

黄土滑塌灾害风险分级系统研究

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SLOPE CLASSIFICATION SYSTEM FOR LOESS COLLAPSE RISK ASSESSMENT

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摘要 基于边坡分级系统的滑坡风险评价,适用于公路或铁路沿线或一定面积范围内多个滑坡的风险评价和对比,为滑坡防治优先排序提供依据,国内目前使用该方法的还较少。黄土滑塌所处的地质环境条件具有共性,而制约滑塌发生的主导因素又有其个体差异性,因此评分分级法不失为一个评价黄土滑塌灾害风险的好办法。本文选取了陕西省延安市东北部一个约3.2km²的黄土沟壑区为研究对象,参考国外铁路公路沿线的岩崩分级系统及香港土质边坡分级系统,结合黄土地区的实际情况,在前期已有的评价指标和权重研究的基础上,使用水文法划分评价单元,对危险性的22个评价指标划分4档评分标准,对危害性的15个评价指标划分5档评分标准,综合危险性和危害性评定结果,设定风险分级矩阵判定表,由此设计了黄土滑塌灾害风险评分系统。运用该系统完成了37个黄土斜坡单元的风险评分和分级,评价结果表明,各单元黄土滑塌灾害风险高、中、低、很低的分布并无明显规律,仅与局地的地质条件和承灾体分布有关;风险分级呈现“中间高两头低”的现象,即“风险高”和“风险很低”的面积较少(占27%),而处于中间状态的“风险低”和“风险中”的面积较多(占73%)。该分级系统适用于黄土滑塌类地质灾害的风险半定量评价。

关键词: 黄土滑塌 风险 分级系统 半定量评价

Abstract: The common slopes classification systems are suitable for a road, railway or a certain area landslide risk assessment, which aims to ordering the priority of the landslide count-measurements. The study of using slope classifying system to assess the landslide risk is rare in open literature. The environmental conditions of loess collapse are similar, whereas the controlling factors to the collapse have differences at individual slopes. So the scoring and grading are a good way to assess the risk of the loess collapse. This paper selects a loess ravine area of 3.2 km² in suburban district of Yanan, Shannxi, China as study area. It is implemented on the basis of analysis to the assessing factors and their weights, which have been done in previous works. It uses the hydrology methods to zone the assessing units, sets four grading standard for the hazards factors and five grading standard for the consequence factors, and synthesizes the hazards results and the consequence results to set the risk judge matrix. Accordingly, it designs the slope classifying system for the loess collapse risk assessment. Applying this classification system at 37 loess slope units, the result shows that the collapse risk level of each unit has not a regular distribution. It only depends on the local geological conditions and the elements in the risk. The statistics of units risk shows phenomena of "much in middle and less in both ends", which means the area of "high risk" and "very low risk" is very less (only 27%), whereas the area of "moderate risk" and "low risk" is much more (73%). This classifying system can be used as a semi-quantitative method to assess the collapse risk at the loess slopes.

Key words: Loess collapse Risk Classifying system Semi-quantitative assessment

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