




Inverse analysis of loess shear strength parameters of Tianshui region

Liu Chao
Chang'an University, Xi'an, China
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main content

- Critical loess slope
- Investigation in Tianshui region
- Inverse analysis
- Results validation and discussion

1. Critical loess slope

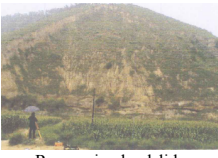


Crack on the top of slope

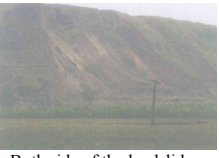


Crush on the surface of slope

$F_s=1.0$

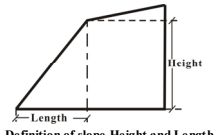


Recovering landslide

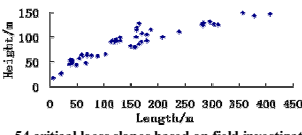


Both side of the landslide

2. Investigation in Tianshui area



Definition of slope Height and Length



54 critical loess slopes based on field investigation

Liner regression equation:
 $\ln(H) = 0.52\ln(L) + 1.95, R^2 = 0.93$

↓
 H&L: theoretical slope size
 Build up slope models below

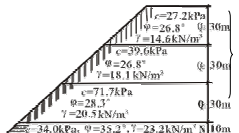
2. Investigation in Tianshui area

Parameters validation

Height /m	Length/m	Slope angle /degree	Factor of safety
90.0	140.3	32.7	1.37
80.0	111.6	35.6	1.25
70.0	86.2	39.1	1.15
60.0	63.9	43.2	1.06
50.0	44.9	48.1	1.02
40.0	29.1	54.0	0.98
30.0	16.7	60.9	0.90
20.0	7.6	69.2	1.05

↑ F_s increasing much more than 1.0
 doesn't match the critical slope $F_s=1.0$

Inverse analysis of the shear strength parameters

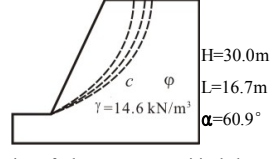


Loess stratum & Parameters

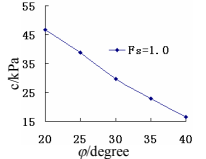
3. Inverse analysis

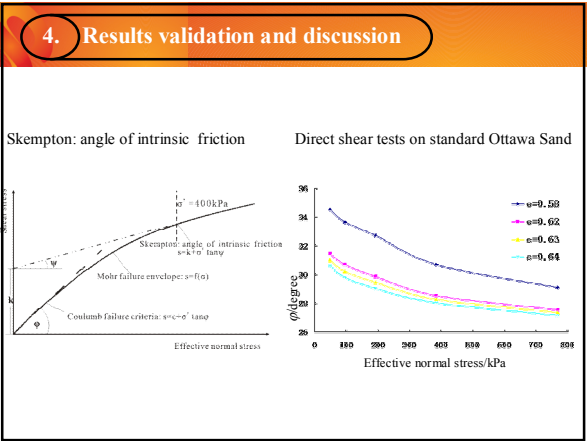
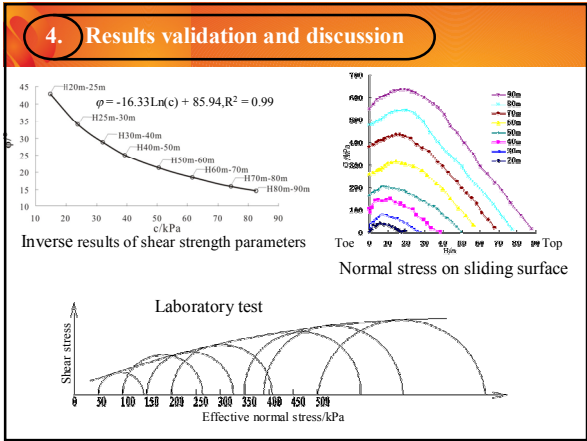
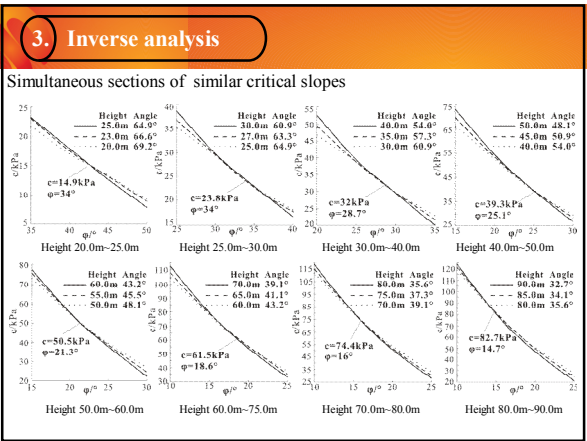
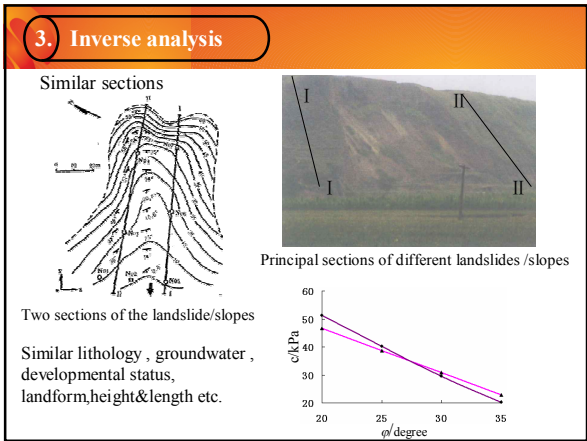
Basis of inverse analysis

$F_s(c, \varphi, \gamma) = 1.0 \xrightarrow{\text{by testing}} F_s(c, \varphi) = 1.0$



Section of a homogeneous critical slope





Thanks for your attention!