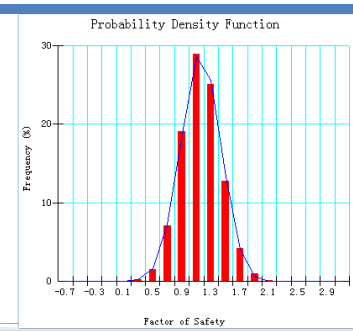
Strength parameters in nature			
layer	Index	c /(kPa)	φ /(°)
Q3 loess	count	90	90
	max	153.3	35.4
	min	0.84	2.1
	average	44.59	24.65
	Standard Deviation	27.49	6.84
	coefficient of variation	0.62	0.28
Q2 loess	count	130	130
	max	137.7	38.7
	min	0.6	3.7
	average	46.06	26
	Standard Deviation	25.44	5.68
	coefficient of variation	0.55	0.22

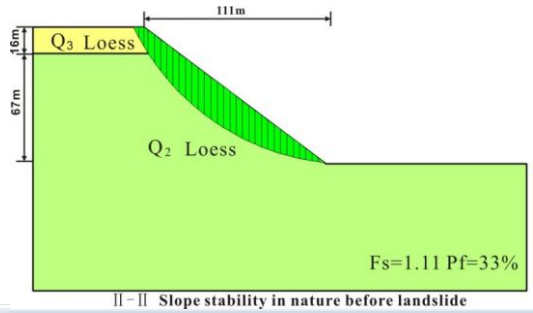
MODLE





I－I Slope stability in nature before landslide





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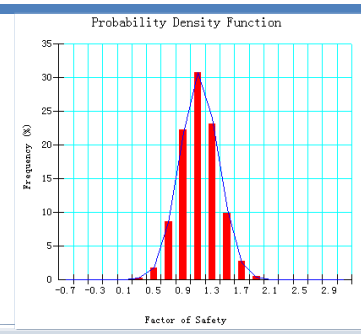

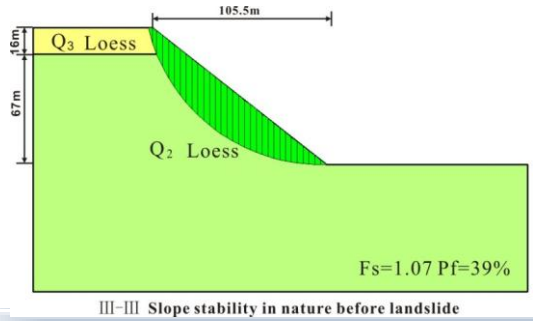

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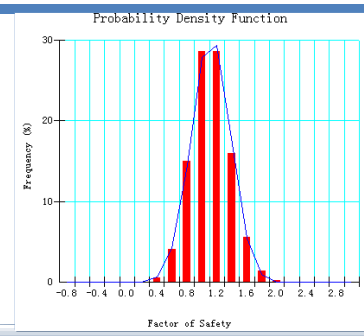
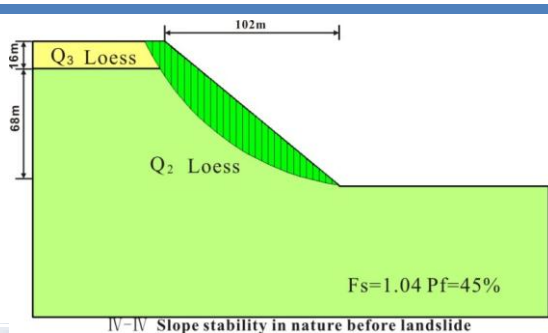
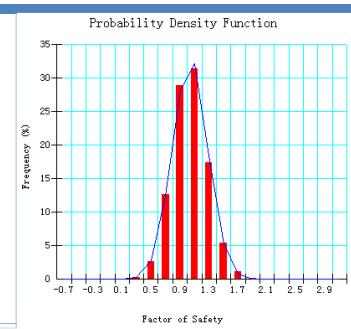




IV－IV Slope stability in nature before landslide



Slope stability in nature before landslide						
profiles	Monte-Carlo method		Rosenblueth method		checking point method	
	Fs	Pf(%)	Fs	Pf(%)	Fs	Pf(%)
Ⅰ - Ⅰ	1.16	28.1	1.15	28.4	1.15	28.4
Ⅱ - Ⅱ	1.11	33.2	1.11	33	1.11	33.7
Ⅲ-Ⅲ	1.07	39.1	1.07	39	1.07	39
Ⅳ-Ⅳ	1.04	44.9	1.03	45.2	1.03	44.8

Suppose the factor of safety F_s=1.0

inverse the cohesion ***c***

internal friction angle ***φ*** stay the same

stratum	*c(kPa)*
Q_3 loess	20
Q_2 loess	30

Critical stability of slopes before landslide		
剖面编号	*Fs*	P_f (%)
Ⅰ - Ⅰ	1.02	51
Ⅱ - Ⅱ	0.99	55
Ⅲ-Ⅲ	0.95	62
Ⅳ-Ⅳ	0.92	68

Strength parameters in nature			
layer	Index	*c* /(kPa)	*φ* /(°)
Q_3 loess	count	90	90
	max	153.3	35.4
	min	0.84	2.1
	average	20	24.65
	Standard Deviation	27.49	6.84
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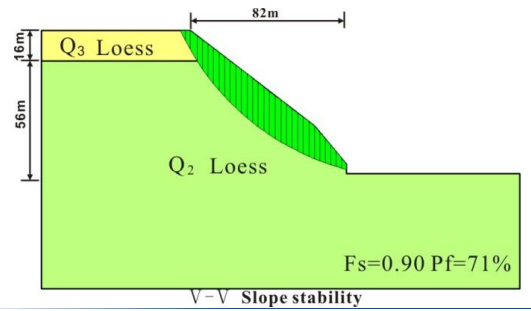
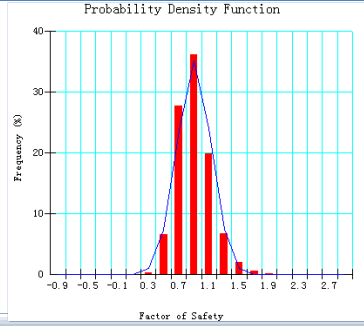
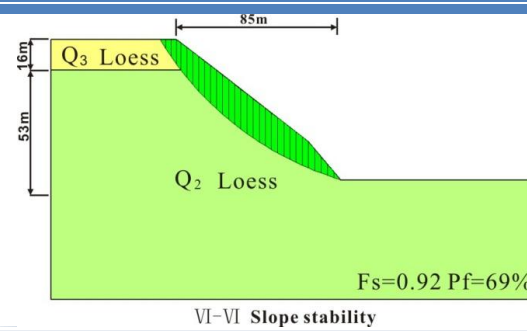
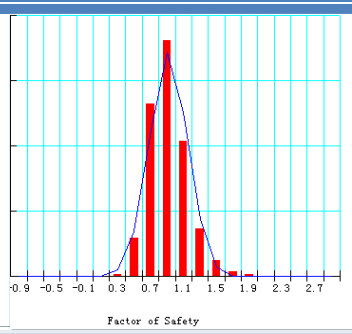






VI-VI **Slope stability**



Slope stability		
profile	Fs	Pf(%)
V - V	0.90	71
VI-VI	0.92	68

Grading of slope stability					
Estimation of stability	unescapable to slip	High risk	Medium risk	Lower risk	Stable
probability of failure(%)	≥90	60～90	30～60	5～30	≤5

Grading of slope stability			
profile	Fs	Pf(%)	grading
V - V	0.90	71	High risk
VI-VI	0.92	68	High risk

- The **slopes** are **in danger** with a great probability of failure , it can fail at any time and the local residents should **relocate** as soon as possible.
- There are only **a little difference** between the results of the three reliability methods(Monte-Carlo method, The checking point method, Rosenblueth method).

Thank you!

Any more information

please give some questions