

# Progressive failure analysis of slope with strain-softening behaviour based on strength reduction method

## 应变软化边坡渐进破坏分析的强度折减法

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## Main goal

Based on the strength reduction method and strain-softening model, a method for progressive failure analysis of strain-softening slopes was presented in this paper.

## Main method

Strain-softening model,  
strength reduction method

The mutation of displacement at the slope crest is taken as the critical failure criterion

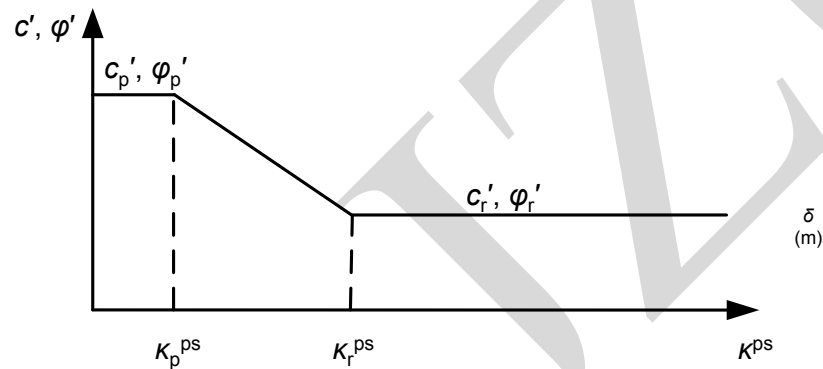


Fig. 1 Strain-softening model

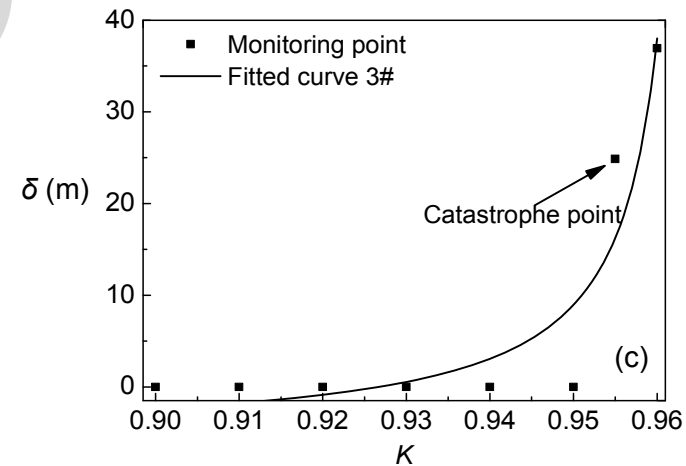


Fig. 4 Relationship between reduction factor and horizontal displacement  
(c) Strain-softening strength

# Computational model and results

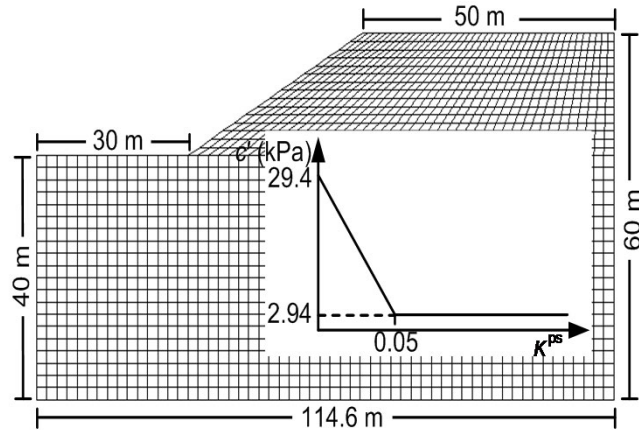


Fig. 3 Calculation model (Zhang and Zhang, 2007)

Table 5 Comparison of results obtained by different methods

Study	Method	Strain-softening strength	Peak strength	Residual strength
Zhang and Zhang, 2007	Sweden	1.014	1.177	0.592
This study	Spencer	/	1.280	0.615
This study	SRM*	0.954	1.259	0.601

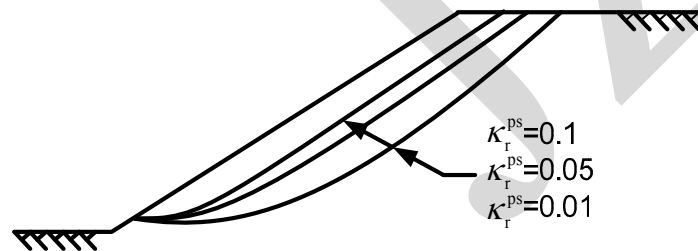


Fig. 7 Relationship between  $\kappa_r^{ps}$  and critical slip surface

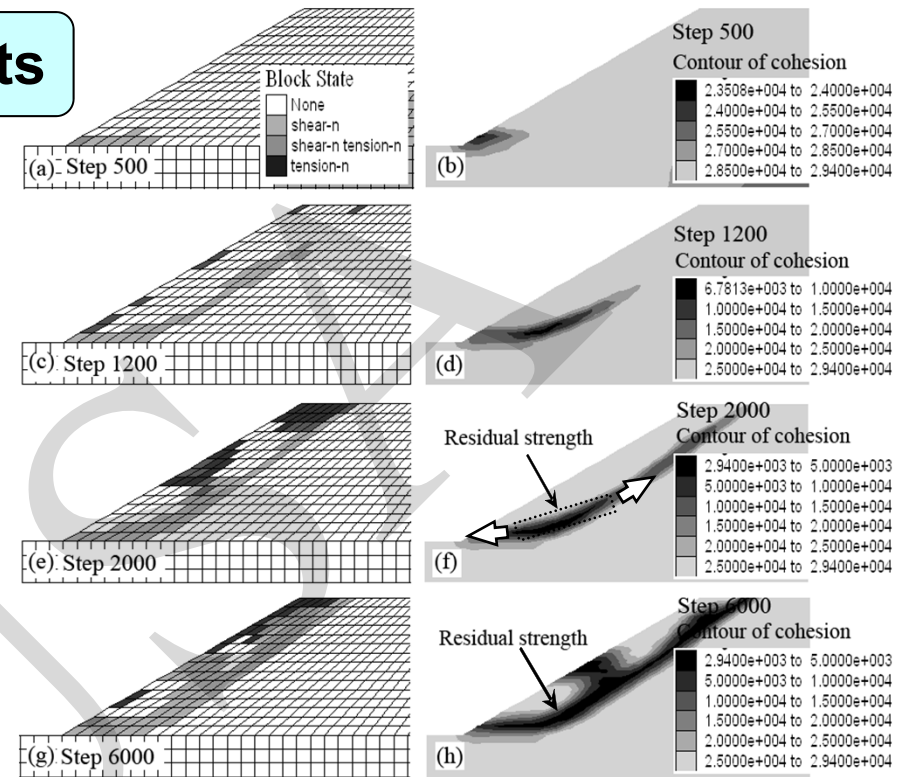


Fig.6 Progressive failure process of the slope

Distribution of failure zone at step 500 (a), step 1200 (c), step 2000 (e) and step 6000 (g); Contour of cohesion at step 500 (b), step 1200 (d), step 2000 (f) and step 6000 (h)

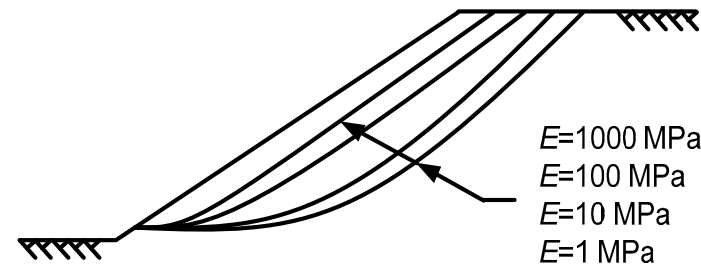


Fig. 8 Relationship between elastic modulus and critical slip surface