大型顺层岩质滑坡渐进破坏地质力学模型与稳定性分析

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GEOMECHANICAL MODEL OF PROGRESSIVE FAILURE FOR LARGE CONSEQUENT BEDDING ROCKSLIDE AND ITS STABILITY ANALYSIS

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摘要	参考文献	相关文章

摘要 大型顺层岩质滑坡广泛存在于自然界中，是滑坡的重要类型之一，也是滑坡领域关注与研究的重点。根据滑坡滑面发展形态，将顺层岩质滑坡划分成两大类：前进式渐进破坏模式和后退式渐进破坏模式。从力学角度揭示顺层岩质滑坡渐进破坏过程的本质是滑坡力学参数弱化的过程。具体体现在滑带本构方程中为初始剪切刚度的降低。由此，定义弱化后滑带的剪切刚度与初始剪切刚度比值为滑带弱化系数，并引入S型曲线表述滑带弱化系数空间特征。在总结大型顺层岩质滑坡特点的基础上，提出渐进锁固力学模型，同时给出该模型的数学表达式。该模型能很好地体现滑坡渐进破坏过程中滑带力学参数的时效性及空间变异性特点。最后，给出该地质力学模型下渐进破坏过程中斜坡稳定性计算公式及步骤，并应用于武隆县鸡尾山滑坡中，分析其临滑前滑坡稳定性变化情况。

关键词： 边坡工程　顺层岩质滑坡　鸡尾山滑坡　渐进破坏　滑带本构方程　S型曲线

Abstract： Large consequent bedding rockslides widely exist in nature，which are one of the major types of landslides and have been the focus in landslide research area. Based on development morphology of sliding surface，consequent bedding rockslide is divided into two categories：advancing consequent bedding rockslide and regressive consequent bedding rockslide. It reveals from the mechanical point that the nature of progressive failure of consequent bedding rockslide is weakening process of mechanical parameters of landslide. It reflects in the constitutive equation of sliding zone is the reduction of the initial shear stiffness. Thus，ratio of the shear stiffness of weaken sliding zone to initial shear stiffness is defined as the weakening coefficient of sliding zone；and the S-shaped curve is introduced to depict the spatial characteristics of the weakening coefficient in sliding zone. Based on the characteristics of large consequent bedding rockslide，the progressive-locking mechanical model is proposed；and its mathematical expression is given. The model could well reflect the characteristics of the timeliness and spatial variability of mechanical parameters of sliding zone in the progressive failure process of the landslide. Finally，formulas and steps for calculating the stability of progressive failure landslide under this model are put forward. The model is applied to the case of Jiweishan landslide in Wulong county to analyze its stability before sliding.

Keywords： slope engineering　consequent bedding rockslide　Jiweishan landslide　progressive failure　constitutive equation of sliding zone　S-shaped curve

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