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广州科学城岩质边坡稳定性可靠度分析

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摘要　　边坡稳定性问题是边坡工程最关键的问题，如何研究其稳定性也是岩土工程的重点研究课题。把Monte Carlo法引入边坡稳定性分析和评价中，借助传统的极限平衡理论，建立边坡稳定性分析的极限状态函数。运算过程中采用伪随机数的方法生成服从正态分布的抗剪强度参数随机变量，进而求出边坡安全系数、安全系数的可靠度指标和失效概率。与传统的极限平衡方法相比，可靠性分析可以直观地反映边坡稳定的可靠程度及其失效概率，能为边坡工程支护设计提供更为可靠的参数，同时也能为生产提供指导作用。因此，可靠度分析方法是边坡稳定性评价的有效方法，具有广泛的应用前景。

关键词　　工程地质；边坡稳定性；可靠度指标；Monte Carlo法；失效概率

分类号

RELIABILITY ANALYSIS OF ROCK SLOPE STABILITY IN GUANGZHOU SCIENCE CITY

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Abstract
  The slope stability is the most important problem in the slope engineering. How to study the problem is one of the major subjects in geotechnical engineering. The widely used Monte Carlo method is adopted in this paper to analyze and evaluate the reliability of slope stability，which is popular in the geotechnical engineering. Before the simulation is performed，the limit state function is established on the basis of traditional limiting equilibrium theory. During the calculation，the probability theory，mathematical statistics and some other necessary mathematical algorithms are used in the calculation program. The pseudo-random variable will be created by the computer program，and then the reliability index and failure probability of slope can be figured out by the Monte Carlo simulation technique. All the calculation and analysis processes are performed automatically by the computer program designed by Microsoft VC++ program language. Analytical results will be output in the form of charts and tables. The practical application in the reliability analysis of rock slope stability indicates that more effective information about the slope stability can be gained by the Monte Carlo method. The conclusion can be drawn that reliability analysis is a new trend to the slope engineering. Compared with the traditional limit equilibrium method，the reliability analysis can directly reflect the failure probability and degree of reliability of slope，which can provide more reliable parameters for the design of slope engineering and direct the construction. In a word，the reliable analysis method of slope stability is a new and effective method with extensive prospect and will be widely used in the geotechnical engineering.

Key words　engineering geology；slope stability；reliability index；Monte Carlo method；failure probability

通讯作者