

## 運用數值模擬進行楔形岩體破壞之敏感度分析

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### 摘要

岩坡類型可分為：(1)平面形(2)楔形(3)圓弧形(4)傾覆形。台灣地區構造活動頻繁，擁有許多斷層節理等構造，這些構造容易促使楔形的岩體發生破壞。針對此情形前人對於楔形岩體穩定性提出兩種不同假定的分析方法，分別是剛塊法(Rigid wedge method)和最大剪應力法(Maximum shear stress method)。物理解釋上，當楔形體為剛體時，滑動面上垂直於滑動方向的剪應力可假定為零來做分析，當楔形體變形性大時，滑動面上垂直於滑動方向的剪應力不可被忽略，而有最大剪應力之假設；令其等於該面之剪力強度。由於真實岩體的性質多介於剛體與變形體之間，前者常會過估安全係數而後者則有低估安全係數的情形。實際上此兩方法正好提供了楔形體安全係數的上下邊界。本研究為了瞭解岩體變形性對滑動面上垂直於滑動方向真實剪應力大小對分析結果的影響，擬使用數值模擬軟體 Flac3D 分析楔形體在不同的變形模數和不同的面角大小的剪應力大小來找出合適的評估方式。經過 Fortran 進行初步分析在滑動面凝聚力為零時，發現對於楔形體滑動線傾沒角較緩時，剛體法和最大剪應力的安全係數差距越大，當塊體滑動沒傾角固定時，面角越小，對於安全係數的敏感程度越高。後續 Flac3D 分析尚在積極進行中。

## **Sensitive study of numerical simulation of wedge failure**

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### **Abstract**

The type of rock slope failure is divided to four parts: (1) planer failure (2) wedge failure (3) circular failure (4) topple failure. In Taiwan, there are highly geological activity that it make a lot of geological structure such as joint, fault and so on which will make the wedge failure happen with high opportunity. To deal with this situation, previous studies provide two analytic methods for the slope of wedge stability: (1) Rigid wedge method (RWM) (2) Maximum shear stress Method (MSSM). From physical aspect, when wedge rockmass is rigid body, the shear stress which is perpendicular to sliding direction will be assumed as zero to analyze. If the wedge rockmass has highly deformable, the shear stress which is perpendicular to sliding direction should not be neglected and assume as maximum shear stress. In addition, because the properties of real rockmass are between rigid body and deformable body, the former usually will overestimate factor of safety, the latter will underestimate factor of safety. In practical, these two methods actually provide the lower and upper boundary of factor of safety. In this study, in order to understand how the deformity of wedge influence the shear stress perpend to sliding direction, we will use Flac3D to find suitable estimating method at different deformation modulus and different dihedral angle. By using Fortan program to preliminary analyze, we found that when the plunge of sliding wedge is gentle, the difference of FS is larger between RWM and MSSM. When the plunge of sliding wedge is fix and dihedral angles are smaller, the more sensitive for FS. The next of analysis by Flac3D is still conducting actively.