



## **Critical slip surface searching method using grid along slope surface**

### **1 J.F. Xue K.G. Gavin**

School of Architecture, Landscape and Civil Engineering

University College Dublin

Earlsfort Terrace

D2, Dublin, Ireland

(Jianfeng.xue@ucd.ie / ph:+353-1-716-7374

In conventional limit equilibrium analysis of slopes as implemented in commercial geotechnical software, the user inputs a best estimate of the region in which they believe the centre of rotation of the critical slip surface lies. Although the software will locate a critical slip surface, this is by no means the slip surface with the minimum factor of safety for the entire slope. Failure to locate the real critical slip surface may arise by miss-identification of the true centre of rotation, or by adopting too large a value for the incremental radius step size. Thus bypassing the critical surface.

To overcome these obvious limitations in searching for the critical circular slip surface, a new approach is proposed in this paper. The method allows the user to establish a multi-layer soil model. The user establishes a grid of search points along the ground surface, any two of which are used to define the shape of the slip surface. By searching along this grid, the program calculates the factor of safety for all possible slip surfaces within the boundary conditions specified and ensures that the critical surface is located.